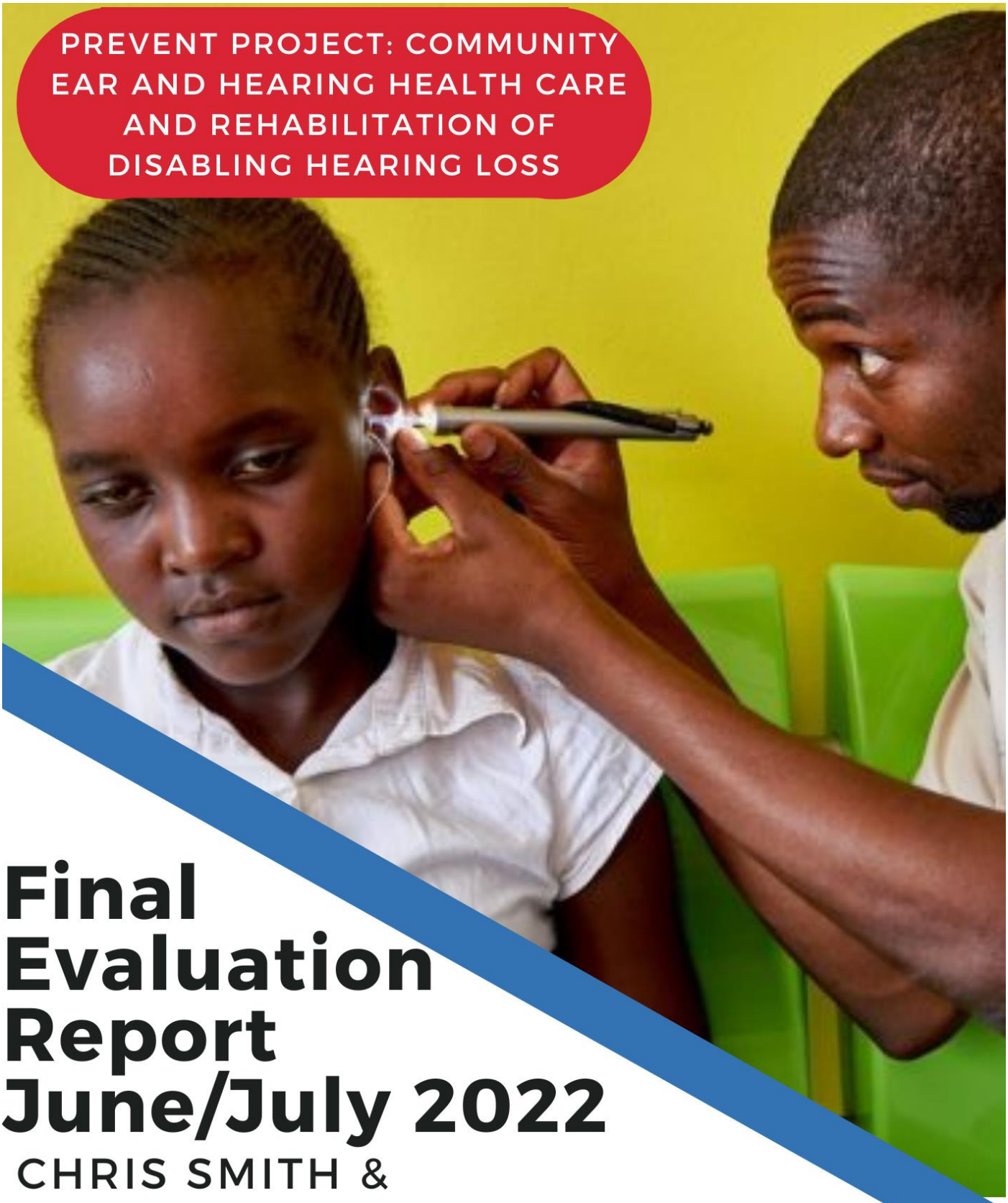
PREVENT PROJECT: COMMUNITY EAR AND HEARING HEALTH CARE AND REHABILITATION OF DISABLING HEARING LOSS



