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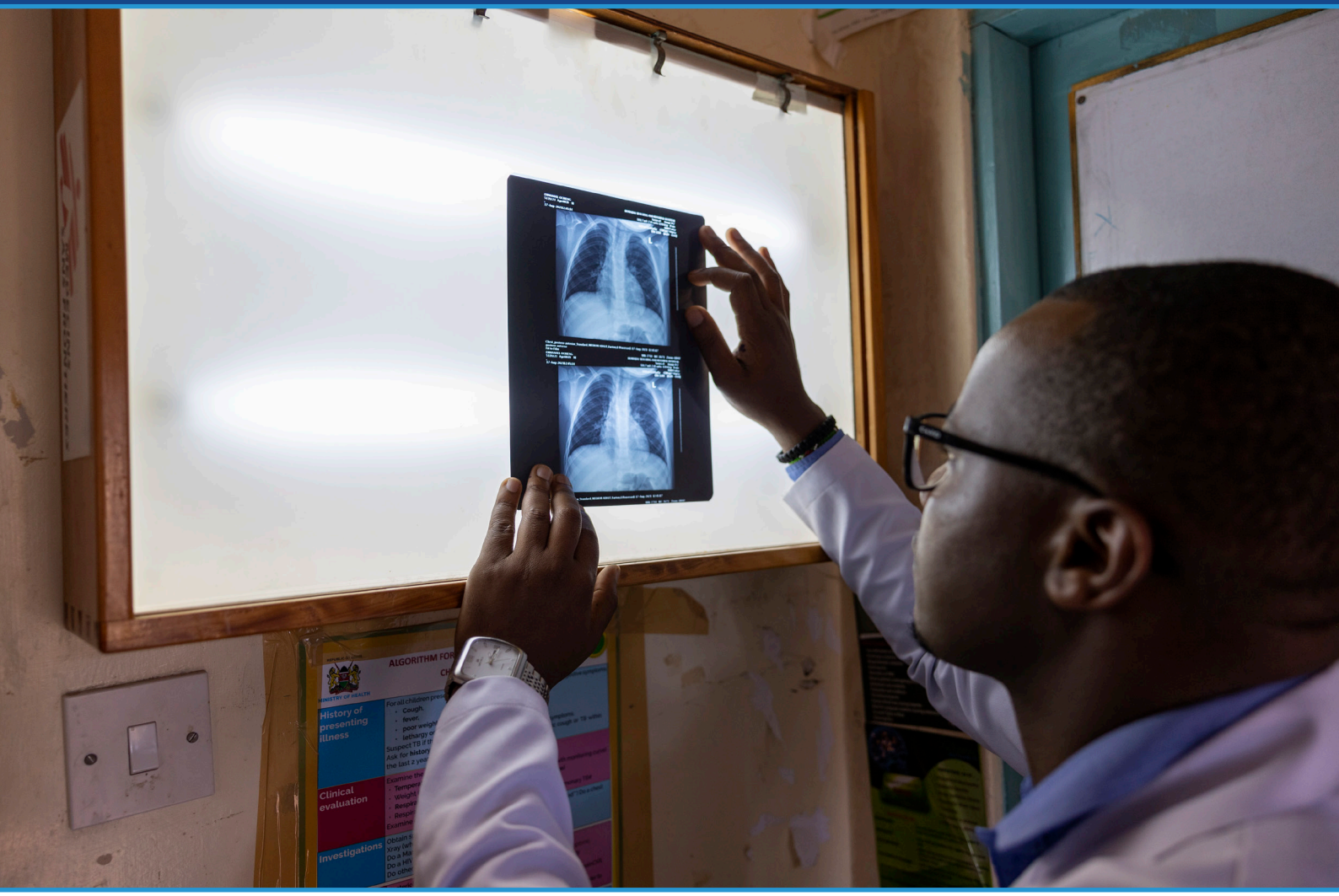
DOCUMENTATION OF LESSONS LEARNED FROM AFRICAN COUNTRIES SUPPORTED BY THE CATALYZING PEDIATRIC TB INNOVATIONS (CAP TB) PROJECT



Elizabeth Glaser Pediatric AIDS Foundation
Fighting for an AIDS-free generation

Unitaid
Innovation in Global Health

REPORT PREPARED BY

Dr. Jeannine Uwimana Nicol[1], Maude Berset,[2] Martina Casenghi,[2] and Mikhael de Souza[2]

NOTES

Photos: Kevin Ouma for EGPAF, 2021.

While EGPAF strives to use photos which accurately depict the actions, topics, or populations referenced, unless specifically indicated, the photographs in this document do not imply program participation, health status, attitude, behavior, or action on the part of persons who appear therein.

[1] University of Stellenbosch, Faculty of Medicine and Health Sciences, University of Rwanda

[2] Elizabeth Glaser Pediatric AIDS Foundation Catalyzing Pediatric TB Innovations HQ project team

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ACRONYMS

CaP TB	Catalyzing Pediatric TB Innovations
CHWs	community health workers
CHVs	community health volunteers
CXR	chest X-ray
EGPAF	Elizabeth Glaser Pediatric AIDS Foundation
ERB	ethical review board
HCWs	health care workers
INH	isoniazid
IPT	isoniazid preventative therapy
PHC	primary health care
MoH	Ministry of Health
TB	tuberculosis
TPT	TB preventive therapy
TOT	training of trainers

EXECUTIVE SUMMARY

The Catalyzing Pediatric TB Innovations (CaP TB) project was one of the Elizabeth Glaser Pediatric AIDS Foundation (EGPAF) projects funded by Unitaid. It aimed to develop and implement models to improve case detection for active pediatric TB disease as well as access to TB preventive therapy (TPT). This project was implemented for four years (2017–2021) in India and nine sub-Saharan African countries: Cameroon, Côte d'Ivoire, Democratic Republic of the Congo, Kenya, Lesotho, Malawi, Tanzania, Uganda, and Zimbabwe.

This documentation of lessons learned on the CaP TB project aims to identify commonalities across countries for each intervention, explain how each intervention was implemented in the different country contexts, indicate what worked well and what didn't, and determine what recommendations could be made to scale up the model in the pilot countries and replicate the project elsewhere. A qualitative approach was the most suitable method of inquiry to document the key lessons learned.

A purposive sample of 10–15 key informants at each country level was identified in consultation with the global and country EGPAF CaP TB project teams. A total of 90 qualitative interviews, including in-depth interviews and group discussions, were conducted from October 24, 2021 to November 10, 2021. These interviews were conducted virtually using Zoom and WhatsApp. A verbal consent from the participants was obtained prior to the recording of the interviews.

Interviews were conducted in English and French and transcribed verbatim in English; those that were conducted in French were first translated and then transcribed in English. All transcripts were then uploaded into Atlas.ti for analysis using a thematic approach.

The findings of this documentation show that improvement of pediatric TB programmatic management and delivery of health services can be achieved across different countries and settings. Strong leadership from national TB program (NTP) managers, facility managers, and health care providers is paramount. Proper advocacy at the community level involving celebrities (as in Côte d'Ivoire), community leaders, and former TB patients and development of contextual information, education, and communication materials on childhood TB can increase the uptake of pediatric TB services in African countries and thus contribute to increased pediatric TB case finding, treatment, and prevention.

There are some critical health systems factors and beneficiary factors that must be considered to improve TB prevention and management in children. The following are needed: increased health care worker and community health worker capacity, additional human resources to ease the workload of clinicians and ensure that some functions of TB case finding are performed by lay workers, financial support for both patients and parents/guardians, adequate supply and management of commodities (drugs and equipment for diagnosis), and increased levels of awareness of parents/caregivers about advanced sample collection for TB in children, among other improvements. Hence, for NTP managers and health care providers to capitalize on lessons learned from the CaP TB project, a proper continuation plan with secured funding sources should be developed. The plan should address the challenges identified by the CaP TB project, enact the recommendations for improvement, and strengthen the health systems at large, especially in the context of the global pandemic of COVID-19. In this way, countries will be able to sustain the outcomes of the CaP TB project and improve childhood TB prevention and management.

1. Introduction

Through the Catalyzing Pediatric TB Innovations (CaP TB) project, the Elizabeth Glaser Pediatric AIDS Foundation (EGPAF) supported the rollout of innovative models of care to improve pediatric TB case finding, diagnosis and treatment of active TB disease, and latent TB infection in India and nine sub-Saharan African countries: Cameroon, Côte d'Ivoire, Democratic Republic of the Congo, Kenya, Lesotho, Malawi, Tanzania, Uganda, and Zimbabwe. This four-year project (2017–2021) was funded by Unitaid.

The successful rollout of the project required the development of strategies adapted for each country and specific context to improve access to TB care for children by decentralizing the management of pediatric TB into the lower levels of the health system and integrating pediatric TB care in different child health entry points, including HIV clinics, maternal and child health clinics, nutrition clinics, and outpatient departments. In addition, the project aimed to develop and implement sustainable models for household contact investigation to improve early case detection for active TB disease as well as increased access to TB preventive therapy (TPT).

2. Methodology

The purpose of this report on the lessons learned from the CaP TB project is to explain how the various interventions were implemented in each context, identify commonalities across countries for each intervention, indicate what worked and didn't work, and determine what recommendations can be made to replicate the model elsewhere. A qualitative approach was the most suitable method to document the key lessons learned. A systematic approach was used to document these lessons through the following steps:

1. **INTRODUCE** the lessons learned documentation process at the country level.
2. **REVIEW** project documents.
3. **DEVELOP** data collection tools (i.e., interview guides).
4. **COLLECT** data from documents provided by EGPAF as well as group and individual interviews.
5. **TRANSCRIBE** and analyze data.
6. **DOCUMENT** and report findings.

2.1. SELECTION OF TOPICS, COUNTRIES, AND INFORMANTS

Six topics were identified for documentation based on the interventions implemented. EGPAF purposely established a matrix linking key topics of investigation with the various project countries as illustrated in Table 1.[1]

[1] As a note, interviews were only conducted in the nine countries located in the African continent. No interviews were conducted regarding implementation in India, as the context was too different to allow for finding commonalities and optimal cross-application.

The selection of countries was based on EGPAF's understanding of the project implementation, and monitoring and evaluation (M&E) data collected throughout the project. The objective was to ensure a balance between contexts where the proposed interventions could be seamlessly implemented—possibly though different approaches—and other contexts where challenges were met.

In consultation with the EGPAF global CaP TB project team, we identified a CaP TB country focal point person (EGPAF employee) in each participating country whose role was to facilitate the identification of key stakeholders to be interviewed, pilot the data collection tools, and schedule interviews.

The identification of key respondents from both a facility level and a national level was done in collaboration with the country focal point persons and the country EGPAF CaP TB project team. The selection was refined by the consultant following an initial discussion and document review. A purposive sample of 10–15 key informants was identified in each country. A total of 122 key informants were interviewed, including at least one CaP TB country director or technical director in each of the participating countries, the EGPAF country project focal point, one person from the national TB program (NTP), representatives from civil society organizations (CSOs) contracted by the project for specific health services, and Ministry of Health (MoH) health facility staff from the sites supported.

TABLE 1. Pediatric TB Topics by Country

Topics	Countries	Topics	Countries
Training and Supervision	Côte d'Ivoire Kenya Malawi Uganda Tanzania Zimbabwe	**Contact Investigation**	Cameroon Côte d'Ivoire Democratic Republic of the Congo Kenya Lesotho Malawi Uganda Tanzania
Facility-based TB case-finding	Cameroon Côte d'Ivoire Democratic Republic of the Congo Kenya Tanzania Uganda	**TPT and introduction of shorter regimens**	Cameroon Kenya Lesotho Tanzania

Topics	Countries	Topics	Countries
Diagnosis of pediatric TB	Cameroon Côte d'Ivoire Democratic Republic of the Congo Kenya Lesotho Malawi Tanzania	**TB/HIV integration**	Cameroon Lesotho Malawi Tanzania Uganda

2.2. DOCUMENT REVIEW PROCESS

Existing country reports (such as the report on the pilot phase, PowerPoint presentations, and others) were reviewed. These helped with understanding the project, assessing the project-planning process, and better preparing for the documentation of lessons learned. The first step involved online Zoom meetings with key stakeholders at the country level to discuss the aim, scope, and objectives of the proposed documentation process.

2.3. DEVELOPMENT OF DATA COLLECTION TOOLS

Guides for semistructured interviews were developed based on the topics listed in Table 1. The aim of the interviews was to gather information about the implementation process, to identify the good practices of the CaP TB project as well as challenges encountered and lessons learned, and to determine recommendations for effective implementation of these interventions. The interview guides were developed in coordination with the EGPAF global CaP TB project team and shared with the EGPAF country management teams for reference and approval.

2.4. ETHICS APPROVAL

The interview guide was constructed in such a way that interviewees were asked only about facility-level data on services and not asked about individual or personal information. As a result, we anticipated that this process would not need any specific ethical review board (ERB) approval. EGPAF country teams assessed whether submissions should be made to the countries' ERBs or whether administrative approval should be requested from MoH representatives. In addition, EGPAF country teams sought to confirm with their contacts at each respective MoH and/or NTP that this data collection would be allowed.

Authorizations were given by all health authorities, and none of the participating countries required a national ERB approval due to the low risk of this documentation exercise.

Individual data were collected to allow contact with participants but were not used at all in the analysis. The database did not include any identifiers. No incentives or remuneration were given to the facility personnel who provided data for this evaluation. Participants had the right to refuse to participate in interviews and if they did so, a replacement interviewee or replacement facility was selected. Interviewee consent was sought before recording began.

2.5. DATA COLLECTION PROCESS

Before data collection commenced, the interview guides were piloted in English and French in Kenya, Malawi, Cote d'Ivoire, Cameroon, Lesotho, and Zimbabwe to ensure that the questions were clear and allowed the collection of the desired data. The pilot informed the final data collection tools. A total of 90 qualitative interviews, including 57 in-depth individual interviews and 33 group discussions, were conducted from October 24 to November 10, 2021, in the nine African project implementation countries. Table 2 highlights the distribution of individual interviews and group discussions conducted per country. The interviews were conducted virtually using Zoom. WhatsApp was used in Cameroon and Côte d'Ivoire as it was the most convenient platform for the participants in these countries; its use, however, was not conducive most of the time, especially for recording purposes. Verbal consent was obtained from the participants prior to recording the interviews. All consented to be recorded. The interviews were conducted in English and French. The data were collected until saturation was reached for each topic identified.

TABLE 2. Summary of Qualitative Interviews Conducted

Country	Individual Interviews	Group Discussions	Total number of Interviews Conducted	Total Number of People Interviewed
Cameroon	17	1	18	19
Democratic Republic of the Congo	5	2	7	11
Côte d'Ivoire	12	4	16	19
Kenya	15	5	20	25
Lesotho	0	6	6	10
Malawi	1	3	4	7
Tanzania	0	8	8	13
Uganda	6	2	8	13
Zimbabwe	1	2	3	5
Total	**57**	**33**	**90**	**122**

2.6. DATA ANALYSIS

All interviews were transcribed verbatim into English; those conducted in French were first translated and transcribed into English using Microsoft Word. All transcripts were then uploaded into Atlas.ti for analysis using a thematic approach. Predetermined themes were identified based on the identified six topics of interest for the documentation of lessons learned from the implementation of the CaP TB project. Predominant themes and subthemes are presented in Annex 1.

2.7. LIMITATIONS

This analysis is not free of limitations. Data collection was done during the COVID-19 pandemic and fieldwork could not be done due to travel restrictions and limited access to health facilities. Hence, qualitative interviews were conducted remotely using virtual platforms such as Zoom and WhatsApp. These interviews were conducted in such a way that the interviewer could not observe the facial or bodily expressions of the participants since most video cameras were off due to poor internet connectivity. In addition, the CaP TB intervention topics were not assessed/documented across all the nine African countries supported by EGPAF although all nine supported countries had implemented similar interventions. This may have resulted in a selection bias and limited the generalizability of the findings.

3. Key Findings

The key findings of the documentation of lessons learned on CaP TB project are structured in line with the predominant themes from each of the topics covered during the data collection. These themes include (1) training and supervision, (2) facility-based TB case finding, (3) diagnosis of pediatric TB, (4) contact investigation, (5) TPT and the introduction of shorter regimens, and (6) integration of TB/HIV services.

3.1. TRAINING AND SUPERVISION

Participants from six project countries—Côte d'Ivoire, Kenya, Malawi, Tanzania, Uganda, and Zimbabwe—were interviewed on the topic of trainings and supervisions. The countries were selected as they presented a variety between on-site and off-site trainings, as well as specific setups to provide trainings.

3.1.1. TRAINING PROCESS

The findings on the training and supervision highlight that most of the countries developed their training materials based on existing national training materials, the online International Union Against Tuberculosis and Lung Disease materials, and World Health Organization (WHO) training materials, with the exception of Uganda, which had already developed materials for pediatric TB that were up to date.

The findings show that adaptation of the content of training materials took place alongside the implementation process of the CaP TB project based on the training gaps identified during supervision visits. In Kenya, Uganda, and Tanzania, the adaptation of the training materials was only done with the introduction of a new TPT regimen (3RH, a short-course TPT regimen), whereas in Côte d'Ivoire, the training modules were updated gradually based on training needs or gaps identified during supervision visits.

Most of the countries used both on- and off-site training except for Zimbabwe and Côte d'Ivoire that used only off-site training of health care workers (HCWs). In most of the countries the training process of HCWs started with a training of trainers (TOT) in which HCWs were trained off-site (at a hotel, conference hall, tertiary hospital, etc.). The selection of HCWs was carried out by the MoH and NTP staff in collaboration with country CaP TB EGPAF team and these HCWs were expected to cascade the training on- or off-site.

It is important to note that Uganda was the only country that reported having a well-organized training system embedded in the MoH structure, whereby the MoH had dedicated trainers at the provincial and district levels. These trainers are the ones who planned and conducted both TOT trainings and on-site training with the support from EGPAF team. Table 3 summarizes the trainings provided within the scope of the project.