Final Evaluation Report June/July 2022

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Contents

Acronyms and Abbreviations

BCH: Beit CURE Hospital

CBM: Christian Blind Mission

CBVs: Community Based Volunteers

ENT: Ear, Nose and Throat

HCWs: Health Care Workers

MoE: Ministry of Education

MoH: Ministry of Health

PEHC: Primary Ear and Hearing Care

PS: Permanent Secretary

QoL: Quality of Life

ZAPD: Zambian Association of Persons with Disabilities

ZENTAS: Zambia Ear Nose Throat Audiology and Speech Society

Acknowledgment

This evaluation report was written by Chris Smith and Professor Liz Grant, independent evaluation consultants from Edinburgh University. The data and support underpinning the fieldwork for this evaluation was kindly supplied by representatives from CBM UK, CBM Zambia and BEIT Cure Hospital Lusaka.

We would like to extend our gratitude to the many people whose help, input and support has enabled the delivery of this evaluation and in particular the healthcare workers, community-based volunteers and patients who shared their personal experiences of the project through focus group discussions and interviews.

Finally, we would like to thank Jesinala Makamba and Sukanzila Munkombwe, for their excellent work as Research Assistants for the Focus Group Discussions in Kabwe and Kapiri Mposhi Districts.

Executive Summary

Intervention Overview:

1. The PrevENT Project: Community Ear and Hearing Health Care and Rehabilitation of Disabling Hearing Loss is a five-year project valued at £1,251,578, funded by the Scottish Government.
2. It focuses on treating and preventing hearing loss through strengthening clinical capacity and the enabling environment in Central Province Zambia in line with Sustainable Development Goals (SDG) 1, 3, 4, 8 and 10.
3. The project was delivered by CBM Zambia in partnership with implementing partner Beit CURE Hospital Zambia.
4. The project aimed to establish and integrate Primary Ear and Hearing Care (PEHC) Services in Central Province in Zambia.
5. This was achieved by developing horizontally integrated cadres of community-based volunteers, health-care workers (nurses and clinical officers) trained in

PEHC and audiology technicians, provided with the equipment required to deliver basic diagnostic and treatment in ear and hearing.

6. This was additionally supported by the construction of soundproof audiology booths in which hearing tests for the purposes of hearing tests and the fitting and programming of hearing aids could be carried out.
7. In a parallel project aimed to influence the development of government policy and resource allocation at National, Provincial Level to embed and sustainably integrate Ear, Neck and Throat (ENT) services in Zambia.
8. Holistic support is offered through direct collaboration and advocacy with communities, government authorities and NGOs to facilitate the success of the programme and deliver additional benefits vis-à-vis the awareness and treatment of persons with disabling hearing loss in the wider community and through government and NGOs.

Evaluation:

1. The review was conducted by Independent Evaluators from the University of Edinburgh who reviewed project documentation covering the project lifecycle and relevant literature relevant to the intervention, and conducted a set of key informant interviews and focus groups discussions in May 2022.
2. This Evaluation uses the Medical Research Council (MTC) Process Evaluation Framework to build up a Theory of Change to chart and evaluate how programme activities produced changes.

Findings:

1. This project had managed to establish and develop Primary Ear and Hearing Care (PEHC) Services in Central Province. There have been substantial improvements in the identification, diagnosis and treatment of people with disabling hearing loss or conditions which risk hearing loss.
2. Central to this has been the development of significant skills and expertise in primary ear and hearing services including 13 audiology technicians, 127 clinicians and nurses trained in PEHC, and 237 community-based volunteers.
3. This was augmented by the construction of 5 soundproof booths for hearing tests, and the provision of context specific diagnostic and treatment equipment for PEHC.
4. Collectively this has seen the number of people per PEHC trained health care worker drop to below 9000 population per health care worker, while previously a population of over 900,000 did not have a single health care worker. These healthcare workers have delivered over 120,000 consultations and services during the period and as long as the services are maintained, this number stands to increase substantially in the coming years.
5. That this was possible during a pandemic which caused some activities to be disrupted for up to 2 years, is commendable.