TABLE 3. Health Personnel Training

Type of Training	Number of Health Personnel (including Lay Workers) Trained (2017–2021)
Training of trainers	830
Pediatric TB management for HCW (including screening, diagnostic, treatment, first line fixed dose combination (FLDC))	7,171
Sample collection procedures for HCW	5,221
Preventive therapy for HCW	5,536
Single-formulation use for HCW	3,742
Contact tracing for CHW	2,137
Screening, treatment adherence and TPT for CHW	5,470
Chest X-ray reading and interpretation	3,241
Sample processing—lab-based diagnostic	2,390
Stock monitoring	1,008
M&E/TIPPI (data collection tools)	4,526
Data clerk training	217

Source: EGPAF CaP TB project (2017–2021)

> *Selection of participants to attend the trainings "was done in collaboration with [the] district health management team and us [EGPAF team] together to see who has the best qualification and who can cascade the training at the facility level. So, it was a combined effort from us and really, [the] district health management team who oversee all health workforce at the district level."*
>
> —Malawi participant

Community health workers (CHWs) and other lay workers such as cough monitors were trained together with HCWs, for trainings focused on elementary information about the burden of TB in children, prevention of TB infection, and community-oriented messaging and contact investigation. Other trainings on more clinical topics were provided to HCW only. This was the case in all countries surveyed on this topic and was well illustrated by participants:

> *"For the community health workers, we gave them a general knowledge on TB, but we insisted especially on the message, the communication that there must be in the community, the follow-up of the patients, the research of contact cases in the community."*
>
> —Côte d'Ivoire participant

"Because cough monitors were lay cadres who volunteered, so we could not give them the content for clinicians. So, they were just trained on basic information on TB, on how to conduct TB screening in children. So, the rest of the content, the childhood TB content was specifically for clinicians and nurses."

—Malawi participant

3.1.2. ADVANTAGES AND DISADVANTAGES OF TRAINING MODELS

The findings show that the advantages of conducting training on-site outweigh the advantages of off-site training. On-site training led to a wider coverage of HCWs in terms of reach and lower cost, and it did not result in a shortage of HCWs as a result of taking HWCs out of the health facilities to attend off-site training. Due to work obligations, it was not possible for some HCWs to attend off-site training.

Other advantages of on-site training mentioned by the participants included the possibility of conducting practical training on topics such as advanced sample collection in children and the reading and interpretation of chest X-rays (CXRs).

"The other thing that I want to add in terms of advantage of on-site compared to off-site training is that children and other procedures were easy to demonstrate. Demonstration is very easy at the facility level compared to off-site. So, we can demonstrate directly to children who are screened for TB at the entry point."

—Tanzania participant

Uganda, Kenya, and Malawi prioritized an on-site training approach throughout the duration of project implementation. Malawi specifically prioritized subjects that were critical in building capacity for the management of childhood TB in their training program.

Participants indicated that some of the disadvantages of off-site training included the cost for accommodation of HCWs and the short duration for covering both theoretical and practical sessions, especially for subjects such as diagnosis and advanced sample collection for which trainees had to practice directly on patients.

In addition, in settings with limited human resource capacity, off-site trainings were not suitable because this led to interruption of the provision of health care services.

"The challenges were sometimes, when you mobilize the only human resource to come and train, this somewhat created some interruption of health care services at the health center."

—Côte d'Ivoire participant

However, some of the participants were of the view that off-site training had some advantages, particularly by capitalizing on maximum attention of HCWs with no interruption to attend to other duties (as expressed by one participant in Côte d'Ivoire). As a result, Côte d'Ivoire and Zimbabwe focused on off-site trainings in cascading their training after the TOT and even for refresher trainings (conducted as a result of the outcomes of supervision visits).

Also, for the Zimbabwe context, the off-site model was considered an incentive for HCWs, as they would get per diem allowances that made the trainings more appealing given the economic conditions of the country. In addition, the off-site model is traditionally used in Zimbabwe.

Interestingly, Zimbabwe had a model whereby facilities with high volumes of patients were used as training hubs to conduct subsequent trainings. HCWs were sent to these training hubs to be trained and do their practicum.

In most countries, findings show that a combination of off-site trainings for TOT and on-site training to cascade knowledge and provide training directly to HCWs was useful. The choice of training modalities for HCWs, including CHWs and lay workers, should be based on contextual issues such as feasibility, acceptability, and coverage.

3.1.3. SUPERVISION OF HEALTH CARE WORKERS

Most participants indicated that supervision visits were conducted on a monthly, bimonthly, or quarterly basis, depending on need, by mentors from EGPAF or a combination of EGPAF and MoH staff supporting the CaP TB project, with the exception of Uganda, where supervision was conducted by district trainers.

> *"So, we used to go there for supervision at least once a month, but sometimes it would depend on the findings from the data. If the data show some discrepancy, you may go sometimes twice a month to address the issues that you see are missing."*
>
> —Tanzania participant

The tools used during supervision visits included supervision checklists and quarterly TB data. The supervisions allowed for correction of possible suboptimal implementation of the elements discussed during trainings at the facilities. The outcomes of the supervision visits were an indicator of what needed to be planned for training.

3.1.4. CHALLENGES RELATED TO TRAINING AND SUPERVISION

The findings highlight several challenges related to the provision of training and supervision of HCWs, including staff turnover, HCW retention, HCW attitudes, socioeconomic factors, and intermittent supervision capacity, among others. The key challenges that cut across all participating countries included staff turnover and retention, which had a negative impact on the upskilling/training process for HCWs. Additionally, in some settings—such as Zimbabwe and Kenya—the attitude of HCWs was a problem in the sense that those who did not participate in off-site training were not keen to participate in subsequent trainings provided on-site by their peers after their return. This could be explained by socioeconomic circumstances, due to which HCWs preferred off-site trainings for the incentives.

Other challenges highlighted by participants include a time lag between training and supervision sessions such that supervision was not being organized close enough to the initial training. This affected the performance of certain HCWs, particularly newly recruited health personnel. Additionally, the COVID-19 pandemic delayed training of scale-up sites and hampered coaching and supervision.

Another challenge reported by the participants, particularly in Côte d'Ivoire and Tanzania, was that those who provided training were not always the ones conducting the supervision visits and thus supervision is not based on what was taught in class.

3.1.5. LESSONS LEARNED AND RECOMMENDATIONS ON TRAINING AND SUPERVISION

- On-site trainings have the potential to reach a wider range of HCWs with minimal service interruptions in the health facilities, reduce costs, and make it easier to conduct practical sessions.
    - Modalities for training HCWs should be chosen based on contextual issues such as feasibility, acceptability, and coverage.
- Supervision tools and quarterly TB data were found to be useful in assessing the competencies of HCWs and CHWs, identifying training needs, and providing timely interventions for identified gaps.
- Continued coaching and mentorship of HCWs and CHWs contributed to the enhancement of clinical confidence of HCWs in managing childhood TB and a decreased loss to follow-up of clients through community support.
    - Refresher training is key in providing continued learning development for clinicians.
    - Continuity of coaching should be incorporated in the capacity-building plan for HCWs in order to allow sustainability in the quality care provided.
    - Coaching and sharing experiences during supervision meetings should be encouraged to increase the chances of success.
- Using dedicated trainers and mentors from MoH was found to be a cost-effective and sustainable approach for conducting and cascading trainings and providing supervision because the trainers were existing MoH staff who specialized in training.
    - Involving national counterparts is an important part of securing the sustainability of the intervention.
    - Synchronizing training and supervision visits by ensuring that the same people are training and supervising is vital to success.

3.2. FACILITY-BASED TB CASE FINDING

Participants from six project countries (Cameroon, Côte d'Ivoire, Democratic Republic of the Congo, Kenya, Tanzania, and Uganda) were interviewed about the topic of facility-based TB case finding. These countries were selected as they provided a useful range and mix of health system structures and organizations with different levels of decentralization of pediatric TB services preexisting in the standard of care. They were also selected

based on the variety of strategies they adopted to integrate TB screening in different child health entry points, the challenges they faced, and the various mitigations they put in place to increase HCWs' motivation to increase the coverage of pediatric TB in different child health entry points.

Similar activities were undertaken in all the participating countries, although there was a certain degree of variation in activity implementation design related to TB case finding in children. These activities ranged from mapping child entry points, defining appropriate flow for child screening, ensuring proper documentation by introducing intensified case finding (ICF) screening forms at the site level, reducing HCW workloads by hiring lay workers to be cough monitors or "community linkage facilitators" that conduct screenings of children in waiting areas and/or triage and escort patients to the doctor.

The project trained most of the HCWs, lay workers such as cough monitors, and CHWs and community health volunteers (CHVs)[2] on pediatric TB screening. Screening for TB symptoms was conducted systematically and, regardless of the level of care (primary health care or district or tertiary hospital care). TB screening was offered in all entry points attended by children, especially non-TB entry points in project health facilities such as outpatient departments and HIV, maternal and child health, and nutrition clinics. Screenings were conducted by either doctors, nurses, cough monitors, or other lay workers depending on the availability of HCWs and the level of care, as expressed by one of the participants:

> *"It was the nurse who screened children up to the age of 14. Nurses were doing the initial screening and passed the files to the doctor. If the screening was positive, the doctor filled in the medical file, did a clinical examination, and used the diagnostic algorithm when a child was presumed to have TB. This was extended to adults because it allowed us to see if an adult had a positive screening, which allowed us to look for TB, and in turn allowed us to go and find the contact children."*
>
> —Cameroon participant

In most countries, additional staff dedicated to TB screening—such as cough monitors or community linkage facilitators—were placed at key entry points. These support staff were either paid directly by EGPAF or through funding allocated to contracted nongovernmental organizations (NGOs) or civil society organizations (CSOs). The payments provided to these support staff were, in most cases, limited to reimbursement of incurred expenses.

Project findings disseminated at the 2020[3] and 2021[4] International Union Against Tuberculosis and Lung Disease world conferences show that systematic screenings of TB at all entry points with the support of a cough monitor or community linkage person provide a critical contribution to the increase in the total number of children diagnosed

[2] In Côte d'Ivoire and Democratic Republic of the Congo, most volunteers were former TB patients.

[3] Kakayeva S, Lemaire J-F, Casenghi M, Cohn J, CaP TB TIPPI Study Team. Thinking outside the (TB) box: Intensified pediatric-TB case-finding in non-TB entry points in nine sub-Saharan countries. Oral abstract session OA-23-643-23 at: 51st World Conference on Lung Health of the International Union Against Tuberculosis and Lung Disease; Oct. 23, 2020; online. https://wclh2020.abstractserver.com/WCLH2020_abstract_book_high.pdf. Accessed July 29, 2021.

[4] Casenghi M. Closing the paediatric TB detection gap: where can we find the missing children? Symposium abstract at: 52nd World Conference on Lung Health of the International Union Against Tuberculosis and Lung Disease; Oct. 19–22, 2020; online. https://conf2021.theunion.org/pdfs/UNION2021_Abstracts_High.pdf. Accessed July 27, 2022.

with TB through the project. In areas where TB screening was already taking place, the CaP TB brought new tools (e.g., gastric aspiration tubes, recording tools, TB screening tools, etc.) to strengthen TB case detection in children.

Most of the participants expressed that the factors that contributed to improvement of uptake in TB symptom screening in non-TB entry points included training and supervision support given to HCWs, recording tools that led HWCs and lay workers to systematically screen for TB symptoms in children, and the addition of lay CHWs and CHVs to support screening in non-TB entry points.

In addition, incentives provided to HCWs through performance-based financing mechanisms increased systematic screening. The latter was reported in Cameroon:

> *"The project trained all nurses to do the screening, but some were responsible for doing so. Despite the training, some nurses were afraid to screen to avoid contamination. Therefore, the hospital offered an incentive to diligent nurses involved in TB screening. This incentive was monthly. It did measure by the number of screened and the feedback we received from the families. This incentive will continue to be provided after CaP TB project."*
>
> —Cameroon participant

3.2.1. CHALLENGES RELATED TO TB CASE FINDING

The key challenges encountered by participants included increased HCW workloads and parent/guardian lack of knowledge about TB transmission (often due to belief that children can't carry TB bacteria) and lack of transportation money for taking children to the hospital for further clinical assessment. Some of the participants felt that their workloads increased due to additional TB-screening tasks, particularly at non-TB entry points.

> *"TB screening was a bit of challenge especially in non-TB entry points such as HIV clinic. Sometimes, because of high volume of HIV patients, patients end up by not being screened of TB symptoms. We thought we could get a lot of these cases through this entry point, but as these people [HCW from HIV entry points] don't think about it often, we ended up by missing a lot of children."*
>
> —Cameroon participant

3.2.2 LESSONS LEARNED AND RECOMMENDATIONS ON TB CASE FINDING

- Adequate mapping of child entry points and proper screening for TB symptoms contributed to pediatric TB case finding.
- Integration of pediatric TB screening in non-TB entry points is feasible and improves identification of pediatric presumptive TB cases and, subsequently, increases TB case detection.
    - Regular training of staff is needed—some HCWs are not convinced that TB symptom screening should be done routinely.
- The introduction of new screening and recording tools prompted HCWs and CHWs to conduct more systematic screening.

- The provision of supportive staff such as cough monitors and volunteers was perceived as a useful intervention to ease the workload of HCWs and improve TB case finding in children.
- TB screening of children can be performed by lay workers such as CHWs, volunteers, and other staff when appropriate and user-friendly screening tools are made available.
- Systematic screening may be perceived as additional work by some HCWs, and it is important to identify challenges and seek ways to mitigate them, including the following:
    - Involve the management authorities of the health facility or district to help find ways of motivating HCWs to systematically screen for TB, especially at non-TB entry points.
    - In countries where a performance-based financing approach is used, it could be leveraged as an incentive for HCWs to improve TB case finding.

3.3. DIAGNOSIS OF PEDIATRIC TB

Participants from seven countries—Cameroon, Côte d'Ivoire, Democratic Republic of the Congo, Kenya, Lesotho, Malawi, and Tanzania—were interviewed about the diagnosis of pediatric TB. Countries were selected to include a range of different health system structures, different preexisting approaches to pediatric TB diagnosis as part of the standard of care (primary focus on clinical diagnosis vs. bacteriological confirmation), different abilities to effectively implement sample collection procedures and provide access to Xpert testing, different solutions put in place to support the procurement of sample collection material, and access to CXR testing.

3.3.1. CLINICAL DIAGNOSIS

To improve the clinical diagnosis of TB in children, clinicians received training on clinical diagnosis of TB in children and HCWs received continuous training and coaching to build confidence in diagnosing TB in children. Job aids and tools were provided, such as forms utilized by clinicians in the process of diagnosing TB in children. In addition, the guidelines for TB management in adults and children were improved and HCWs were encouraged to use these tools to clinically diagnose TB in children.

> *"The forms had all steps to follow and carry out an investigation. This form had three sections: one for clinical information, another for the samples taken, and another for the paraclinical results. So, the form guides us to do everything well. After filling in the investigation form, the doctor took the sample and sent it to the laboratory; at the same time, he filled in the X-ray form, and the mother brought the child in for the X-ray."*
>
> —Côte d'Ivoire participant

> *"The main tools used were those from the program [NTP]. They were improved when we saw the gap. That is the technical guide to TB treatment and care for adults and children. With CaP TB, we highlighted the gap management of pediatric TB, thus we strengthened the capacities of health care workers at the site level so they could respect*

the algorithms, SOPs [standard operating procedures], how to perform X-rays in a contact child, how to use the X-ray, microscopy, and molecular diagnosis, especially the Xpert."

—Cameroon participant

3.3.2. BACTERIOLOGICAL DIAGNOSIS

To improve the bacteriological diagnosis of TB in children, training and coaching on sample collection procedures was offered through on- and off-site training and supervision, and standard operating procedures and job aids for sample collection were provided.

"At first there were health workers who were hesitant to do the gastric tubing and that we saw that the coaching helped to put them in confidence to do this gastric tubing and gradually they practiced and understood that it could really help in the diagnosis of TB in children. So, one of the challenges was the hesitation, but the coaching helped to resolve that."

—Côte d'Ivoire participant

"We had a problem with a diagnosis, and it was hard to make an accurate diagnosis. We can't say that the new techniques have changed everything, but they have brought a big plus in diagnosis and precision. Before the project, we were much more involved in presumption than in certainty. CaP TB project made health care workers feel confident in diagnosing TB because they took samples for analysis to confirm or not TB."

—Cameroon participant

- Various sample-collection kits, equipment, materials, and personal protective equipment for biological specimen collection were provided.
- National testing guidelines were updated with Xpert MTB/RIF (Xpert) as the first diagnostic tool.
- Access to Xpert testing was increased by strengthening hub and spoke models and sample transportation from spokes to hubs.
- Countries were supported in their shift to the Xpert MTB/RIF Ultra cartridge.
- Additional GeneXpert platforms were procured where required.
- Community linkage staff and motor riders were recruited in Lesotho, Kenya, Democratic Republic of the Congo, Côte d'Ivoire, and Cameroon to support sample transportation.

"The project paid for the transport of the staff who brought the sputum to the CDT. CaP TB trained them on how to pack samples (triple packing). Sometimes, the CaP TB used trainees who were people doing refresher training (those who have finished their studies but are training at the hospital) or the psychosocial counselors to transport the samples."

—Cameroon participant

3.3.3. CXR DIAGNOSIS

To improve the use of CXRs for diagnosis of TB in children, nurses and doctors were trained to interpret the results of CXRs. In Kenya, EGPAF contracted an external agency (Telerand) to interpret CXRs (through an e-health system). In Côte d'Ivoire, support was given through the development of a specific training module on CXR interpretation and the setup of a WhatsApp group platform to serve as a peer-support exchange forum for CXR reading with an expert in pneumology to provide guidance. This helped HCWs to confidently diagnose TB in children at the PHC level without referring the children to specialized TB centers or secondary levels of care:

> *"... the other element is that there was the creation of a WhatsApp group which was very interesting, and, in this group, there was a radio specialist for the centers who could export CXR film into the WhatsApp group and quickly benefit from an interpretation. It reinforces them [HCWs] in their decision and it was also a method of learning"*
>
> —Côte d'Ivoire participant

In some countries, as part of universal health coverage, the health system covers the fees of CXRs and bacteriological tests for children under 5 years of age and for those above 5 years of age coinfected with HIV. However, in countries such Cameroon, Côte d'Ivoire, and Kenya, costs for the use of the CXR device and the reading of CXRs has to be paid by the patients and was thus covered by the CaP TB project:

- In Cameroon, Lesotho, and Kenya, a voucher system was used for patients to access CXRs free of charge.
- In Côte d'Ivoire, CXR films were procured for the MoH, securing availability and free access to quality CXRs.
- In Democratic Republic of the Congo, the CXR fee varied from one facility to another (with no standard price) and parents could not afford to cover the fees. This negatively impacted the motivation of parents/guardians with presumptive TB children to attend facilities.

3.3.4. CHALLENGES RELATED TO DIAGNOSIS OF PEDIATRIC TB

At times, a challenge for the collection of alternative sample types was HCWs' attitudes that only HCWs who were sent off for training were expected to do the procedures. This was noted even at sites where training had actually been done on-site.

> *"In Maseru [Lesotho], you get there [the health facility] and sputum induction equipment is there and there are patients who need sputum induction but then they say, and I quote, "The person responsible for doing sputum induction is not here." You see what I mean. But the other staff who are saying that have been trained on sputum induction. So, it is just that they are using this excuse not to perform the sputum induction."*
>
> —Lesotho participant

"The absence of motivation is challenging. When a group goes to the training and receives the per diem, the ones remaining think they are the ones who will perform all activities of the project. They said, "Those are activities which will be done by those who were trained because they got the per diem during the training." When we did the coordination meetings, staff who did not attend tended to think that those who participated should do the project activities and not the others. That is a problem because you can't invite everyone to the meeting."

—Cameroon participant

- The main obstacle to diagnosis of pediatric TB reported across all six countries was the reluctance of parents/caregivers to allow their children to undergo advanced sample collection procedures, such as gastric aspiration, as they were perceived as traumatizing for the child.
- The lack of confidence of HCWs at the PHC level resulted in an inability to collect samples in children younger than 5 years of age.
- Due to COVID-19, some types of sample collection activities stopped due to infection control issues and HCW fear of contracting the disease.
- Lack of proper infrastructure to store specimens at the PHC level was a challenge that led to poor yields of TB case finding. A remedial plan from the CaP TB project was to improve the storage of specimens at the PHC level by procuring refrigerators. This was reported mainly in Lesotho, Cameroon, and Côte d'Ivoire.

"For instance, if the riders for health must get to the facility on Wednesday, the samples should be collected the day before. So, if the patient comes on Thursday, they would have missed the riders for health. So, the patient would have to come back the next week. Sometimes the caregiver would not bring back the child because of money issues. At our level, what we did is that we procured fridges for storage of samples. It helps to some extent."

—Lesotho participant

"Another challenge was when a child came late and the sample could not be transferred the same day for testing. As we did not have a refrigerator to store collected samples, we would ask mothers to come back the next day for the sample collection. Or they were asked to stay overnight in the hospital to have it done the next morning. The parents refused to stay overnight in the hospital because they had not planned that. Sometimes they could not afford to pay the hospital fees. When providers asked them to return, some did not, and the number of people lost to follow-up increased. This problem was solved by asking the project to provide a refrigerator."

—Côte d'Ivoire participant

- In most countries, the sites' Xpert cartridges were sometimes out of stock.
- Poor maintenance of lab equipment such as GeneXpert machines led to delays for lab results.

- Limited access to GeneXpert and lack of proper infrastructure for sample collection somehow influenced the HCWs to not collect samples. In Cameroon, for example, there were difficulties in finding an appropriate location for sputum induction.

"We were often reluctant to use certain rooms to collect sputum since the big problem we have is the fact that the health structures don't have enough rooms, reserving a room exclusively for this activity was really a bit difficult."

—Cameroon participant

- Long distance to travel to the facility for further assessment was identified as a challenge. Parents were not in position to pay transport fares. As a result, in Côte d'Ivoire, Lesotho, and Kenya, a voucher system was introduced, and transport money was provided to facilitate travel to health facilities for further investigation of TB.

"The main issue is that many of our clients live in remote areas and for them to reach the health facility is a bit challenging. For instance, after conducting contact investigation, once the child has been identified as eligible for IPT [isoniazid preventative therapy], he has to get to the facility to be evaluated. It has been challenging for some parents to reach the facility. This was the major issue and that's why under CaP TB, we came up with the idea of providing transport for parents and kids.

—Lesotho participant

- Although parents were supported for their transport fares, at times they had to pay for other clinical investigations such as CXRs:

"Now with patient having access, caregiver must bring a child to the facility and transport may be an issue. Even when they reach the facility, they have to do a chest X-ray, but they have no money to get that X-ray done. Additionally, in most cases, they have to go to the hospital if they are at the health center level and that was an issue of money until later on when we introduced the voucher system for transport and chest X-ray, which helped."

—Kenya participant

3.3.5. CHALLENGES RELATED TO DIAGNOSIS OF PEDIATRIC TB AFTER A NEGATIVE XPERT RESULT

Xpert MTB/RIF sensitivity for diagnosis of TB in children is suboptimal—even using the more sensitive Ultra cartridges[5] —due to the paucibacillary nature of the disease in children. It is thus essential that symptomatic children with a negative TB test result are evaluated again by clinicians to avoid a false-negative diagnosis.

[5] The sensitivity and specificity of Xpert MTB/RIF Ultra for diagnosis of pulmonary TB in children varies depending on the sample type. When compared with a culture as a reference standard, the sensitivity and specificity of Ultra for pulmonary TB diagnosis in children was, respectively, 75.3% and 97.1% for sputum samples (expectorated and induced), 70.4% and 94.1% for gastric aspirate samples, 56.1% and 98.0% for stool samples, and 43.7% and 97.5% for nasopharyngeal aspirates. Kay AW, Ness T, Verkuijl SE, et al. Xpert MTB/RIF Ultra assay for tuberculosis disease and rifampicin resistance in children. *Cochrane Database Syst Rev.* 2022; 9(9):CD013359. https://pubmed.ncbi.nlm.nih.gov/36065889/.

Active reassessment was reinforced—clinicians had to review children with a negative TB test result within a week or two. In addition, HCWs had to make a make a phone call to the parents as reminder to bring the children back to the facilities for reassessment.

"We trained the providers with an emphasis on clinical diagnosis. We shared with them the tools and guides revised under the project. These guides considered the algorithms of management and diagnosis of children when Xpert is negative and advocated for using X-rays."

—Cameroon participant

"There was a classic and active reassessment. In classic reassessment, health care workers give an appointment to a child to come back after taking antibiotics. But with the CaP TB project, we tracked down children who should come back. With active reassessment, health care workers call parents/caregivers of children by telephone and sometimes CHWs could go into the community to look for them. That helped to rule out TB in the end. It helped to find TB cases among these children."

—Cameroon participant

"Before the CaP TB project, we tended to wait until we had a positive bacteriology to put a child on treatment but with the project, we realized that the rate of clinically diagnosed children was higher and the explanations we were given were that the child is bacilliferous. It's true that the GeneXpert is more sensitive but in children it's not very different. For those who are suspected of having TB, even though the biological examination is negative, we see them again after 10 days of antibiotic therapy and then, depending on the evolution, we advise them. So, we have a lot more clinically diagnosed cases of TB since we've been on the CaP TB project."

—Côte d'Ivoire participant

Although the CaP TB project supported the development of diagnostic tools (e.g., investigation forms and algorithms) and digital platforms to build the confidence of HCWs to clinically diagnose TB in children and reinforced the reassessment of children with a bacteriological negative test through a recall mechanism, there were challenges related to the health systems, health care provider levels, and socioeconomic statuses of parents. At the health system and health care provider levels, lack of competence of HCWs to confidently perform clinical diagnoses (especially at the PHC level), staff turnover, and lack of motivation of HCWs and the burden of filling project forms remain hinderances to clinical diagnosis. For children requiring reassessment for TB, the socioeconomic status and ability of parents to cover costs also hindered the diagnosis and treatment of TB in children.

"The GeneXpert is just a machine; even if its negative, it doesn't remove the probability of TB so when it is negative, we gave to the children antibiotics and we observe for 7 or 10 days depending on the symptoms, and we could also use the radio for CXR. So, when the test is negative there is a possibility to reevaluate."

—Côte d'Ivoire participant

"The first challenge is the competence of the health center staff at the primary level. Most of the time, they don't have the competence to know when I can mention TB and what I can do to establish my suspicion. Are there any tests I can do or transfer to a specialist? The initial examination, which is the Xpert, is not done on-site. Parents must travel to the Xpert site for their children to benefit from it and some of these parents can't afford the transport fare."

—Cameroon participant

Checking in on misdiagnosis: Reassessment of children in whom TB was excluded in Cameroon

In order to have a better understanding of the proportion of children for whom a TB diagnosis could possibly have been missed under the CaP TB project interventions, the EGPAF Cameroon team and the Cameroon NTP performed a small evaluation. The evaluation was performed in 26 project facilities across the 3 regions where the project was implemented and included all children 0–14 years old that had been assessed for TB between October 2020 (after the first wave of COVID-19) and March 2021 and for whom a TB diagnosis had been ruled out.

A questionnaire was developed to conduct phone interviews with caregivers to collect updated information on the health status of their children, to perform a TB screening by phone, and to request that the caregivers bring their children to the facility for a medical check. Transport and medical fees related to the reassessment were covered by the project. Out of 2,355 children included in the reassessment evaluation, 250 had to be excluded because medical records could not be retrieved and 510 could not be contacted due to various reasons. Among the 1,595 who could be contacted and for whom medical records were available, 27 had died (1.7%) and 1,568 were still alive as reported by the caregivers through the phone interviews. Of those, 87.4% (1,371 of 1,568) did not report any TB-related symptoms during phone interviews and 12.6% (197 of 1568) reported symptoms. All children assessed through phone interviews were invited to come to the facility for further assessment. None of the asymptomatic children came to the facility for reevaluation. Among the 197 children reported as symptomatic, 72 (36.5%) came to the facility for reassessment. Of those, the vast majority (88.9%) were not confirmed as having TB, and only 8 were finally diagnosed with TB (see Figure 1).

In conclusion, out of the 1,568 children who were able to be screened for TB during the reassessment, 0.5% (8 of 1568) were diagnosed with TB; 4.0% (64 of 1568) were diagnosed as not having TB, and 87.4% were asymptomatic according to a phone-based TB screening. While the phone-based screening cannot be considered as accurate as an in-person assessment, we can assume that the caregivers would have brought the children to the facility for a medical check if they had presented symptoms, especially considering that this did not imply any extra costs as the project was covering all expenses.

It thus seems that the initial diagnosis provided during the CaP TB intervention was accurate.

However, there are some major limitations that need to be highlighted and discussed. Of the patients initially diagnosed as not having TB, 27 had died before being reassessed. It cannot be excluded that they died of TB. Out of those identified as symptomatic through the phone-based TB screening, 125 didn't come to the hospital for reassessment of their symptoms and therefore it cannot be excluded that they had TB.

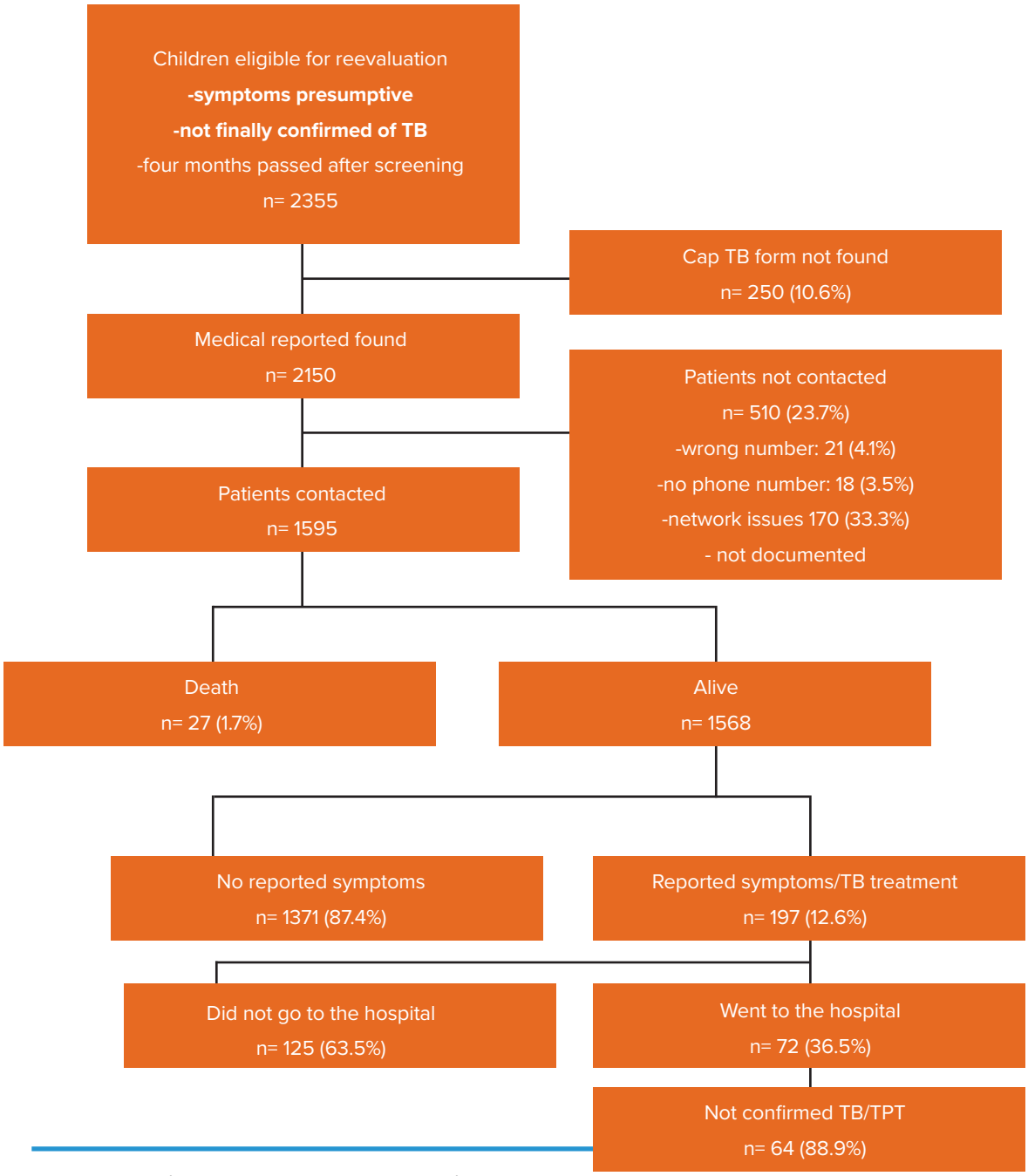

FIGURE 1. Children reevaluated for TB in Cameroon

3.3.6. LESSONS LEARNED AND RECOMMENDATIONS ON DIAGNOSIS OF PEDIATRIC TB

- Treatment decision trees for pediatric TB put in place by CaP TB optimized case detection.
- Training and on-site coaching as well as regular site support and supervision are critical to build HCW confidence in clinically diagnosing pediatric TB.
- Provision of free diagnostic services for children through a voucher system to cover CXRs, diagnostics, and transport costs was a catalyzing factor that improved pediatric case finding in most countries where universal health coverage for children under 5 years of age is not yet a policy. This incentivized parents/caregivers to bring their children in for further investigation.

"Sometimes patients had to pay for diagnostic test, but when CaP TB came, it made [TB] diagnosis in children easy by covering the cost. This relieved parents by not paying for diagnostic tests."

—Democratic Republic of the Congo participant

- Access to CXRs at lower levels of care, such as PHCs, allows HCWs to clinically diagnose TB cases in children.
- Enhancing the confidence of HCWs through training and infrastructure for CXR reading and interpretation contributed to increased numbers of clinically diagnosed cases of TB in countries such Kenya.
- Implementation of advanced sample collection procedures contributed to improved use of Xpert testing.
- An efficient and functional GeneXpert hub with appropriate biological samples improved the proportion of bacteriologically confirmed cases among those diagnosed with TB.
- Due to staff turnover and retention, it's important to train as many HCWs as possible on diagnostic procedures for pediatric TB as a remedial plan.

3.4. CONTACT INVESTIGATION

Participants from eight countries (Cameroon, Côte d'Ivoire, Democratic Republic of the Congo, Malawi, Kenya, Lesotho, Tanzania, and Uganda) were interviewed about contact investigation. Interviews took place both at facility and community levels in all eight participating countries.' Key activities performed to enhance contact investigation included the following:

- Both HCWs and CHWs were trained on contact investigation.
- Updates were made to contact investigation standard operating procedures (SOPs) and community tools to support documentation of activities (i.e., community TB screening forms, contact investigation registers, referral forms from community to health facilities). New recording tools were

introduced to facilitate contact investigation, as explained by one of the participants from Côte d'Ivoire:

"When the CHW finished screening at the community and found a presumed case, he gave him a reference card. A provider received him at the health facility based on this card. If the provider confirmed the presumption of TB, he collected the sample and sent it to the lab. The health facility could get the results of the contact investigation from the reference card, the contact registers and the patient report register where the names of the cases contact were recorded. The provider kept the reference card."

—Côte d'Ivoire participant

- Collaboration was strengthened between CHWs and TB nurses to list index cases and contacts and coordinate further investigation of contact.
- Transportation fees were provided to contacts to facilitate access to health facilities in case of referral for further services.[6] It's important to note that support for transport fees wasn't systematic but based on needs. For example, in Kenya, all EGPAF supported facilities were provided with vouchers to cover CXR costs and transport fares. Once a patient was foundto be unable to afford transport fare to return to the facility—based on history taking by a clinician—a voucher was provided for reimbursement of transport. For patients who could afford to return to the facility but could not afford to pay for a CXR, a second voucher was given to cover the cost of an X-ray at the hub.
- Transportation fees were provided to CHWs or volunteers to reach contacts in community.
- In most countries, World TB Day commemorations were used as a platform to increase the visibility of pediatric TB and inform caretakers about the importance of contact investigation for potential TB in children living with index TB cases.