6. However, one of the consequences of this disruption is that while Primary Ear and Hearing Care has undoubtedly been successfully established in Central Province in Zambia, the government (at National, Provincial and District level) is not yet ready to adopt *full* responsibility for the delivery of the services established by the project.
7. This has been exacerbated by a change of national government during the course of the intervention which has required new relationships to be built across the board.
8. However, the relationships between CBM, and the Government are strong and there is clear willingness, especially at local level, to assume increasing responsibility for these services and the project team are committed to providing the necessary intermediary support to ensure services are maintained in the interim

Recommendations:

1. This PEHC model should be extended to other Zambian Provinces and analogous settings elsewhere.
2. Support is extended from CBM and BEIT CURE and steadily reduced as the government gradually increases the support offered to ensure that continuity of services is ensured.
3. CBM and Beit CURE should establish a mechanism to establish collective accountability for the delivery of the services until the government assumes full ownership.
4. The National ENT Coordinating Committee is established as a priority to engage the government for the resource allocation required to support these services in the long term and establish them nationally.

1. Introduction and Methodology

The end-of-project review of the Scottish Government-funded PrevENT Project: Community Ear and Hearing Health Care and Rehabilitation of Disabling Hearing Loss was commissioned by CBM UK the managing partner of the programme as part of their requirements to evaluate the performance of the project and report into Scottish Government at project cessation.

Purpose: to carry out an End of Programme Evaluation assessing if the deliverables, outcomes and impact of the programme have achieved as planned/expected, to find out how the programme was perceived among different stakeholders and provide lessons for future programmes.

It was agreed in the Terms of Reference that the evaluation would use the MRC Process Evaluation Framework to build up a theory of change to chart how the programme activities produced the resulting change. The evaluation will be conducted through the following set of questions to interrogate the intervention and guide the analysis:

- Description of the project: What activities took place, what was and now is the context, what changes and conditions occurred.
- What **impact** did the Prevent Programme have on access to treatment and diagnosis of hearing loss in the 3 Districts within Central Region, Zambia
    - What has been the targeted impact on hearing health outcomes?
    - What has contributed to these impacts?
    - What has been the uptake of services accomplished?
    - What has been the impact on patients with regards to their physical health and their wellbeing?
    - What has been the impact of training on nurses/clinicians?
    - What has been the impact of the training and service delivery on the institutions (BCH/clinics)?
    - What has been the broader impact on health outcomes?
    - What has contributed to these impacts?
    - Has the project delivered any unexpected outcomes outside the scope of initial expectations?
    - Has the programme had any effect on public policy (at a district/national level)? Can these changes be attributed directly or indirectly to the work of the programme?
- Are services more accessible, less accessible or has there been no change in accessibility?
- What was (and continued to be) the impact of COVID 19 pandemic on the programme and how have risks generated by the pandemic been mitigated?
- What have been the challenges and successes of the activities from the perspectives, of, and with the following stakeholder groups:
    - Wider community of practitioners
    - Public Sector

    - NGOs
    - Wider community
    - From the institutions delivering the services and training
- What lessons can be identified from the programme for future implementation for ENT projects
- Has the intervention been deemed to be cost effective, and if so by whom and with which markers?
- How sustainable is the programme likely to be after funding ceases? What obstacles do stakeholders identify in maintaining or securing sustainability?
- What is the relation of the programme to the national Strategy and how has, and how will the programme contribute to national indicators and outcomes?

The review sources identified to support this analysis were:

1. LogFrame

2. Desk Based Review of critical project documents such as Narrative Reports to Scottish Government and wider Academic Literature, minutes for Stakeholder Engagement meetings, Outreach Clinic Gender statistics, Beit CURE EHC Training Database, Beit CURE School Screening Database

3. Key informant Interviews and Focus Group Discussions

Desk-Based Review

A desk-based review was undertaken, through collecting, organising and synthesising available information. This provided an understanding of the country context and allowed the opportunity to identify gaps to address during the in-country fieldwork. Activities include scanning the literature, analysing secondary data, and creating a reference list so that all documents are organised and easily accessible. A review of the existing documents included a review of the programme log frame and a review of the available reports and project data.