Facility contact investigation is when a cough monitor or HCW asks the patient who has confirmed TB to bring their family members to the health facility to be screened for TB symptoms. This is generally done through health talk (i.e., health education on TB prevention) before the patient leaves the health facility premises. Community contact tracing is conducted when CHWs or CHVs go into the community to identify family members of clients who have confirmed TB and refer them to the health facility for TB screening. The list of patients with confirmed TB is generated at the facility level by HCWs or, in some settings, by cough monitors. In some countries (but not all), people doing community contact tracing can collect samples at the community level, and in a few countries, CHWs were allowed to initiate preventive treatment. This was, however, not the case in most countries where TPT was initiated by a primary health care (PHC) outreach team that was mainly led by a nurse or doctor and would visit patients based on information provided by the CHW.

[6] This was done in half of the participating countries: Kenya, Malawi, Côte d'Ivoire, and Lesotho.

"Facility contact tracing whereby a cough monitor is inviting the family members living with clients who have been confirmed having TB to be screened for TB symptoms. Also, the cough monitors assisted with a nurse to do line listing of index client's family, their children, and neighbors who have been in contact with them. When the clients have children below 5 years, they are expected to be brought to the clinic so that they can be initiated for TPT. Children above 5 years should be brought to the facility to be screened for TB symptoms. Whereas community contact tracing takes place when the CHW or CHV is given a list of households or names of the people to trace in the community."

—Kenya participant

In half of the participating countries—Malawi, Tanzania, Uganda, and Zimbabwe—contact investigation was done by existing facility staff and CHWs/CHVs. Nonetheless, additional staff was needed to assist with intensified contact investigation. In some of the countries, these additional workers (mainly lay workers) were called cough monitors.

In Côte d'Ivoire, Cameroon, Democratic Republic of the Congo, Lesotho, and Kenya, additional staff were recruited as cough monitors or facility linkage persons to undertake contact-investigation activities. The CaP TB project partnered with existing NGOs already working with NTP or MoH such as in Cameroon, Lesotho, Côte d'Ivoire, and Democratic Republic of the Congo. In Tanzania, the project hired volunteers from the CSO MKUTA to conduct contact investigation at the community level. In Lesotho, LENEPWHA was contracted by EGPAF. In Côte d'Ivoire, CHWs/CHVs were from Alliance CI and in Democratic Republic of the Congo, they were from Club des Amis Damien. These were either CHWs previously mainly involved in HIV care, or former TB patients, and were placed at health facilities and worked at the community level as well.

Some countries did not pay a salary or stipend to these lay workers but provided compensation for transport costs, telephones, and other costs in order to align with the MoH human resource structure and community volunteerism concept. The advantage of this approach was the continuity of services when funding elapsed since these lay workers were absorbed into the existing PHC structure. This was mainly reported in Uganda.

3.4.1. CHALLENGES RELATED TO CONTACT INVESTIGATION

The findings highlight a few challenges that were consistent across the eight countries involved in contact investigation at facility and community levels. These were mainly related to geographic location and mobility of patients (i.e., patients lived far from the health facility catchment area, which made investigation of contacts problematic for the contact tracers and costly for those parents who had to take their children for further investigation).

"Concerning where I'm working now, this is a pastoral community, moving from place to place looking for pasture and water. That's also one of the challenges. Also, the area distance. In some of these northern regions, people are living scattered from the facility. Yeah, that's because of distance."

—Kenya participant

In some countries—Kenya, Malawi, Côte d'Ivoire, and Lesotho—transport costs were provided to parents who could not afford to cover transport fare to the facilities through a voucher system, but the issue of parents not turning up to the health facilities persisted, especially in Lesotho. The reluctance of some parents to take their children for further investigation was also related to the hospital admission cost involved when a child needs to spend a night at the hospital for a sample to be collected early in the morning. This was mainly reported by participants from Kenya and Democratic Republic of the Congo.

Another challenge commonly cited by participants was increased workloads caused by recording tools for screening and contact investigation. Although the screening tools were useful in prompting HCWs to screen children for TB at every visit, the tool was too time consuming given HCWs' other responsibilities.

> *"That is, asking a series of questions verbally and checking off maybe once somewhere instead of, every time filling out papers and paperwork. I'm telling you, it's tons of paper that every month or every week, had to come back to the office for data entry, etc."*
>
> —Democratic Republic of the Congo participant

Other challenges related to contact investigation included the following:

- A limited number of CHWs were allocated per site, thus contact investigation was problematic. Although the project recruited additional CHWs in some countries, sustaining these additional CHWs was not guaranteed when the project ended.
- During travel restrictions linked to the COVID-19 pandemic, household contact investigation was shut down in most countries. In some countries, remote contact investigation was provided (over the phone).
- Additionally, COVID-19 led to increased reluctance from patients to visit health centers:

> *"We had that challenge, people were fearing to come because they feel like if you have a cough, you have COVID-19 ... they could hide because of that, but with time people are now realizing that COVID-19 is with us, and it will be with us for a longer period."*
>
> —Kenya participant

- Finding index cases and contacts was difficult when incorrect details (e.g., cell phone numbers or residential addresses) were provided.
- Due to the level of stigma still attached to TB, confidentiality issues were a hinderance during household contact investigations, particularly with nomadic peoples in some regions of Kenya.
- The facility management team lacked of involvement and ownership. This was mainly reported by participants from Cameroon, Côte d'Ivoire, and Democratic Republic of the Congo.

3.4.2. LESSONS LEARNED AND RECOMMENDATIONS ON CONTACT INVESTIGATION

Overall participant response was positive on contact investigation using both facility and community approaches, indicating that contact investigation was very well organized, as was contact follow-up. As a result, there an increased number of children with TB were identified and started prophylaxis. Moreover, facility and community contact investigation approaches were standard procedures recommended by the MoHs.

- Accessibility of EGPAF project staff and technical support provided by EGPAF were considered to be factors that contributed to improved TB case finding in children. This was mainly expressed by participants from Côte d'Ivoire, Lesotho, and Kenya.

"The availability of EGPAF agents. Whenever we needed them, they acted directly, and this encouraged us."

—Côte d'Ivoire participant

- Involvement of community leaders and members in raising awareness about TB improved acceptance of contact investigation.

"There were support groups and educational talks in the community with the leaders telling them about TB. It is something unknown in society, and some people are not informed. So, the involvement of the community has boosted community case finding. It has helped to get presumed TB cases."

—Côte d'Ivoire participant

- More advocacy activities are needed to raise awareness on childhood TB prevention.
- Improved communication mechanisms between CHWs, health facilities, and local leaders will ease contact investigation at the community level.
- Strong collaboration between medical staff (i.e., nurses, medical doctors, etc.) and CHWs is critical for success and good performance of contact investigation.
- Development of job descriptions and responsibilities for medical staff and CHWs allowed efficiency and synergy in service provision and increased involvement of site management.
- Transport fee assistance and logistical support for CHWs is key to improved household contact investigation.
- Contact investigation made very early (a maximum of three days after the TB case confirmation) by well-trained staff improved contact identification, TPT initiation, and, sometimes, TB case notification.
- Due to the economic status of patients and geographic limitations to contact investigation, patients should be supported to cover the transport cost and some diagnostic lab tests. Subsidized transport of household

contacts to health facilities can improve the uptake of TB case finding and TPT initiation in children.

- Use of specific registers for contact investigation and TB presumptive case identification allow for better tracking of the contact investigation cascade and follow-up of children eligible for preventive treatment or requiring TB investigation.
- Dedicated and trained human resources (either HCWs or CHWs) are key to successful contact investigation.
- Increasing the number of CHWs/CHVs can improve the reach of these lay workers in conducting contact investigation in the community.
- Community contract tracing was used as an opportunity to screen for other conditions such as malnutrition, HIV, and others, mainly in Uganda. Such a broad perspective and approach to community contact tracing could be a great opportunity for early detection of other health conditions in children.

"Contact tracing at community level does not only focus, you know, on TB but trying as well to look at all other possible avenues that could point out to the existence of TB. It's a broader kind of approach that looks at other risk factors that could be pointing out that TB could be present."

—Uganda participant

3.5. TPT AND THE INTRODUCTION OF SHORTER REGIMENS

Participants from four countries—Cameroon, Kenya, Lesotho, and Tanzania—were interviewed about TPT and the introduction of shorter TPT regimens. These countries were selected for their ability to strengthen the provision of TPT and/or introduce shorter TPT regimens (e.g., 3RH).

The use of TPT / isoniazid preventive therapy (IPT) among TB/HIV coinfected children was not a new program in all four countries; however, adherence was not achieved at the desired level until the implementation of the CaP TB project. Through the project, enormous efforts were made to educate and capacitate HCWs in terms of management, including management of TPT adherence in children.

"Because the health workers had serious issues [knowledge gaps] and sometimes, they were also expressing their own fears about mono-resistance of INH; but that was broken through numerous trainings so that they become comfortable around training."

—Lesotho participant

In CaP TB project–supported sites in Cameroon and Lesotho, TB/HIV coinfected children were given TPT at the HIV service.

"Under CaP TB project, it is the psychosocial worker who receives the child and screens him for TB. If the screening is positive, the child is referred to the coordinating doctor of the HIV care unit that will conduct

the investigation. If the coordinating doctor believes that the child is eligible for INH, he puts him on INH ... That is the mechanism put in place to ensure that all children with presumptive TB at the HIV service level were taken care of as required."

—Cameroon participant

However, TB contacts of HIV index cases, who were under 5 years old and HIV-negative, were given TPT at TB services.

At the beginning of the CaP TB project, a baseline assessment was conducted in which TPT completion was documented.[7] In all countries, there was an important increase in rates of TPT completion during the four years of the project, that can—at least partially—be attributed to the project's efforts in introducing shorter regimens, providing trainings on TPT, and providing support for TPT adherence. Completion of TPT was 40.0% in Cameroon in 2017; it is now 92.0%. Similarity, TPT completion rose from 63.8% to 94.1% in Kenya, 33.0% to 84.3% in Lesotho, and 36.6% to 99.3% in Tanzania.[8]

The project also supported the introduction of TPT registers, which contributed to an increase in recorded TPT uptake and adherence due to improved recording and reporting.

"Even as we look at our progress in this [TPT adherence] indicator, we have good adherence for children. Because the good thing about the CaP TB follow-up, there is specific forms for following up every client compared to the national level follow-up where you must document everybody in one database. So, the adherence was good, despite it being a six-month course of treatment, there was a good adherence."

—Tanzania participant

Indeed, one of the recurrent issues with TPT is a loss to follow-up. Many children initiated on IPT don't complete the treatment (6 months of daily INH). One of the solutions was to pilot a shorter course regiment (3 months of daily dispersible RH).

The new shorter regiment of TPT was well received by patients due to its short duration compared with the normal IPT, which had a long duration of six months. It could be argued that the shorter regimen of TPT contributed to good adherence.

"Because the new drugs were of a shorter duration, you know, people really embrace it."

—Kenya participant

The project, however, didn't formally assess the impact on adherence of the introduction of shorter regimen, as this would need to build a stringent analysis comparing populations on INH and populations on 3RH that would be similar in all aspects except the TPT regimen they received. CaP TB wasn't designed to develop such an analysis.

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[7] As the baseline data was collected retrospectively, it is possible that the low TPT completion rate is at least partially due to suboptimal registration of completion, rather than poor adherence. This possible bias can't be fully ruled out and must be taken into account when assessing the projects' impact on increasing TPT adherence.

[8] EGPAF CaP TB project data, 2017.

According to some participants, acceptability of TPT in children infected with HIV was less problematic than for contacts. However, it is difficult to compare as the number of children eligible for TPT among children with HIV is difficult to establish (there are no good guidelines for how often children with HIV should be on TPT or how long the protective effect of TPT can be expected).

> *"They [HIV-infected children] still depend on the caregivers because they are already under that program. It has already paved some ground that help the mothers bring their children for treatment because they are already on lifetime medication, and they are aware that they are vulnerable to many other diseases including TB. It is not as difficult as in the general operations."*
>
> —Lesotho participant

For introducing a shorter TPT regimen, CaP TB focused on the 3RH regimen for child contacts under 5 years of age. Consistent with WHO recommendations, the preferred regimen for children living with HIV remained six-month INH (with an exception made for those on Efavirenz-based regimens) due to drug interactions between Rifampicin and protease inhibitors. Out of the four participating countries, two (Lesotho and Tanzania) have not been able to introduce shorter TPT regimens; in the other two (Cameroon and Kenya), CaP TB supported the introduction of and transition to shorter regimens.

In Lesotho and Tanzania—where the introduction of shorter TPT regimens could not be supported through the project—CaP TB was nonetheless able to do some groundwork to prepare for the actual implementation of the new shorter regimen. For example, in Tanzania, funds were secured for training HCWs to provide TPT shorter regimens.

> *"We designed the training package for health care workers, to train them on how to provide the shorter regimen. So, we had meetings during which we wanted to sell the idea to authorities at the ministry level, regional level and even at facility level on the importance of using shorter regimen."*
>
> —Tanzania participant.

In Lesotho, even though the use of 3RH has been recommended since 2019 in the National Guidelines for Drug-Susceptible Tuberculosis for children below 2 years of age, the introduction of 3RH will take place only after the INH in stock is finished.

In Kenya, CaP TB successfully piloted the use of the 3RH regimen for child contacts and the NTP subsequently recommended the national scale-up of use of the 3RH regimen for child contacts. When the use of 3RH for TPT was introduced, a few activities were conducted focusing on training HCWs on this new regimen. The additional human resource support in non-TB entry points to help with TB symptom screening further helped to determine eligibility for TPT.

> *"Before CaP TB we were using the longer regimen which was lasting for six months (6INH). We can appreciate that the project has empowered us by doing the sensitization and training before introducing shorter TPT in our facility. We can also appreciate the effort of the project, bringing other supporting staff, whom we call the cough monitors, who*

have helped us accelerate this project. They have really helped us in initiating the children on the TPT program through their assistance with screening."

—Kenya participant

In Cameroon, a two-way approach consisting of facility and community tracing was implemented to enhance the initiation of TPT in eligible children under 5 years of age and HIV-positive children who were not on TPT. This approach resulted in an increased uptake of TPT.

"We had two approaches: the community approach where CHWs were going in the community and screening all contact[s] and referring eligible children for TPT. We also targeted HIV contacts who were not taking TPT. We also had the facility model where index cases brought contact[s] they are living with at the heath facility for investigation."

—Cameroon participant

Continuous efforts were made to increase community awareness about the benefits of TPT and the new shorter regimen using various platforms that included media coverage and the involvement of CHWs and volunteers. Respondents from Lesotho and Kenya highlighted that this likely enhanced adherence to TPT

"... the community component was also continuously bringing the community members to understand the importance of this TB prevention in children. A nationwide implication of the communities through training of the media houses [ensured] that they can help us to advocate for TB generally in children but also primarily for preventing TB in children."

—Lesotho participant

During COVID-19 restrictions, countries such as Lesotho, Kenya, and Cameroon introduced multimonth drug dispensing systematically regardless of the patient's adherence level. This was done to ensure that there was no interruption of treatment and thus improve the patient's adherence.

3.5.1. CHALLENGES RELATED TO TPT AND THE INTRODUCTION OF SHORTER REGIMENS

There were several challenges associated with TPT and the introduction of shorter regimens across the four participating countries, but some of these challenges were mitigated in the process of project implementation. The key challenges highlighted by the participants included regular shortages of INH, and inadequate knowledge and fear of HWCs about INH resistance.

"There was a stock-out of commodities here and there. So, the first thing that we did was to make sure we don't come across that type of situation. You will [also] realize that health care workers were not aware about the latest updates regarding the eligibility for TPT. For instance, if you go through our current TB guideline, you will notice that children of less than 15 years are eligible for TPT as far as they have been in contact with someone who has TB. Yet many nurses have been reluctant to

provide TPT to these kids. So, we had to go through training, supportive supervision, mentorship to make sure that they do get access to the latest updates so that they can do the right thing."

—Lesotho participant

Additionally, inadequate communication between HCWs and caregivers/parents on the benefits of TPT has led to caregivers not demanding TPT due to a lack of information.

"The caregiver in the household may be a TB patient who is an adult and when you follow up, you find out that the children who could have been eligible did not get INH, yet it was not the case. Not because the caregiver did not want, but because they were not aware. You find out that the health care worker did not provide that information. This is one of the areas where CaP TB was trying to bridge the gap to make sure that the health care workers have that knowledge and they can pass that knowledge to the caregivers so that the children can have access to INH."

—Lesotho participant

The mobility of patients on IPT was reported as a challenge. This led to the introduction of multimonth drug dispensing in order to curb the issue of low adherence and low completion rates of TPT.

"One of the challenges now is related to clinic appointment. There were sometimes children who could not honor the clinic appointment. The reasons were that some of them were attending schools. Some of them had no stable caregivers. There are some caregivers or parents who are never concerned. The reason that sometimes they were moving up and down in terms of their business or jobs that they were doing."

—Kenya participant

3.5.2. LESSONS LEARNED AND RECOMMENDATIONS ON TPT AND THE INTRODUCTION OF SHORTER REGIMENS

- Good stock management and a continuous supply of TPT drugs contributed to good adherence rates. To ensure good TPT treatment outcomes, countries should improve their drug management systems and ensure consistent supplies of TPT drugs.

"When we [CaP TB project team] started working on the logistics management of TPT, our TPT completion rates were in the lows (this is for the general population, not just children). They were around 30%. When we worked on the logistics feeds, we focused on the CaP TB project, our completion rates have risen to between the upper 80% and 90% level. This is how much we have worked to ensure good TPT completion rate in the CaP TB project."

—Lesotho participant

- Provision of multimonth drug dispensing was an enabling factor to improve adherence, especially in the context of COVID-19 and among nomadic people. This approach should be considered in scaling up the CaP TB project.

- The short duration of the new TPT regimen and the good flavor of the medication contributed to good TPT adherence.

"The mono-therapy [INH] for TB prevention was long compared to the short regimen. The short duration regime was friendly in children as the medication had a good taste."

—Cameroon participant

- The positive impact of coaching and supervision created an enabling environment for the uptake of TPT. Continuous coaching and supervision support are needed to improve the knowledge and confidence of HCWs in TPT management in children, especially in countries such as Lesotho where fear of drug resistance was a concern among HCWs.

"We made sure we were in touch with them always and if they had a question, they could get in touch with me or the rest of my team. So, that really yielded something. So, if I go to a specific facility, I knew that I had to look out for this man."

—Lesotho participant

- Strengthening community linkages for creating awareness of TPT for children was also perceived as a contributing factor in the increased TPT uptake. Support groups led by parents with children on TPT helped to enhance parents' knowledge and trust about allowing their children to begin TPT or TB treatments, and providers connected parents to these groups. This contributed to increased awareness in the community. The multidisease campaign at the community level allowed the population to learn about TB and rely on the community to identify TB cases.

"I want to note the importance of community involvement. We are working with helpers. The people we are working with are living in the community. Anything that we do should always be strengthened at community level so that it can yield the desired performance."

—Lesotho participant

3.6. INTEGRATION OF TB/HIV SERVICES

Participants from five countries—Cameroon, Malawi, Lesotho, Tanzania, and Uganda—were interviewed about the topic of integration of TB/HIV services. These countries were selected for their ability to support the integration of TB screening in HIV entry points (based on M&E data reported), challenges they met, and mitigations they put in place.

With the support of the CaP TB project, the integration of TB services in HIV units was strengthened through the following activities:

- Screening for TB was done using carbonated CaP TB forms (specific CaP TB project forms that document the outcomes of TB screening and diagnosis until treatment or TPT initiation).
- On clinic days, CHWs and TB linkage facilitators gave health education to

patients in waiting areas. In Lesotho and Cameroon, these CHWs and CHVs were the ones conducting screening for TB in HIV clinics.

- Collection and diagnosis of TB samples was performed at HIV units and antiretroviral therapy (ART) clinics.
- In all five countries, TPT was provided to eligible pediatric HIV patients at HIV units and ART clinics.
- Monthly mentorship and quarterly support supervision were organized, targeting HCWs in HIV units and ART clinics.
- District quarterly TB/HIV review meetings brought TB and HIV units together to interrogate data and assess their performances in TB/HIV collaborative activities according to national and WHO guidelines.

It's worth noting that TB/HIV integration was already taking place to a certain degree in most countries.

> *"The key contributing factors for the integration of TB services into HIV services in Tanzania is the fact that these services were already in place, we only reinforced their provision."*
>
> —Tanzania participant

However, TB screening was not systematically done despite national guidelines recommending it; or if screening was done, its outcomes were not documented, and, as such, it is impossible to assess the quality of the screening that was implemented. The CaP TB project assisted with reinforcing case findings in HIV coinfected children by setting up new recording tools and registers. These tools compelled HCWs to provide the services and record the service provided.

> *"In the beginning, we didn't even use a tool in the HIV clinic for the TB/HIV integration because we felt we already have screening tools. Yet, we realized that only having screening tools was not sufficient and focal persons needed to be added and we needed to adapt some of the things."*
>
> —Tanzania participant

In Uganda, Tanzania, and Malawi, all TB-related services, such as screening for TB symptoms and providing of treatment, were provided at ART sites (where they existed at the PHC level) by the same health care workers. In Lesotho and Cameroon, TB-related services were provided by a TB nurse even if all PHC services were under one roof.

In the sites supported by the CaP TB project in Cameroon and Lesotho, the psychosocial workers or cough monitors received and screened children for TB symptoms. When a child was found to have TB symptoms, the child was referred to the doctor at the HIV clinic for further investigation. If the doctor decided that the child was eligible for isoniazid (INH), he/she initiated TPT. But when the child was confirmed to have active TB, the child would be initiated on TB treatment at the TB unit using a form that allowed the child's progress

to be traced from the consultation to the TB service through the lab. TB contacts of HIV index cases who were under 5 years old and HIV negative were given TPT at TB services.

> *"That is the mechanism put in place to ensure that all children with presumptive TB at the HIV service level were taken care of as required."*
>
> —Cameroon participant

This model of partial integration, whereby some TB activities are performed at ART clinics or by an HIV nurse, seems to have worked in Lesotho and Cameroon.

Nevertheless, this model had some limitations/disadvantages in terms of the optimization of TB case finding and adherence for HIV patients who are coinfected with TB since treatment is not done by the same HCWs. Additionally, contact investigation becomes solely the responsibility of the TB unit/nurse instead of a shared responsibility among HCWs at ART clinics since HIV patients coinfected with TB are managed at the TB unit. In other countries, all the TB services were provided at the HIV sites/clinics by same HCW. This was reported mainly in Malawi, Uganda, and Tanzania.

It is important to note that in Tanzania and Uganda, there was a careful consideration to not introduce extra human resources or new staff to support the integration of TB services at HIV clinics. The project used existing staff from MoH structures to ensure the sustained provision of integrated services when project funding ended, as expressed by participants:

> *"We didn't create new systems that will collapse the moment the project stops."*
>
> —Uganda participant

3.6.1. CHALLENGES RELATED TO INTEGRATION OF TB/HIV SERVICES

- Clinicians from HIV entry services perceived that CHWs were doing clinicians' work, which created some friction and attitude among HCWs. This was mainly reported in Cameroon. This challenge was addressed through increased coaching and supervision visits.
- HCWs perceived the screening for TB symptoms using the pediatric TB–specific screening tool as extra work. Hence, not all HCWs were compliant in filling the form, particularly the newly recruited doctors in Cameroon.

> *"The challenge was the HIV entry point. Through this entry point, we could get a lot of cases. But as these people are not thinking about it often, we had missed a lot of cases ... We need to focus on this entry point even after CaP TB project."*
>
> —Cameroon participant

- Stock management of supplies such as INH was inadequate. This was mainly reported in Lesotho. A remedial plan was put in place by the EGPAF team to improve stock management, consisting of an electronic system for drugs management and coaching for HCWs on stock management.
- Lockdown measures due to COVID-19 limited movement of patients to health facilities to collect their treatment supplies. This created a lag in provision of TPT for patients. However, the remedial plan put in place

provided multimonth drug dispensing to patients. This was implemented across all five countries.

- There was a lack of harmonization of treatment plans for TB/HIV coinfected patients, especially in Cameroon. A remedial plan was made to allocate one clinician as a focal point person in charge of coordination of treatment of coinfected patients.

"One of the big problems we had was when we had registered many TB/HIV coinfection. We had difficulties harmonizing the two treatments. The solution was for the coordinating doctor of the HIV unit to be the coordinating doctor of the TB department and be responsible for monitoring the project. We relieved him of other tasks of the project. To have one doctor as manager of these two units made easy our task."

—Cameroon participant

3.6.2. LESSONS LEARNED AND RECOMMENDATIONS ON INTEGRATION OF TB/HIV SERVICES

- Promotion of one-stop-shop model, where all TB services are provided at the HIV unit or ART clinic, proved to be useful in minimizing loss to follow-up of patients and missed opportunities for screening.
- The use of the project's pediatric TB form to screen, identify, and refer eligible children living with HIV for TPT allowed an increase in TPT coverage. There is, therefore, a need to implement additional screening tools (similar to the pediatric TB form) to complement current tools or adapt existing registers to include data elements on TB.
- The adaptation of existing registers to include data elements on TB/HIV collaborative activities enhanced integration.
- The use of CHWs trained in TB/HIV for TB screening reduced the workload on HIV Units / ART clinic teams which created an environment of enhanced TB/HIV integration.
- By escorting patients and their caregivers, CHWs and TB linkage facilitators strengthened the linkage of presumptive TB cases to laboratories for HIV and TB testing and to TB clinics for treatment.
- Use of a quality improvement approach (including data use, mentorship, and coaching) motivated site teams to track and develop innovations to address barriers/challenges related to integration of TB/HIV services.

4. Overall Lessons Learned and Challenges Related to the Implementation of the CaP TB Project

Several lessons, challenges, and subsequent recommendations—on topics ranging from community and patients to health care providers and the health system at large—were consistent across topics and countries.

4.1. LESSONS LEARNED FROM THE IMPLEMENTATION OF THE CAP TB PROJECT

1. The CaP TB project raised general awareness on pediatric TB among HCWs and in the community in the countries of implementation. Given that TB in children is neglected in most African countries, the CaP project contributed to the awakening of health providers and the community at large about childhood TB. Also, some HCWs were encouraged by the positive results they saw from the project, particularly the increased number of pediatric TB cases identified and how well children were responding to TB treatment (i.e., the cure rate). This boosted the moral of some of the clinicians.

"This project awakened our consciousness on the consideration of pediatric TB. In Côte d'Ivoire, not all health facilities are aware of pediatric TB. Most health facilities conduct passive TB research, and in the CaP TB sites, we do aggressive case finding. We need to integrate the CaP TB strategies throughout the country. We need to see with the minister how to implement these strategies countrywide, especially in high TB prevalence areas."

—Côte d'Ivoire EGPAF project staff

"CaP TB brought some imperative elements with it, especially regarding the management of pediatric TB and, more importantly, categorizing children under the presumptive cases because it was quite difficult for us just to have them presumptive with the five general signs and symptoms of TB that we all know. The CaP TB carbonated forms and the trainings came in and they brought us some more information regarding the presumptive cases as well as the TB diagnosis management and how, interprofessionally, we can help each other to diagnose TB in children."

—Lesotho MoH staff

2. Engagement of stakeholders at the community level on communication activities such as advocacy meetings, IEC materials, and awareness campaigns played a big role in the uptake of contact investigation, adherence, and improved health-seeking behavior in general.

"First, the beneficiaries or the stakeholders at all levels should be well engaged, as we did in CaP TB. Our engagement levels were from the ministry level to the health facility and health care level, so people understand the importance of the projects, how are the interventions going to benefit them. If beneficiaries are also aware of the benefits of the project, that can be taken by them, even when they don't have funds. TB screening does not really require funds, they just need the existing human resource to understand that when they screen patients for TB, for example, and identify them earlier on, it is the way of preventing them from acquiring the diseases."

—Côte d'Ivoire EGPAF project staff

3. The intensification of supervision and mentorship, coupled with on-site trainings, is key to improving the confidence of HCWs in performing advanced sputum collection for diagnosis of pediatric TB.

4. Decentralization of TB services and mainstreaming of systematic TB screening in all entry points at the facility level increased pediatric TB case finding.

"We managed to decentralize the management of TB service especially for pediatric [clients] at lower facility level including to the rural where previously the client was presumed from the lower facility and then referred to the regional hospital. But now due to the input of CaP TB, the HCWs at the PHC level are competent to diagnose and manage pediatric TB."

—Kenya EGPAF project staff

5. Improved recording and reporting tools on pediatric TB (such as the ICF form, among others) prompted HCWs to align their behavior with the pediatric TB guidelines but also provided an account of services rendered. Although these newly introduced tools from CaP TB project were labor intensive, HCWs perceived them as useful tools in general.

"The benefit is really the screening reflex. Thinking about TB and you see that you decrease the number of children that you were missing before. But on the other hand, it is much more intensive work ... I'm telling you, it's tons of paper that every month or every week, had to come back to the office for data entry, etc."

—Democratic Republic of the Congo MoH staff

4.2. PROGRAMMATIC CHALLENGES RELATED TO THE IMPLEMENTATION OF THE CAP TB PROJECT

1. **The sustainability of CaP TB activities after the project funding cycle came to an end** was a concern raised by HCWs and MoH partners. Most of the HCWs and EGPAF staff involved in the CaP TB project expressed their fears that CaP project–related activities would not be sustained once the funding ended.

2. **The lack of sustainability of CaP TB interventions, especially recording and reporting tools,** was a concern of most participants. Although these tools enabled improvements in case finding and management of pediatric TB, participants across all nine countries indicated that these tools could have been streamlined with the national TB recording and reporting tools to reduce workloads and allow CaP TB activities to be sustained after the end of the project.

"So, you have data for project, and you have data for national level. And sometimes, many times, it happened that people would concentrate on project forms, because of the incentives for volunteers and they might forget national tools."

—Tanzania EGAPF staff

3. **The increased workload from routine TB screening and project recording and reporting tools** was a concern. Participants indicated that the workload too much for existing clinical schedules of HWCs working in HIV units and non-TB entry points, particularly in areas with a high volume of patients.

"The challenge of filling the tools. He [HCWs] has 10, 20, 30 patients to see and on top of that he has to fill out the normal consultation form. He also has to fill out the screening papers, etc. So that was also a challenge, it was very heavy at the beginning but little by little they got used to it. But it's still a challenge, especially in high-volume services."

—Democratic Republic of the Congo MoH staff

"This project increased the usual tasks of providers, so they had to be encouraged to be fully involved in the activities. The project increased the workload, and the consultation time became lengthy because providers were not filling all these forms previously. We saw the patients, although missing some because we did not think about TB in the first consultation."

—Côte d'Ivoire participant

4. **The noncompliance of HCWs to treatment guidelines** was mentioned as a challenge in some countries. For example, in Côte d'Ivoire, Lesotho, and Tanzania, newly recruited doctors were resistant to adhere to the new guidelines for diagnosis and treatment of TB in children.

5. **The attitudes of HCWs toward lay workers' involvement in screening, diagnosis, and linkage to care** was a concern. Some HCWs felt that the introduction of volunteers such as cough monitors was a threat to their work.

"There was a challenge in other entry points with regards to TB screening, where we used volunteers to screen first, then the patients that were presumed by volunteers had to be seen again by clinician because we would not want to use volunteers' judgment only to send people to laboratory. Also, sometimes clinicians thought that we were robbing them [of] their jobs."

—Tanzania EGPAF staff

"So, we had facilities where we had issues where clinicians didn't want to take those results, or those forms from community volunteers. So, we just had to discuss with the facility management to explain that we are not taking clinicians jobs and give it to volunteers who did not go to school. But we are trying to help the system because it is overloaded on all that."

—Lesotho EGPAF staff

6. **The inadequate supply management of commodities and maintenance of lab equipment contributing to poor TPT treatment outcomes** was a concern. Most of the countries reported experiencing regular supply stock-outs of drugs (especially TPT drugs) and cartridges for GeneXpert machines and some equipment breakdown. As a result, there were interruptions in TPT initiation, treatment, and adherence and collection of advanced sputa.

4.3. RECOMMENDATIONS FOR FOSTERING PEDIATRIC TB PREVENTION AND MANAGEMENT IN AFRICA

4.3.1. RECOMMENDATIONS FOR IMPROVING PEDIATRIC TB MANAGEMENT BASED ON CAP TB EXPERIENCE

1. **Ensure that the proper tools are in place to support and encourage pediatric TB screening.** This could include adaptation of existing tools.
2. **Continue using diagnostic forms introduced by CaP TB and explore ways to integrate them with NTP tools.**
3. **Conduct regular program review meetings/sessions and supervisions to allow for prompt action on remedial solutions to enhance the provision of quality pediatric TB care.**
4. **Identify the catalyst of change or "champions of change" at the onset of implementation of a new project such as CaP TB.** This is paramount in achieving project outcomes, especially in a context of limited resources and competing priorities. These champions of change can be HCWs or program managers that are enthusiastic, passionate about TB, and willing to journey with other HCWs to achieve good results.

4.3.2. RECOMMENDATIONS FOR ENSURING THE SUSTAINABILITY OF EFFORTS INITIATED UNDER CAP TB

Involving HCWs working in CaP TB–supported sites in providing support during a potential scale-up at the national level ensures optimization of the project and sustainable rollout of key interventions based on the findings. It is important that the minister of health leverage the project and use the health workers who have been fully exposed to CaP TB to be mentors in other facilities where this approach will be rolled out.

1. **Activities introduced by a project should be implemented in coordination with the MoH with the aim of strengthening existing services, not as a stand-alone project.** This sends a good signal to HCWs and managers and promotes ownership. This is what happened with CaP TB and it should be replicated for future projects. Ensuring that such projects are not done by the implementer only, but that the MoH and NTP are involved in all steps, and play an active role—conducting trainings and supervision visits and ensuring that TOTs include key MoH trainers—increases their buy-in and the chances of sustainability.

2. **Consultation with and engagement of national stakeholders and community members in project implementation should be prioritized from the start.** This helps to help foster collaboration, create positive impact, and ensure sustainability, as shown by CaP TB experience.

3. **Funds should be secured from national budgets and international donors to ensure that the interventions initiated under CaP TB can be continued and scaled up at the national level.** Both EGPAF and MoH managers should explore ways of securing funding ahead of time to ensure sustainability of proven good practices. In all countries, EGPAF was able to secure some funding to support some of the CaP TB activities in addition to the Unitaid funding; however, gaps remained that should be better understood and could be avoided in the future with early advocacy for funding.

4. **Systematic pediatric screening in non-TB entry points should be added to national budgets and built into funding requests submitted to international donors.** Despite its relatively low cost, covering the cost of screening is a challenge because it requires either adding lay workers or ensuring that HCWs have sufficient time and incentive to properly conduct pediatric TB screening.

5. **Pediatric recording and reporting tools should be streamlined with the NTP systems.** Newly introduced recording and reporting tools should aim at improving performance as well as avoiding increased workloads for HCWs completing these forms. Suboptimal streamlining of M&E data and processes created additional work for HCWs. Hence, a careful revision and adoption of these new project tools by the NTP is paramount. The screening and recording tools implemented through the project are not sustainable by themselves. As an EGPAF staff member from Tanzania said, “if you want quick results, that’s what you do. But it’s not about quick result, it’s about lasting impact.” One way to secure the sustainability of their impact—without maintaining the tools themselves—is to ensure that their core elements are integrated within revised national registers and put in place ad hoc national tools, such as those in Kenya and Uganda that introduced a stamp to replace the use of ICFs in facilities after the close-out of the project.