Key informant Interviews

Interviews were undertaken with key informants from CBM, Beit CURE Hospital, District Health Officials, Hospital Administration at Kabwe General Hospital, staff from Broadway Secondary School and the National ENT Coordinator. A semi-structured interview approach was used, combining a predetermined set of open questions (designed to prompt discussion) with the opportunity for the interviewer to explore particular themes or responses further. In this way, the interview does not limit respondents to a set of predetermined answers (unlike a structured questionnaire). This approach was used to understand how the intervention worked and to explore any challenges faced during the course of implementation. It also allowed respondents to discuss and raise issues that may not have been considered by the reviewers.

Focus Group Discussions

Focus group discussions were undertaken with (1) Audiology Technicians, (2) Health Care Workers trained in PEHC (Nurses and Clinical Workers), (3) Community Based Volunteers and (4) patients at community outreach clinics.

Some of the focus group discussions were conducted with the support of two research assistants trained in public health from the Central Province (and therefore fluent in the primary language of the respondents). Participants numbers were kept to a maximum of 7 participants per focus group and conducted in 2 of the 3 provinces in Central Province. In all Focus Group Discussions consent was sought and received from all participants for recording of proceedings to take place alongside note taking to ensure that participants responses could be captured and reviewed to ensure that their contributions were incorporated with fidelity. As per agreement these recordings were deleted following review.

2. Context of PEHC in developing context and in Zambia

PEHC in a Developing Context

Hearing loss ranks as the third highest cause of disability[1] globally, with over 1.5 billion people estimated to be currently affected by some extent of hearing loss, which is expected to rise to 2.5 billion in the next 30 years[2]. Of this over 360 million are estimated to currently be living with disabling hearing loss[3][4].

However, much of this hearing loss is deemed to be preventable; the WHO World Report on Hearing outlines that cost-effective and evidence-based interventions can prevent much of this potential loss of hearing.

Left unaddressed, many of the causes of preventable hearing loss can lead to debilitating consequences with consequential effects on, non-exhaustively; interpersonal communication, speech and language development, educational attainment, employment, economic independence and psychosocial wellbeing[5].

While not all hearing loss is preventable, interventions against common ear diseases, infections, vaccine preventable illnesses and environmental exposure (noise and chemicals) present opportunities to substantially reduce the incidence of hearing loss that is preventable and improve lives. In addition to this, preventative measures can be supported by a range of technological, medical and surgical interventions[6] to help support those who have already experienced hearing loss and ensure that they are not ignored.

As outlined in the World Report on Hearing, despite the evidence base supporting the effectiveness of preventative interventions, they are not accessible to the vast majority of those in resource limited settings. Resultantly, the World Health Assembly adopted resolution WHA70.13 on the "Prevention of Deafness and Hearing Loss" in 2017, which encourages all Governments to incorporate ear and hearing care into their national health systems.

The resolution recognised that 90% of those living with disabling hearing loss were located in low- or middle-income countries, and that much of this was preventable through low-cost interventions.

Context in Zambia

Hearing loss is both a cause and consequence of poverty in Zambia, and as much as 6% of the population in Zambia are estimated to experience hearing loss, with more

[1] As defined by number of years lived with disability
[2] WHO – World Report on Hearing 2021
[3] Nordvik, Øyvind et al. "Generic quality of life in persons with hearing loss: a systematic literature review." BMC ear, nose, and throat disorders vol. 18 1. 22 Jan. 2018, doi:10.1186/s12901-018-0051-6
[4] Disabling Hearing Loss refers to hearing loss in excess of 35 decibels (dB) in the strongest hearing ear.
[5] Olusanya, B.O., Neumann, K.J. and Saunders, J.E., 2014. The global burden of disabling hearing impairment: a call to action. Bulletin of the World Health Organisation, 92, pp.367-373.
[6] Such as hearing aids, cochlear implants, speech therapy and sign language therapy

again estimated to suffer from diseases affecting the ear. Hearing loss is an under-recognised consequence of many major diseases prevalent in Zambia and their associated treatments; including HIV/AIDs, malaria, tuberculosis, meningitis, maternal complications and childhood diseases. For example, rural communities[7] Zambia are at risk of otitis media, from exposure to contaminated water, which is often left untreated by antibiotics and ear cleansing and instead treated using traditional methods which increase the risks of degeneration of the condition.