5. Conclusion

The lessons learned from the implementation of the CaP TB project in nine sub-Saharan African countries highlight a plethora of innovative activities that were implemented to raised awareness on about TB in children, which is something that was not well understood at the community level and or embraced by all HCWs. In addition, various activities were conducted to that improved TB prevention, control, and management from the facility level to the community level, including through introduction of recording and reporting tools, algorithms for TB screening in children, and SOPs standard operating procedures for on pediatric TB diagnosis, and the introduction of shorter TPT regimens.

Several lessons learned in the process of implementation provided evidence that pediatric TB care can be managed and TB treatment outcomes can be achieved through strong leadership from NTP managers, facility managers, and health care providers. Strong advocacy at the community level involving celebrities, community leaders, and former TB patients and the development of contextual IEC materials on childhood TB are also potential drivers of increased uptake of pediatric TB services in African countries.

There are some critical health system and beneficiary factors that must be considered to improve TB prevention and management in children. These include building the capacity of HCWs and CHWs; adding additional human resources to ease the workload of clinicians; providing financial support to patients and parents/guardians to reduce the financial burden of transport and diagnostic tests; improving awareness of parents/caregivers about advanced sample collection of TB in children; managing the supply of commodities (drugs and equipment for diagnosis); improving collaboration between TB/HIV services by promoting a one-stop-shop model of integration; improving the attitudes of HCW toward intensification of TB case finding in children; and ensuring the availability of earmarked funds to support work on pediatric TB. It is imperative that NTP managers and health care providers capitalize on the lessons learned from this project.

A proper continuation plan should be developed to address these challenges, enact the recommendations, and strengthen the health systems at large, especially in the context of the global pandemic of COVID-19. In this way, countries will be able to sustain the outcomes of the CaP TB project and improve childhood TB prevention and management.

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— Dr. Jeannine Uwimana Nicol

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Unitaid is a global health agency engaged in finding innovative solutions to prevent, diagnose and treat diseases more quickly, cheaply and effectively, in low- and middle-income countries. Our work includes funding initiatives to address major diseases such as HIV/AIDS, malaria and tuberculosis, as well as HIV co-infections and co-morbidities such as cervical cancer and hepatitis C, and cross-cutting areas, such as fever management.

Unitaid is now applying its expertise to address challenges in advancing new therapies and diagnostics for the COVID-19 pandemic, serving as a key member of the Access to COVID Tools Accelerator. Unitaid is hosted by the World Health Organization.

ANNEX 1. TOPICS FOR DATA COLLECTION

TOPIC 1: TRAINING AND SUPERVISION

- Development and adaptation of training materials
- Approach used for cascading training
- Training delivery model (on-site vs. off-site training)
- Supervision process (frequency of supervision, tools used for supervision)
- Challenges and lessons learned on training modalities
- Challenges and lessons learned on supervision of HCWs

TOPIC 2: FACILITY-BASED TB CASE FINDING

- Implementation process of systematic TB screening in different child entry points
- Human resources needed for systematic TB screening
- Challenges and lessons learned on facility TB case finding

TOPIC 3: DIAGNOSIS OF PEDIATRIC TB

- Understanding the diagnosis process for TB in children (use of CXR, GeneXpert, etc.)
- Implementation of advanced sample collection procedures and lab-based diagnosis
- Challenges and lessons learned on the diagnosis of pediatric TB (implementation of sample collection procedures and sample transportation)

TOPIC 4: CONTACT INVESTIGATION

- Community-based contact investigation (models, HR needs, key challenges)
- Advantages and disadvantages of mixed models (facility and community levels)
- Challenges and lessons learned on the implementation of contact investigation (contact investigation and linkage to care)

TOPIC 5: TPT AND THE INTRODUCTION OF SHORTER REGIMENS

- Understanding the implementation of TPT in children
- Introduction of new shorter regimens for TPT
- Adherence to TPT
- Challenges and lessons learned on TPT and the introduction of shorter regimens

TOPIC 6: INTEGRATION OF TB/HIV SERVICES

- Understanding the integration of TB/HIV services
- Description of how TB screening was done at HIV entry points
- Understanding the approach used to link children on TPT to TB services
- Description of how integration of TB/HIV services was implemented in non–CaP TB sites
- Identification of key factors that enhanced the integration of TB/HIV services
- Challenges and lessons learned on the integration of TB/HIV services

ANNEX 2. INTERVIEW GUIDES FOR CAP TB DOCUMENTATION

INTERVIEW GUIDE

Introduction

Good (morning/afternoon/evening), My name is _____; today I will be conducting an interview on the implementation of the CaP TB project in your country/region/health facilities in order to get an in-depth understanding of the implementation process of the CaP TB project; to assess how measures implemented in the project have a potential to improve prevention, control and management of childhood TB as well as gathering recommendations on how best implement pediatric TB management innovations in line with the National TB Program.

In particular, we are interested to understand the following aspects of the CaP TB project:

(a) The overall implementation of the CaP TB project

(b) What worked and why

(c) What did not work and why

(d) Advantages and disadvantages of the project

(e) Areas of improvement & recommendations for roll out of CaP TB interventions

To obtain reliable information we request that you answer the questions that follow as frankly as possible. Your explanations are important in this documentation of best practices and lessons learned. There is no right or wrong answer. It is your knowledge that count.

If you agree, this interview will be recorded, allowing me to make sure I can go back to your exact statements in case of doubts. The records will be destroyed after the transcription of our discussion. If you prefer, it is also possible not to record at all this discussion, or to turn the recorder off at times.

The information you give to us will be kept confidential. There is no place where these notes will be written together with your name. You will not be identified by name or address in any of the reports we plan to write. The final report will also not contain any direct quotes from you.

This interview is part of a series of interview I am conducting with EGPAF, MOH and other Civil Organization personnel, allowing me to document lessons learned from the project into a report. This report will be made publicly available on EGPAF's website, and will be shared with key stakeholders in the country and globally. It is thus possible that the final report will be seen by you, as well as by other people in your country in EGPAF, in the MOH, or elsewhere.

The interview will take between 45-60 minutes.

PARTICIPANT'S LINK TO CAP TB

The aim of collecting this information is to help in the analysis of the answers given. This information will not be used in the report, so as to ensure increased confidentiality.

Question	Response
Type of/level of Health facility(ies) where the person is attached / providing TB related support (if applicable)	
Role played in CaP TB project (please provide a description of the main task, not only a title)	
Duration of involvement with CaP TB project	

If the interviewee agreed, turn on a recorder now.

In addition to guideline A, a questionnaire will be done, and sent to all CaP TB countries, with the following elements:

What trainings were done on-site / of site

What were their duration?

What was their frequency (including refresher trainings)?

How many participants attended each session?

What material were used for the onsite training?

What sessions included practical

INTERVIEW GUIDELINE A: TRAINING AND SUPERVISION

This section aims at understanding the implementation of trainings to Health Care Workers (HCW) and Community Health Workers in the CaP TB project

1. Description of training cascade

- How trainers were initially trained
- How trainings were cascaded at district, and then PHC level?

2. Were the trainings done on-site vs off-site (this can also be answered on an ad-hoc questionnaire if required). What were the benefits and challenges of both models (on-site vs off-site training)?

- You may want to think in terms of number of people that can access the training
- In terms of "dissemination" of the knowledge amongst the health workers
- In terms of "availability" of the trainees to allocate time for training
- In terms of ability to run practical

3. Regarding the material used for the training: *(a) how training materials were adapted to fit the needs and the logistics of the on-site training / (b) how training materials were adapted to the local context (for example using pictures or case-studies to which the trainees can easily relate to; or adapting to national guidelines)*

4. Detail for which topics the training included practical sessions

   Probe:

   a. What were the benefits and challenges of organizing practical sessions?

   b. How were they mitigated?

5. How was HCWs' competency on pediatric TB assessed?

   Probe:

   a. Was pre-post assessment used?

   b. Were there other means put in place to assess acquired knowledge?

6. Were trainings (modality, material used, etc) changed over the course of project implementation?

Probe:

a. What were the main reasons for the changes?

b. Did the changes implemented regarding the training improved the way participants increased their knowledge/skills on pediatric TB?

7. What was put in place to adapt the mode of delivery of the training to the various type of participants (Community Volunteers, Nurses, Doctors, Lab technicians, etc)

   Probe: were there various trainings to group people of similar medical background?

   What were the benefits and challenges of conducting trainings that integrated people of various backgrounds?

8. What are the key elements of those trainings to replicate after and beyond the project (to the rest of the country, or even other countries)?

9. Is there anything else you would like to comment or add in the topic of trainings and increasing capacity of medical personnel / community volunteers regarding pediatric TB?

These sets of questions focus on the onsite support and supervision after receiving CaP TB training. We would like to reflect on how the supervision enhanced the capacity to identify and adequately take care of children with TB

10. What was the content of the supervision?

    Probe: How were performance data used during the supervision?

    Were check lists established to guide supervision?

    How useful were they?

11. Please describe the link between the trainings and the on-site supervisions?

    Probe: were the supervisors the same people as those who gave the training?

12. What was the timing of the supervisions :

    How often did such supervisions happen?

    How long after the training did the supervisions take place?

13. What were other means put in place to increase the clinic staff confidence in identifying and managing pediatric TB? How effective were those means?

    Probe: a. availability of a “reference” contact to call in case of doubt

b. sharing of experience through groups such as WhatsApp groups

c. implementation of on-site coaching/mentoring between HCW visits and attachments to best performing sites)?

14. What are the successes and challenges of such supervisions? (Provide 1-3 examples)

How were those challenges mitigated?

15. What are the key elements to replicate after and beyond the project (to the rest of the country, or even other countries)?

INTERVIEW GUIDE B: FACILITY-BASED PEDIATRIC TB CASE-FINDING STRATEGIES

Note: This section focuses on the implementation of systematic TB screening in different child entry points (cough monitoring, fever, etc). We would like to better understand the implementation process of the facility-based pediatric TB case finding strategies in different settings. As a note, HIV entry points are addressed in another set of questions, given their specificity.

1. Could you describe how pediatric TB screening was implemented in CaP TB supported sites?

   Probe:

- Was there a difference on how TB screening was conducted based on the level of care (i.e. District/regional hospital; specialized TB facilities; PHC)?
- If yes, kindly explain how the screening was done at each level of care?
- Who was in charge of conducting TB screening in the different entry points (medical personnel, lay workers, community workers, ex-TB patients)
- Was the staff performing TB screening introduced by CaP TB or pre-existing staff?
- Where was the screening happening (examples: in waiting areas, triage desks, triage, nurses' room)?
- Was screening systematic, or were there criteria applied on how / when was the screening implemented?

2. In addition to the CaP TB intensified case finding form, did the project introduce additional tools to support Ped TB screening?

   Probe: How did this new tool(s) or approach help with TB screening?

3. If the project introduced dedicated HR to perform TB screening, was this done systematically in all facilities and across all entry points or only in facilities or entry points with particular characteristics (i.e high patient volume sites)? Please specify

4. What are the factors that contributed to the uptake of TB symptoms screening in non-TB entry points (successes)?

5. What are the main challenges in implementing TB screening in non-TB entry points?

6. Please comment on the feasibility and acceptability of performing TB screening in waiting areas or triage desk if this was done in your country

7. Did the project provide incentive to the screeners / set targets for screening?

- What type? How were they administered?
- Were the incentives / targets different among existing staff / medical staff / lay workers / volunteers
- What was the impact of providing incentives / setting targets on integration of screening in non-TB entry points?

8. Which solutions did the project implement to ensure children who screened positive for TB in the different entry points were linked to clinical evaluation and TB diagnostic services (i.e CXR, sample collection and Xpert testing etc)

9. Did the project implement and specific solution to ensure that symptomatic children to whom clinicians prescribed a course of large spectrum antibiotics where re-evaluated for TB after completing the treatment?

10. vWhat are the elements linked to TB case finding you think could be replicated after and beyond the project (in other parts of the country or in other countries)?

11. Is there anything else you would like to comment or add in the topic of TB case-finding in children?

INTERVIEW GUIDE C: DIAGNOSIS OF PEDIATRIC TB

1. What did the project put in place to increase HCWs confidence to clinically diagnose pediatric TB?

   Probe: Please tell us more about:

- How was the coaching/mentorship done?
- How was the case review conducted?
- Introduction of job aids and tools that turned out to be particularly useful to guide HCWs through clinical assessment and decision making (what are other measures / support put in place to support HCWs to improve)

2. 2. Did the project support access to CXR and capacity for CXR interpretation?
   If YES, please provide detailed description of the approaches and interventions implemented by the project to improve access/use to CXR (affordability and accessibility)?

- Access to CXR (vouchers, transport reimbursements etc)
- Build capacity for CXR interpretation for pediatric TB diagnosis by HCWs
- In some countries, the project coordinated with external services to help interpreting child CXR (potentially private / for payment services). Was that the case in your country? What was the result?

3. Did the project implement sample collection procedures at PHC level?
   If yes, please list the sample collection procedures that the project implemented at PHC

4. Did the project implement sample collection procedures at District Hospital level (on any other "upper" level facility – regional hospital, reference hospital, specialized center)?

   If yes, please list the sample collection procedures that the project implemented at District Hospital level.

5. What are the main challenges the project encountered with of sample collection procedure?

6. What are the key advantages/benefits linked to sample collection procedures?

   Probe: Will these procedures continue after CaP TB project?

7. Did the project support sample transportation? If yes, please describe the support that was provided?

8. 8. What was put in place to improve access to Xpert testing?

   Probe: How were Xpert results shared back to clinicians?

9. Please describe the main challenges faced encountered by using Xpert as initial test for TB in children?

10. What was put in place to help accelerating the use of (better) Xpert cartridges (Ultra) (if Ultra wasn't introduced, please say why)

11. What was put in place to ensure the majority of presumptive cases are investigated?

    Probe:

- What were the challenges you faced in investigating all presumptive TB cases?
- What was put in place to mitigate them?
- Were there barriers that could not be addressed?

12. Please describe which approaches/solutions the project implemented (if any) to ensure that symptomatic children with a negative TB test result were evaluated again by the clinicians?

13. Please describe 3 main challenges faced by the project to improve pediatric TB diagnosis

- How were those challenges mitigated?
- What could have been the reasons for clinicians preferring bacteriological diagnosis vs clinical diagnosis or vice-versa?

14. Please describe 3 main challenges faced in creating capacity to manage pediatric TB at PHC level?

    Probe:

- How were those challenges mitigated?

15. What are the key factors that contributed to the success of TB diagnosis in children?

16. What are the elements linked to pediatric TB diagnostic that should be replicated after and beyond the project (in other parts of the country or in other countries)?

17. Is there anything else you would like to comment or add in the topic of pediatric TB diagnostic?

INTERVIEW GUIDE D: CONTACT INVESTIGATION

Note: this section consists on learning how community-based contact investigation was implemented. We would like to know what worked best, why and how

1. Please describe in detail how the implementation of community-based TB contact investigation was conducted?

- Who was in charge of conducting contact investigation (nurses, lay workers, CSO volunteers, others)?
- Please describe how the staff responsible of conducting community-based contact investigation was integrated within the health facility team?

2. Please describe how the line-listing was established allowing to identify TB patients for whom contact tracing had to be done?

3. Please describe which tools were used by the project to monitor the coverage of contact investigation activities (i.e to assess how many of the TB patients for whom contact investigation should have been done had their household contacts reached and screened for TB symptoms)

4. Please describe how results from contact tracing were shared back with the facility health staff

5. Did the project need to provide additional resources in order to ensure successful implementation of community-based contact investigation activities?

   If yes please specify: Probe:

- Did the project recruit or introduced the HR needed to conduct contact investigation?
- If yes, please describe:

  a. who was recruited (i.e which cadre)

  b. the main HR related costs (i.e was a stipend provided? were direct costs to contact tracers reimbursed?)

6. Did the project implement additional incentives and/or set targets for contact tracers?

- What was the impact of these incentives / targets on implementation of contact tracing activities and coverage achieved?

7. What are the factors that contributed to increase the yield of TB case finding through community level contact tracing?

Probe:

- How were those challenges mitigated?
- During the COVID-19-related restrictions, did you implement contact investigation by phone due to movement interdictions? If yes please describe advantaged and disadvantages

Note: this section consists on learning how mixed models of contact investigation (facility vs community) were implemented. We would like to know what worked best, why and how

9. If there was a mixed model of community and facility-based contact tracing, please describe:

- What were the challenges faced using a mixed method?
  - What was the rational/main reason to select either
  - What were the advantages of using both facility and community-based contact tracing of TB in children (using them "concurrently" / in a mixed approach)?

10. For the facility-based approach, please describe which solutions/ approaches were put in place to follow up with TB index patients and ensure they were bringing their child contacts to facility to be screened.

Note: this section consists on learning how linkage to care (for active TB and TPT initiation) was implemented. We would like to know what worked best, why and how

11. What was put in place to link children to care after community contact tracing (new tools, approaches for follow-up -i.e phone calls, cost reimbursement)?

12. Please list 1-3 examples of things that have worked well to link TB contacts children screened at community level for further care at the facility.

13. What challenges did you face linking children screened at community level to a health facility for further investigation and treatment initiation (TPT or drug-sensitive TB treatment)?

- How were those challenges mitigated?

14. What are the elements linked to contact investigation that should be replicated after and beyond the project (in other parts of the country or in other countries)?

15. Is there anything else you would like to comment or add on the topic of TB contact investigation?

INTERVIEW GUIDE E: TPT AND INTRODUCTION OF SHORTER REGIMENS (ACCEPTANCE AND ADHERENCE/COMPLETION)

1. What did CaP TB project put in place to increase up-take of TPT in children?
2. What are the measures/interventions the project put in place to improve:
   - Acceptability of TPT by parents and caregivers
   - In case of older children, acceptability by the patients
   - Acceptability by health care providers
   - Feasibility by healthcare providers (workload)
3. What were key factors of success to increase up-take of TPT in children?
4. What were the main challenges faced to scale-up TPT initiation?
5. What did CaP TB put in place to support adherence to TPT?

   Probe:
   - How follow-up of TPT patient was organized (i.e frequency of appointment, follow-up in case appointments were missed etc)
   - How was adherence to TPT monitored
   - If and how counselling was provided to reinforce adherence
6. What were key factors of success to increase TPT adherence?
7. What were the main challenges faced to increase TPT adherence?
   - How were these challenges mitigated?
8. What did CaP TB put in place to support the introduction of shorter TPT regimen (3RH and 3HP) (new tools, method, collaboration)?
9. What are the best practices related to TPT that (up-take, introduction of new regimens, improvements of adherence) that could be replicated beyond the project?
10. What were the main challenges faced to accelerate introduction of shorter TPT regimen?
    - How were those challenges mitigated?
11. Is there anything else you would like to comment or add in the topic of TPT?

INTERVIEW GUIDE F: HIV/TB INTEGRATION

Note: Probe about the easy answer of saying "we were already doing it". We are looking here at the "quality" and "fidelity" of implementation of TB screening in HIV entry points. TB screening is officially done, but numbers show us it was most likely poorly implemented before CaP TB. We want to know what the challenges were to make it better, whether we achieved it, and how we can replicate this model.

1. What did CaP TB project put in place to integrate and improve pediatric TB management (screening, investigation, TPT and treatment) into HIV entry point?

- Could you share with us how TB screening was conducted in HIV entry points?
- Who conducted the screening? (was it done by the usual staff from ART clinics, or was it other people / who)?
- Please describe the flow for children identified as presumptive TB in the HIV clinic
- For children identified as asymptomatic / not presumptive or diagnosed as having TB, please describe whether TPT initiation and follow up was done by HIV services or if children had to be linked to TB services?

2. If there was the need to link children on TPT to TB services, what was the approach implemented?
3. How was that different from non-CaP TB supported sites / (ie we seek to know what CaP TB changed compared to "standard of care" in HIV entry points)?
4. Please share the key factors of success (1-3 examples) that helped to integrate TB services (TB screening, investigation, TPT and treatment in HIV services) into HIV services?

   Probe:

- How were these challenges mitigated where possible?

5. What are the best practices of integrating TB and HIV services that could be replicated beyond the project ?
6. Is there anything else you would like to comment or add in the topic of HIV/TB integration?

ANNEX 3. SUMMARY OF THEMES AND QUOTES

Theme	Key Findings with Quotes
Topic I: Training and Supervision (Zimbabwe, Kenya, Côte d'Ivoire, Uganda, and Malawi)	
Theme 1: Development and adaption of training materials	
Subtheme 1: Development of training materials	• Most of the countries developed their training materials based on existing national training materials, the International Union Against Tuberculosis and Lung Disease materials, and WHO training materials. The exception was Uganda, where there was not much change in the content because they had already developed updated materials for pediatric TB. • ***"The materials that were used in the training … Most of them were … We have some of the guidelines that were from national TB and leprosy control program. Some of them are taken from there and then some of them were taken from WHO guidelines. That's where we extracted these materials. We did that. That's where we adapted some materials and some of the material, for example, monitoring material were just created from the program."*** ***—Tanzania participant***
Subtheme 2: Adaptation of content during the course of the project	• There was no adaptation of the training materials that was done during the implementation of the project. However, in some countries, the adaptation was done based on the training needs gaps identified during supervision (e.g., Côte d'Ivoire). • The content was also adapted because of the updated national TB guidelines, like it was the case in Uganda and Tanzania with the introduction of TPT and the new regimen (3RH). • The training manuals were updated gradually based on gaps identified based on field experiences. This was done in Côte d'Ivoire, where training sessions were organized gradually as they identify gaps in knowledge and competencies (usually these trainings were conducted off-site).
Theme 2: Approach used for cascading training	
Subtheme 1: Cascading training process	• All the countries conducted an off-site TOT. Then, after TOT, trainers cascaded the training from central to peripheral levels of health care. • Both on-site and off-site models were used depending on the level of care and the training needs of HCWs. Most of the countries used existing trainers from their district or national database, as it was in Uganda and Tanzania, and CaP TB staff were providing facilitation and support. But for some countries, such as Côte d'Ivoire, trainers were selected and contracted by EGPAF and, at times, those who conducted supervision after the training were not the same people that were involved in supervision. The latter had a negative impact on HCWs to a certain extent because, at times, the training received off-site was not cascaded during site visits.

Subtheme 2: Modality of training—off-site versus on-site	• All the countries interviewed on training and supervision used both modalities/approaches of trainings (off-site and on-site). Some countries, such as Uganda and Tanzania, had more sessions of on-site training as part of cascading the training, as well as during supervision. There was some novelty in how the on-site training was conducted to keep HCWs motivated and not interrupt the services at facility level. • Lessons learned: For countries with well-established infrastructure (i.e., district trainers and and standard logistics and procedures for training) to support training, the trainings and supervision were conducted smoothly. Also, trainers were innovative in terms of where on-site trainings were conducted, the manner used for motivating the HCWs beyond financial incentives (e.g., in Tanzania, lunch was provided on-site or meal vouchers were provided), and assistance provided for HCWs during their clinical work from coaching provided on-site at the same time (e.g., Uganda and Tanzania). • In Zimbabwe, the cascading of the training had a particularity where there were some sites chosen as "attachment sites" (mainly regional and tertiary hospitals) where HCWs were sent for training, especially for practical-related sessions. At those sites, there were specialists/consultants who would shadow the HCWs during their practical sessions.

Advantages and disadvantages of off-site versus on-site	• On-site training was able to reach a large number of staff, which had positive effects on the implementation of the project. ***"So, the approach of using on job training [on-site training] will include or involve many health workers and community workers from all entry points. So, this approach helped us to train as many as possible health workers, who were used to screen children and to diagnose TB, including community health workers. So, this was the cost effective in terms of costs." —Tanzania participant*** • On-site training helped in a big way, particularly for practical sessions. • ***"Yeah, the other thing that I want to add in terms of advantage of on job training [on-site training] compared to off job [off-site training] is that children and other procedures were easy to demonstrate. Demonstration is very easy at the facility level compared to off job. So, we can demonstrate directly to children who are screened for TB at the entry point." —Tanzania participant*** • For TOT trainings or at the start of the project, off-site training is the best modality to use, as it capitalizes on the maximum attention of trainers (HCWs) with no interruption from attending to other duties. • ***"Yeah. For the off-sites trainings. Yeah. In terms of accessibility, we had, of course, like, challenges because we could not take a lot of people to the facility because, like the other facilities, like it is us, whereby maybe you are only two or three nurses and clinician, so definitely you are forced to just select maybe one or two, meaning that the other one would not be part of the training. And again, on the part of advantages was that now the participation was like good because people would only concentrate on the training. Like start on time, people would come in time, they would participate, there would be no disturbances, unlike the on-site because you could maybe train a lot of people and everyone could come and attend, those that are eligible. But we had challenges now in terms of concentration, others could be on duty on that day, so they would rather attend to the clients, then they would come to the training at a later stage." —Malawi participant*** • ***"Probably one more thing. The on-site training, it was very efficient because we could, in terms of implementation, it was very quick for people to implement and this is just because we were able to gather more people at a go while the off-site implementation was slow because very few people could attend and also people had to brief also their colleagues on what they have actually learned from the training so because of that, implementation was not quick for the off-site training." —Malawi participant***

Subtheme 3: Challenges encountered during cascading training	• Trainers were not supervisors in some sites. This has a disadvantage in that supervision is not based on what was taught in class. When the supervision is done by trainers, they know what to focus on and they are already familiar to trainees, which can facilitate the learning on-site. • The duration of the training in class was short: training materials are extensive and difficult to cover in 3 days, which is not enough time to cover theoretical and practical sessions. ***"The training lasted only three days, and there was plenty of information to give. Sometimes one should teach theory and practical sessions. The time was not enough." —Côte d'Ivoire participant***
Subtheme 4: Assessment of HCW competencies	• All countries used pre- and post-training tests to assess the competencies of CHWs during the training and this was done mainly during off-site training. A combination of observations and monthly or quarterly TB report meetings were used to assess the competencies of HCWs during on-site training and supervision. Uganda and Tanzania used the latter approach during their training and supervision.
Theme 3: HCW supervision process	
Subtheme 1: Supervision process	• All countries reported using the traditional models of supervision and mentorship whereby trainers/supervisors were conducting monthly and quarterly supervision visits. These visits consisted of using checklists and performance data (monthly and quarterly data) and later setting up a remedial plan for challenges identified. For some countries, such as Côte d'Ivoire, it was also a platform used to identify gaps in terms of competencies of HCWs and to plan for a training (mainly off-site). For some countries, such as Tanzania, Uganda, and Kenya, it was during these supervision visits that on-site training could take place (mainly practical training to address knowledge gaps). • ***"Then we would asses through those data and identified gaps in performance and so on. Then we do our supportive supervision with the country management team. We use those data shared by the TB focal person. So, we usually use the performance data in our CaP TB site-monitoring checks" —Tanzania participant*** • ***"Those who are supervising were the people who at least were involved in training some part of their life, and they know pediatric TB and the interventions and all that stuff. So, they were the technical team. And then we had staff who were supporting from the facility with the best performance. So, we had some of the supervisors who were the best performers who were included in the supervision so that they can elaborate to the health care workers how they can achieve the results that they need. So, they were just sharing those experiences." —Tanzania participant*** • ***"So, we used to go there for supervision at least once a month, but sometimes it would depend on the findings from the data. If the data are with a discrepancy that you see you may go sometimes twice a month to address the issues that you see are missing." —Tanzania participant***

Subtheme 2: Challenges and recommendations	• Challenges that have been identified include time lags between training and supervision sessions. In addition, in some countries, the trainers were not always same people who conducted supervision. Doing supervisions in a very timely manner could correct challenges with time lags. • Some recommendations made to mitigate the challenges included: a. Adapt supervision tools with clear terms of reference. b. Leave the supervision report with providers immediately after the visit to allow them to act on the recommendations. "The problem was that health care providers were not given recommendations after supervision, so they should put them in practice for the improvement activities. They will wait to receive the final report before starting to implement the recommendations. This practice was delaying the improvement of negative points observed during the supervision." —Côte d'Ivoire participant c. Maintain supervisor-supervisee constant communication in order to ensure that HCWs are implementing the recommendations made in the previous supervisory visit before the next visit.
Topic II: Facility-based TB Case Finding (Cameroon, Tanzania, Kenya, Democratic Republic of the Congo, Côte d'Ivoire, Malawi, Uganda, and Lesotho)	
Theme 1: Pediatric TB case finding (screening at facility and community level)	
• ***"It was the nurses or doctors, possibly for the hospitals, who were in the project. They were the ones who were doing this activity, for example at the level of outpatient consultations, the nurses or the few consulting physicians were reinforced so that during the outpatient consultation, especially during pediatric consultations, they could systematically use the screening form. So, it was the nurses and doctors who were assigned to these areas, for example the nurse responsible for nutrition. It was she or he who did this screening work. Similarly, in the hospitalization, etc. In summary, it was a work that was done by the doctor, especially by the nurses within these different entry points." —Democratic Republic of the Congo participant*** • ***"So, we would give that child an appointment to come back to the hospital or health center depending on the nearest health facility. Since we recorded the parents' details, we called the mother to remind her of the appointment. If the mother had to go to the health center, we would notify the doctor to see the child and inform us of the child condition. The project had provided us with communication card credits that did top up every year for the call without worry." —Cameroon participant***	

Theme 2: Contact investigation (facility and community)	
Subtheme 1: Contact investigation process	• In most countries, contact investigation was done by local staff, with the exception of Côte d'Ivoire, Cameroon, Democratic Republic of the Congo, Lesotho, and Kenya, where additional staff were recruited as cough monitors or facility linkage persons or existing NGOs working with NTP or MoH were used, such as in Cameroon and Democratic Republic of the Congo. In Côte d'Ivoire, CHWs working under an NGO contracted by EGPAF called Alliance CI conducted it, while in Democratic Republic of the Congo, it was conducted by the Club des Amis Damien, a group of former TB patients who worked at the health facilities they used to attend. • CHWs receive a salary; Club des Amis Damien volunteers only receive transport fees. • ***"When the CHW finished screening at the community and found a suspected case, he gave him a reference card. A provider received him at the health facility based on this card. If the provider confirmed the presumption of TB, he collected the sample and sent it to the lab. The health facility could get the results of the contact tracing from the reference card, the contact registers, and the patient report registers where the names of the cases contact were recorded. The provider kept the reference card." —Côte d'Ivoire participant*** • ***We had a contact tracing register at the community level where we inscribed the information on contact cases and could be used to retrace them. CHWs also had the community TB screening tool used to screen each family member to find out if the contact was TB suspected or not. If a case contact had a positive screening, CHW gave him the reference card. With this card, the presumed case contact went to the health facility. If he could not go, the CHW could collect the sputum and bring it to the health facility. When the case contact arrived at the health facility with the referral card, the provider would follow the diagnostic algorithm available at the health facility. The case contact would present the provider with the reference card, and the provider would confirm whether he was suspected or not. If the provider confirmed that the case contact had a positive screening, he stapled the reference card to the lab request form. The lab technician had to specify on the lab form that this person came from the community by putting the name of the CHW who had referred them. If the person was confirmed positive, he should go to the TB service with the lab form with the stapled reference card. This case contact was recorded in the TB management register and marked as coming from the community. The provider would give him a note to the referring CHW, who would continually report the patient's condition to the health provider.*** • A model for community-based investigation (contact tracing) is Alliance CI in Côte d'Ivoire, which had a "coaching element / peer support CHW." This could be seen as a good practice to build the capacity of lay workers and CHVs involved in TB and other health-related programs. ***"At the project level, the project increased the number of CHWs. The project recruited and trained CHWs to cover CaP TB sites, perform activities related to the project. The project added 22 CHWs to the CaP TB project. To be specific, we trained basic CHWs and made them CHW coaches." —Côte d'Ivoire participant***

	• The notion of coach and base CHWs meets with the national policy on community health in Côte d'Ivoire. According to this policy, we have two main actors: coaches and base CHWs. The coach CHW is part of the national group but has some coaching, guidance, and leadership capacity compared to the others. He has a better understanding of community activities than base CHWs. At the Côte d'Ivoire, CHWs are trained to manage all diseases, not just TB. They have a comprehensive package. But among them, some have a great capacity to handle TB. They are CHWs coaches. They stay close to the providers and help them manage all the diseases. When a case of TB is identified in their catchment areas, they automatically give the patient for follow-up. When the CHW coach works in malaria or other diseases services identifies a case of TB, they hand it over to the base CHW. There is a synergy of action between them. As the base CHWs do not have much knowledge of TB, the coaches and providers go into the community to train them. The data validation meeting is an opportunity for the capacity building of base CHWs. There is the quality control of the service called community rating carried out by the CHW coach and the nurse who go to the field to see what the basic CHW is doing and then validate their data.
Subtheme 2: Additional human resources to support screening	• Most of the countries interviewed indicated that additional staff (human resources) was needed to assist with intensified case finding at the facility level as well as for contact tracing. In some of the countries, these additional workers (mainly lay workers) were called "cough monitors," whereas in some countries they did not change the name of the existing lay workers that were contracted to conduct screening at the facility level and or perform contact tracing. This was mainly reported in Uganda and Tanzania. • Also, some countries did not pay a salary/stipend to these lay workers but provided some sort of compensation for transport cost, telephone, or other costs in order to align with the MoH human resource structure and community volunteerism profile/concept. The advantage of doing so was to allow continuity of services when funding elapsed since these lay workers would be absorbed or part and parcel of the existing PHC structure. This was mainly reported in Uganda. • Community linkage staff and motorbikers were recruited in Lesotho, Kenya, Democratic Republic of the Congo, Côte d'Ivoire and Cameroon to support contact tracing and transportation of samples. Particularity in Côte d'Ivoire and Cameroon, community linkages and the ones who were transporting the samples from the community to the facility were the same people. • Contact investigation was very well organized and follow-up was well done. • There was an increase in the number of children diagnosed with TB or who started prophylaxis.
Subtheme 3: Advantages and disadvantages of external workers recruited for project	• When a project uses the existing staff to implement its activities, these activities do not stop right after the end of the project. Staff who have acquired the knowledge and skills continue with the project activities and facilitate the sustainability of the activities after the project. • In Cameroon, the CaP TB project was considered a project that aimed at capacity building for HCWs in order to improve childhood TB, hence no incentive was given to both HCWs and lay workers. Instead, the incentives were used under the performance-based financing, where for health facilities that performed well based on quarterly reviews/reports, an award was given to the facility and the financial incentives were shared among facility staff. However, there were some challenges at the beginning as HCWs were resistant to participate in the project because of a historical approach where HCWs were paid directly for new projects, especially projects that were donor funded. ***"There was a problem with the sustainability of the project. And if we put the incentive in, what would happen after the project. So, no incentives should have been given."***

Subtheme 4: Lessons learned and challenges encountered	• Overall, the use of additional staff to conduct systematic screening and contact tracing contributed positively to increases in case finding, eased the staff workload, and raised awareness in the community about childhood TB and the acceptability of TPT for eligible children. The effect of strengthening human resources for TB case finding and contact tracing improved the yield of TB diagnosis in children and uptake of TPT. • Introduction of ICF tools and other reporting tools for line listing of contacts contributed to good outcomes on case finding. • Cough monitors or facility linkage staff recruited from the pool of lay workers under the MoH district/PHC structure had high potential to be absorbed in the system and to continue to render the services after the project funding elapsed, as was in the case of Uganda. • Cough monitors and contact tracers who were recruited from existing NGOs that had volunteers who were former TB patients or affected by TB tended to perform well compared with volunteers who were from HIV or other programs. This was evident in Democratic Republic of the Congo, Côte d'Ivoire, and Lesotho. • For instance, in Democratic Republic of the Congo, contact tracing was well organized as it was supervised by the Club des Amis Damien, a group of former TB patients who work at the health facilities where they received treatment. As former TB patients, they are used to the health care providers and have a good relationship with them. • For some countries (mainly in Democratic Republic of the Congo and Côte d'Ivoire), the participants expressed that implementation certain activities of the project such community contact tracing (taking place outside of working hours) and filling of recording reporting tools (paper workload) were perceived as extra work and outside of their main duties. This affected the outcomes of the program to some extent as HCWs with that attitude affected performance at sites. As a result, they have not been considered a priority, thus neglected. • If there was no close follow-up, involvement, or ownership in the project by the facility management team, some activities—in particular, contact investigation and tracing—were affected as were other larger activities of the project. • Most of the participants across the nine countries expressed that workload increased from the screening tools introduced by the project. Although the screening tools were useful in prompting HCWs to screen for TB in children at every visit, the tool was too time consuming to fill in given the other responsibilities that HCWs have.