Adults with hearing loss are disproportionately at risk of unemployment and suffering from communication barriers to the formation and maintenance of relationships, and reduced access to information and services which exacerbates the risk of negative health and socioeconomic outcomes. Meanwhile, children face reduced language and cognitive development and educational outcomes, with statistical studies indicating that most Zambian school classes include at least one child with a progressively disabling chronic ear infection. For example, a study in Lusaka district indicated a 11.5% prevalence of disabling hearing loss in school age children[8].

Despite this need, Zambia is served by a single audiologist and just five ear, nose and hearing (ENT) specialists, against a population of 17 million[9]. This is estimated to constitute just 1% of the workforce requirements to service the population needs for EHC provision[10]. Transport to and treatment in tertiary ENT services in Lusaka are costly, and late referrals worsen morbidity outcomes.

Before the project there were no nurses or clinical officers in the country who had received training in Primary Ear and Hearing Care. Even simple procedures such as removing of foreign bodies were not available in primary services. This at times has led to damaging interventions by health care workers trying to help but were not equipped with the right training or equipment. BEIT Cure shared one example whereby a HCW attempted to remove a seed from the nose of a child but moved it further down the nasal cavity which eventually entered the child's lung and ultimately resulted in the death of the child before reaching the University Training Hospital for emergency surgery.

Saliency of ear and hearing conditions is low in Zambia with public health information disseminated through limited distribution mechanisms, in which health workers and community-based volunteers constitute a primary mechanism for penetration of health care messaging into rural and hard-to-reach communities. Knowledge of hearing loss, basic ear care is low in these workers and volunteers, which represents missed opportunities to promote beneficial health behaviours, promote prevention, early referral, rehabilitation and reduce stigmatisation and promote inclusion.

In response to the adoption of Resolution 70.13 on the Prevention of Deafness and Hearing Loss, the Government of Zambia developed a plan to develop Primary Ear and Hearing Services which extended into the communities which needed them,

[7] 70% of the PrevENT catchment area is peri-urban to rural.
[8] Hapunda-Chibanga, R. K., Aswani, J., Kipingor, M., & Munthali, J. (2020). Prevalence of Hearing Loss in Primary School Children in Lusaka, Zambia. Medical Journal of Zambia, 47(2), 91 - 97. Retrieved from https://mjz.co.zm/index.php/mjz/article/view/687
[9] https://medium.com/who/making-ear-and-hearing-care-accessible-for-all-in-zambia-601aae05192e
[10] WHO – World Report on Hearing 2021

under its 2017-2021 National ENT Strategic Plan[9]. This plan enabled the development of projects, such as the PrevENT project to be developed and implement, to begin to redress the significant burden of ENT problems in the country[11].

[11] Establishment of comprehensive care for ear diseases and hearing loss in Lusaka, Zambia | SpringerLink