Subtheme 5: Factors that enhanced contact tracing	• The systematic screening for TB symptoms enhanced contact tracing. • ***"It is mainly the screening that has facilitated the diagnosis of TB. When a HCW does the screening, he must continue the diagnostic process." —Côte d'Ivoire participant*** • The accessibility of diagnostic kits and interpretation of X-ray results also helped. • ***"The accessibility of diagnostic kits and the reading of the X-ray on the WhatsApp platform with specialists, the X-ray and lab technician, and doctors made our task easier. That allowed for a quick reading of the X-ray and helped us decide in favor TB or not. The platform led us to see to know what to do." — Kenya participant*** • The accessibility and support provided by EGPAF project team was considered as a factor that contributed to improved TB case finding in children. This was mainly expressed by participants from Côte d'Ivoire, Lesotho, and Kenya. ***"The availability of EGPAF agents. Whenever we needed them, they acted directly, and this encouraged us." —Côte d'Ivoire participant*** • There were support groups and educational talks in the community with the leaders telling them about TB. It is something unknown in society, and some people are not informed. So, the involvement of the community has boosted community research. It has helped to get suspected cases and TB. There were support groups that targeted parents of index cases with TB and on TPT. The providers oriented these parents to be the relays in the community. We had the multi-disease campaign at the community level that allowed the population to know about TB and to rely on the community to identify TB cases in their surroundings. • Advocacy activities at community level mainly reported in Côte d'Ivoire, Tanzania, and Democratic Republic of the Congo. • ***"There was an awareness caravan that we initiated at the Côte d'Ivoire. We have had international football celebrities involved who are role models to sensitize the population to join the fight against TB and increase notification." —Côte d'Ivoire participant*** • ***"There was the participation of former TB cases to break the stigma. In a World Bank project, we found that parents were reluctant to put their children on TB. In Africa, not everyone knows about prevention. Some parents were prescribed TPT for their children but refused to come and take the treatment. We had to break the barrier first. It started with the involvement of the parents to break the barrier. We used the double talk strategy where parents and children on treatment broke the barrier by talking about their treatment experiences. That led to reluctant parents bringing their children to start treatment. The second strategy was that celebrities and political leaders were involved in the awareness of the community about TB through the caravan that we put in place. The third strategy was the development of communication tools on pediatric TB that did not exist. We put together a comic book on the management of pediatric TB. We started to popularize it through the opera news, the known communication channel. We developed leaflets and posters specifically on pediatric TB, something we didn't have in the country. We even made a film on pediatric TB called Vision CDI. CaP TB helped to make this film. This film passed on the national TB channel with the principal actor known at the Côte d'Ivoire. That helped create awareness among parents about the need for pediatric TB care. Currently, a competition on TB is being organized for the finalists to write on TB principal challenges at the Côte d'Ivoire." —Côte d'Ivoire participant***

Theme 3: Supporting diagnosis	
Subtheme 1: Accessibility of X-rays and interpretation	• Some countries covered the fees of X-ray and bacteriological tests for children under 5 years and above for those coinfected with HIV as part of the universal health coverage. However, in some countries such Cameroon, Côte d'Ivoire, and Kenya, X-rays costs (for patients and reading of X-rays) were covered by the CaP TB project. • In Democratic Republic of the Congo, the X-ray fee varied from one facility to another (no standard price) and parents could not afford to cover those fees. This contributed negatively to contact-tracing work and motivation of parents/ guardians with presumptive TB children to attend facilities. • Transport fees were reimbursed to parents for any traveling related to the TB investigation in most countries, except Cameroon, where these costs were not covered. • Nurses and doctors were trained to interpret the results of X-rays. No specific problems have arisen with interpretation of the X-rays***. "We trained clinicians on pediatric TB where the module on X-ray interpretation was included, but we were comfortable with the reading of the X-ray, as we did not have radiologists in all the facilities where the X-ray was done. The interpretation was difficult sometimes." —Cameroon participant*** • ***"It provided films for radiology and the X-ray was free for any child with suspected TB. After doing the X-ray, the X-ray technician put it directly on the WhatsApp platform, the pneumologists or radiologists read the X-ray and was interpreted, and results were put on the child's form while waiting for the other results for the decision." —Côte d'Ivoire participant***
Subtheme 2: Process for diagnosing TB in children	• ***"The project put in place diagnostic tools that required providers to do all the necessary investigations to diagnose TB. The screening and investigation form that was available guided us. CHWs or nurses, depending on the entry point, should screen every child who comes to the health facility. When the screening was positive, CHW or a nurse should bring the child to the doctor with his screening form. The doctor checked the screening done before him. As soon as he confirms the presumption of TB, he starts filling in the investigation form. The form has all steps to follow and carry out an investigation. This form had three sections: one for clinical information, another for the samples taken and another for the paraclinical results. So, the form guides us to do everything well. After filling in the investigation form, the doctor took the sample and sent it to the laboratory; at the same time, he filled in the X-ray form, and the mother brought the child in for the X-ray." —Côte d'Ivoire participant***
Subtheme 3: Transportation samples	• In most of the countries, they have a transportation system that was put in place but financially supported by the project with the exception of Zimbabwe, Uganda, Lesotho, and Côte d'Ivoire. • The project paid for the transport of the staff who brought the sputum to the CDT. CaP TB trained them on how to pack samples (triple packing). ***"Sometimes, the CaP TB used trainees who were people doing refresher training (those who have finished their studies but are training at the hospital) or the psychosocial counselors to transport the samples." —Côte d'Ivoire participant***

Subtheme 4: Lessons learned	• Involvement and close follow-up of patients TB patients by HCWs ***"Before the project started, we had to transfer any child with suspected TB to the CDT level, and we didn't even know what happened to that child once referred. We were no longer involved in his follow-up. But with the arrival of the CaP TB project, we collect samples ourselves and can follow the child until the final decision to put him or not on treatment. The number of children diagnosed with TB has increased significantly" —Côte d'Ivoire participant*** • Access and availability of diagnostic tools equipment such as Xpert contributed to case finding. ***"The availability of the Xpert test at free of charge to all children with signs of TB has encouraged its [Ultra cartridge] use. There is also the facility to collect the samples and transport them. There is also the rapidity of getting the results." —Côte d'Ivoire participant*** • What was put in place to ensure the majority of presumptive cases are investigated was mainly due to the availability of the TB symptoms screening form. • ***"It was the screening and diagnostic forms that made this possible. As soon as you filled in a part, it asked you to continue until the end of the process. It was difficult not to follow the diagnostic process pre-established by the project." —Côte d'Ivoire participant***
Subtheme 5: Challenges with diagnosis	• Most countries reported challenges with sample transportation when they were using contracted companied to perform the task. In some instances, the children arrive at the facility late when the transport has left. This resulted to send back the child at home and ask them to come back again another day, which somehow contributing to missed opportunities as some of these children did not come back due to transport issues. ***"The transport of samples is also one of the problems we have encountered in the implementation of bacteriological diagnosis because the Xpert machines are not everywhere. So, we reinforced the reference system that was already set up by the project before the project arrived. We supported the system by financing the transport of samples." —Kenya participant*** • When it comes to sputum induction, some of the parents gave their children food prior collection of samples and this resulted to have to repeat the test the following day. If the child is to be admitted, the cost of admission was paid by the parents and that was a hindrance to many parents. This was reported in Kenya and Zimbabwe. However, with increased awareness of parents on the importance of TPT in children under 5 years, some parents were adhering to fasting for the children prior to sputum induction, which was mainly reported in Kenya. • In Kenya, due to geographic characteristics of some localities where people are nomads, contact tracing was quite challenging, as well as initiation to IPT. However, there were measures put in place to be able to communicate with the patients/parents. Also, those needing treatment such as TPT were given one or two months of supply of medication to avoid interruption of treatment of the child due to movement of parents looking for green pastures.

Topic III: Integration of TB/HIV Services (Uganda, Tanzania, Lesotho, Malawi, and Cameroon)
TPT and new TPT short regimen
• *"We facilitated the inclusion of the shorter regime, 3RH less than two years, 3HP for above two years. As I said, the shorter regiment has been included in the new guidelines but in the field, it has not yet been implemented because of supply chain issues. So, in the field we are still providing INH for six months." —Lesotho participant* • *"In our guideline, we have recommended the use of shorter regimen. However, we have not yet started implementing that route … because our transition was going to be informed by supply chain factors. In other words, we were going to complete INH that is in stock and in the process, as we're moving towards completing the stock that is available, the shorter regiment would be ordered, and when we were completing the anticipation was that we would be moving over to the shorter regiment. However, that has not happened. We still have INH, and we continue to use that. However, at some point … for example, a month or two ago I had to go back to my memo. The MoH has written a memo to the districts to say that they may now use RH which is one of the recommended shorter regiments as the INH is running out now, so that is where we are." —Lesotho participant*
Challenges and remedials
• *"We have not come across many issues whereby the parent will deny access to their children to get INH but the main issue is that many of our clients live in remote areas and for them to reach the health facility is a bit challenging. For instance, after conducting contact tracing, once the child has been identified as eligible for IPT, he has to get to the facility to be evaluated and then if needed to get … it has been challenging for some parents to reach the facility. That's why under CaP TB, we came up with the idea of providing transport for parents and kids." —Lesotho participant* • *"The caregivers in the households may be a TB patient who is an adult and when you follow up, you find out that the children who could have been eligible, or who is eligible did not get INH; not because the caregivers did not want but because they were not aware, and you find out that the health care worker did not provide that information. This is one of the areas where CaP TB was trying to bridge the gap to make sure that the health care worker have that knowledge and they can pass that knowledge to the care giver so that the children can have access to INH." —Lesotho participant* • *"In the beginning the main challenges—as [my colleague] said—was regarding the supply. There was a stock-out of commodities here and there. So, the first thing that we did is to make sure we don't come across that type of situation. So, there is lack of knowledge. You will realize that health care workers were not aware about the latest updates regarding the eligibility of IPT. For instance, if you go through our current TB guideline, you will notice that children of less than 15 years are eligible for IPT as far as they have been in contact with someone who has TB. So many nurses have been reluctant to provide IPT to these kids. So, we had to go through training, supportive supervision, mentorship to make sure that they do get access to the latest updates so that they can do the right thing.* *In few instances we got some resistance because they felt they are unable to rule out TB conclusively and therefore, they felt scared of providing INH for TPT because it will lead to resistance.* *Because the health workers had serious issues [knowledge gaps] and sometimes, they were also expressing their own fears but that was broken through numerous trainings so that they become comfortable around training and also the community component which was also continuously bringing in the community members to understand the importance of this TB prevention in children. So, it was a combination of goals and it also dived into a nation-wide implication of the communities through training of the media houses so that they can also help us to advocate for TB generally in children but also primarily for preventing TB in children." —Lesotho participant*

Theme 1: Process for TB Screening, diagnosis, and treatment at HIV services (ART clinic)
• In sites supported by CaP TB project, the psychosocial worker or cough monitors receive and screen children for TB. If the screening is positive, children are referred to the doctor of the HIV care unit for further investigation. If the doctor decides that the child is eligible for INH, he/she puts the child on INH. But when the presumption for TB is confirmed, he will refer them for lab tests. If tests are positive, children will be linked to the TB unit using a form that allows the child's progress to be traced from the consultation to the TB service through the lab. That allows the monitoring of children by ensuring that all diagnosed children received treatment. This model was mainly used in Lesotho and Cameroon. ***"In Cameroon, children who are HIV positive and eligible for INH are given INH in the HIV department, and those who are in contact with an index case, but HIV negative, are given INH in the TB department. That is why we have two INH registers at the health facility level, one at the HIV unit and another at the TB unit." —Cameroon participant***
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• In Uganda, Tanzania, and Malawi, all HIV services were provided at ART sites by the same health care workers, particularly at the PHC level where there are ART sites. Also, in these three countries, TB/HIV integration was already taking place to a moderate level, although sometimes HIV screening was not done systematically to the desired level in line with national guidelines.
• In countries where integration of TB services into HIV was taking place, the CaP TB project assisted greatly in reinforcing the intensification of case finding in children beyond the TB/HIV coinfected patients through the recording tools such as the ICF forms, INH register, and others. These tools compelled HCWs to provide the services and record the service provided. ***"The national guideline recommends that we should have one stop center. Because the guidelines already provided that premises to say that everything should be done in one place. Integration of TB and HIV services should be done by, at one place. You know at entry point." —Uganda participant***
Theme 2: Approach used to link children on TPT to TB services
• At CaP TB project–supported sites, HIV coinfected children are given TPT at the HIV service. However, TB contacts of HIV index cases under 5 years old who are HIV negative are given TPT at TB services. This was reported in Cameroon and Lesotho, whereas in other countries, all the TB services were provided at the HIV site/clinics by same HCW. ***"Under CaP TB project, it is the psychosocial worker who receives the child and screens him for TB. If the screening is positive, the child is referred to the coordinating doctor of the HIV care unit that will conduct the investigation. If the coordinating doctor believes that the child is eligible for INH, he puts him on INH … That is the mechanism put in place to ensure that all children with presumptive TB at the HIV service level were taken care of as required." —Cameroon participant***
• With the support of the CaP TB project through the introduction of the TPT registers, the uptake of TPT increased and the adherence was generally good due to the follow-up mechanism establish through recording and reporting tools. ***"Even as we look at our progress in this [TPT adherence] indicator, we have good adherence for children. Because the good thing about the CaP TB follow-up, there is specific forms for following up every client compared to the national level follow up where you must document everybody in one database. So, the adherence was good, despite it being a six-month course of treatment, it was a good adherence." —Tanzania participant***

Theme 3: Key challenges for integration of TB services (TB screening, investigation, TPT and treatment in HIV services) into HIV services
• Change the existing registers designed according to WHO standards to those in which the project indicators are integrated. • Contact children of HIV positive index cases are followed at the TB level, which created multiple appointments, and parents complained or sometimes could not afford to pay for transport since there was no transport reimbursement for parents who brought children for contact screening. ***"The challenge was the HIV entry point. In the different sites, psychosocial workers receive the children. Sometimes because of the workload, they are not thinking about doing TB screening. Through that entry point, we could get a lot of cases. But as these people are not thinking about it often, I would assume that we had missed a lot of cases ... We need to focus on this entry point which was a problem despite regular supervision and coaching. Even after CaP TB, we need to focus on HIV entry point as it has the probability of having more children with TB." —Cameroon participant***
Theme 4: Lessons learned to enhance TB/HIV integration and challenges
• In countries where integration of TB services into HIV was taking place, the CaP TB project assisted greatly in reinforcing the intensification of case finding in children beyond the TB/HIV coinfected patients through the recording tools such as the ICF forms, INH register, and others. These tools compelled HCWs to provide the services and record the service provided. ***"CaP TB really strengthened the screening. TB screening is happening among HIV clients within the HIV clinic but the quality of it, you know, maybe it's a quick tick in the box and then you don't look at it, but the CaP TB project really enhanced the quality of that screening so that we yield a better outcome and identified more cases." —Uganda participant*** • In Cameroon, integration of TB into HIV services was taking place prior the project, although the focus was mainly on adults. With the support of the CaP TB project, the focus was on pediatric TB where TB screening and linkage to care were actively done. However, the TB cases were managed at the TB services, not at the HIV clinic. ***"But if he thinks the child is presumptive of TB, he sends him for lab tests. If the child is diagnosed positive, we link him to the TB unit. The coordinating doctor used a form to link and trace children progress through different services." —Cameroon participant*** • The CaP project helps to raise awareness and to improve the capacity of HCWs on management of childhood TB, in particular in Lesotho, where IPT was not provided as well as the introduction of the new regiments such as 3RH. • Key recording and reporting tools such ICF and TPT registers were useful to reinforce the use of the national guidelines in countries where TB/HIV integration was provided already, as reported in Uganda and Tanzania. ***"So that one-stop model where both services are integrated under the same roof was already in place. CaP TB focused on more is the pediatric component. Prior to CaP TB we focused more on the individual themselves and the contact tracing and the household checking was not happening as it should have been." —Uganda participant*** • Constant supervision and monitoring were also a contributing factor that enhanced integration of TB/HIV services in Tanzania and Uganda. There was a dedicated TB focal person (e.g., nurse) at the HIV clinic who was providing a supporting HCWs to ensure that TB screening is done systematically and effectively***. "... So there was as well a dedicated staff [a TB focal person] at the HIV clinic whose role was to support the screening of TB within HIV clinic." —Tanzania participant*** • ***"A key success factor for Tanzania while we were able to boost this [Integration of TB/HIV services] in a relatively short timeframe, we were not re-inventing the wheel, we're not starting from scratch, we were building on an existing structure and structure that is there—established by government but only needed to be fine-tuned. A structure that needed to have a focal person that can provide mentorship to the health care worker. So, we are not adding a lot of additional human resources. But adding a better tool, providing coaching and mentorship on the ground, that made to me a difference and the fact that we were having a team that was looking at the data and be able to reflect with the service providers on the performance." —Tanzania participant***

Theme 5: Recommendations

- Recording and reporting tools newly introduced should aim at improving performance as well avoid workload of HCWs in completing these forms. Hence, a careful revision and adoption of these new project tools by the NTP is paramount. This was expressed by all the countries interviewed on the topic.
- ***"The most critical (activity) was having the TB linkage facilitator within the facility. The site team redesigned the client flow and actually had TB linkage facilitators and maybe to be part of the team. So the beauty with the TB linkage facilitator is that hmm, they reduced the workload and they could actually also support the site team." —Uganda participant***

Elizabeth Glaser Pediatric AIDS Foundation

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