3. Key Organisations on the Project

Roles and Responsibilities

CBM Zambia

Role: Responsible for in-country coordination

Responsibilities:·

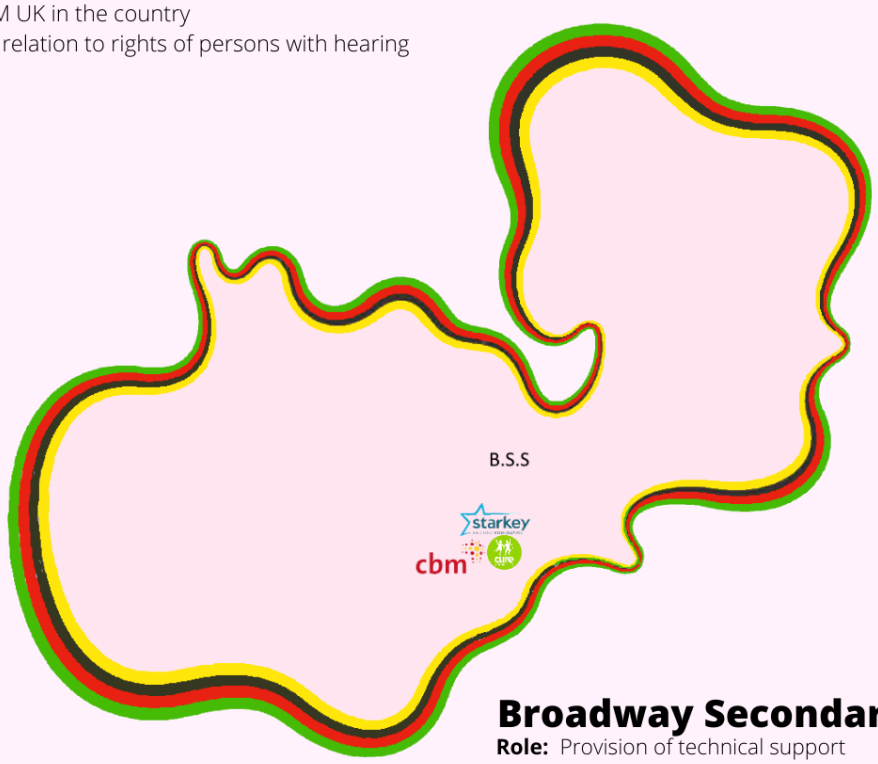
- In–country project management and project coordination, close working with BEIT Cure on project implementation
- Reviewing the Narrative and Financial Reports (Monthly, Quarterly, Semi-Annual and Annual) to be submitted to CBM UK
- Beholden to CBM UK and Partner Compliance audit
- National level dissemination
- Partner capacity development
- Project visits to monitor, evaluate and provide technical and financial support to the project
- Conducting Partner Assessment and support on the implementation of the action plan
- Representing CBM UK in the country
- Advocacy work in relation to rights of persons with hearing impairments

Beit CURE Hospital

Role: Main implementing partner of project activities in Central Province and at national level

Responsibilities:

- Implementation of the project activities, including direct engagement with people with hearing impairments
- Refurbishment of hearing aids provided by DeafKIdz International
- Procurement Logistics and project management
- Liaising with other project implementation partners, e.g. Starkey Institute, Eduplex and Broadway Secondary School
- Providing necessary trainings to HCWs (nurses and clinicians), ToTs and practical training and support to audiology technicians
- Project related data collection and monitoring and evaluation
- Preparing the Narrative and Financial Reports (Monthly, Quarterly, Semi-Annual and Annual) to be submitted to CBM CO Zambia.



Broadway Secondary School

Role: Provision of technical support

Responsibilities:

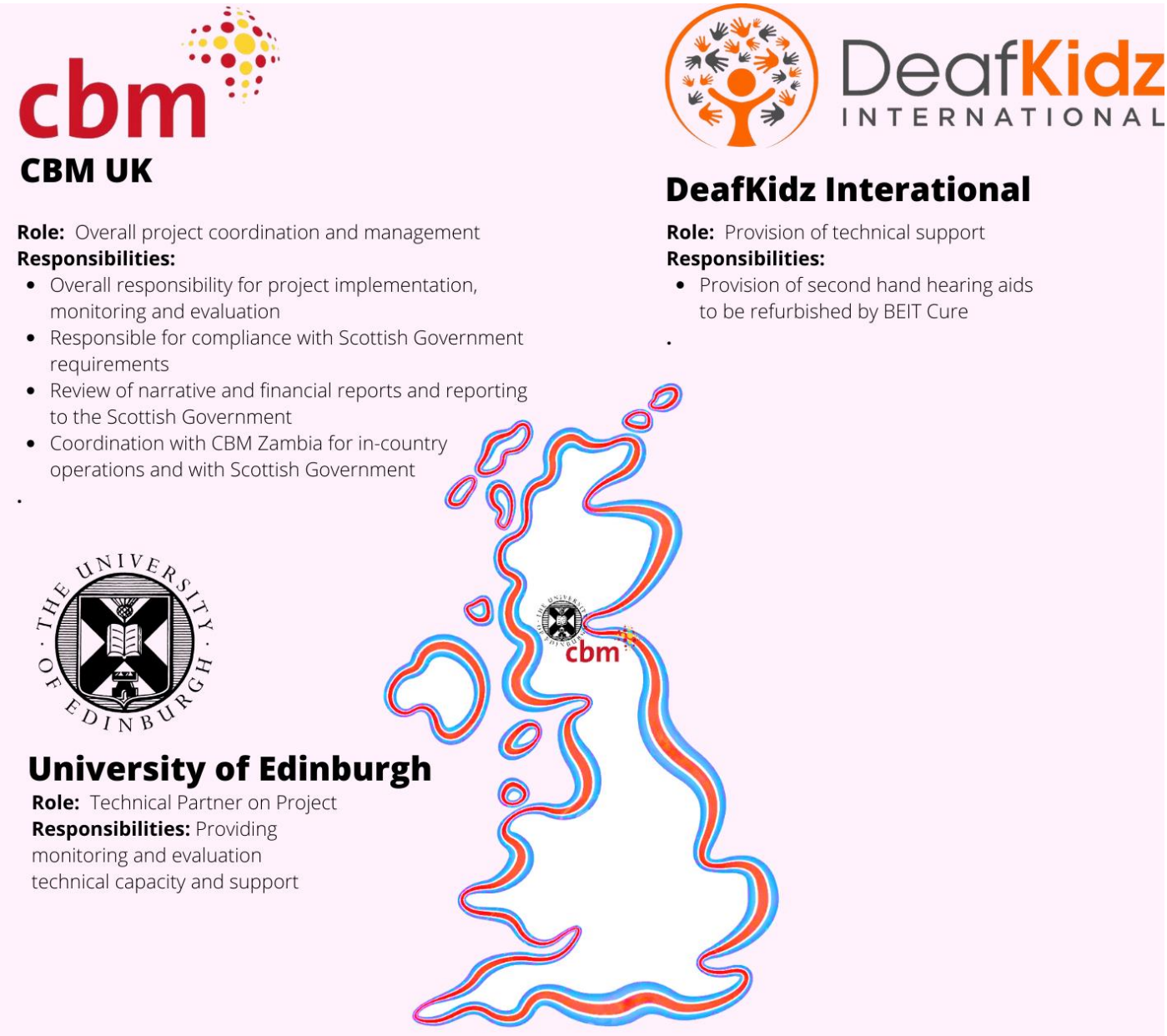
- Liaise with BEIT Cure on outreach functions in Kabwe District and Central Province to ensure inclusion of persons with hearing impairments

Starkey Institute

Role: Provision of technical support

Responsibilities:

- Training of audiology technicians
- Follow up support with audiology technicians
- Coordination with BEIT Cure on training management of technicians



Infographic of the Project Partners

CBM works alongside persons with disabilities to fight poverty and exclusion and transform lives, building inclusive communities where everyone can enjoy their human rights and fulfil their potential. CBM has been working in Zambia for over 30 years, preventing blindness, improving health and helping people with disabilities go to school, earn a living, access health care/rehabilitation and secure respect in their communities.

Beit CURE Hospital (BCH) is a well-respected NGO teaching hospital in Lusaka which was founded in partnership with the national government, with an excellent track record of delivering development projects, including experience working with CBM on multiple projects.

The Starkey Hearing Foundation runs a unique Hearing Instrument Technician course in Lusaka to train community clinicians from across East and Southern Africa, taught by Zambia's only Audiologist.

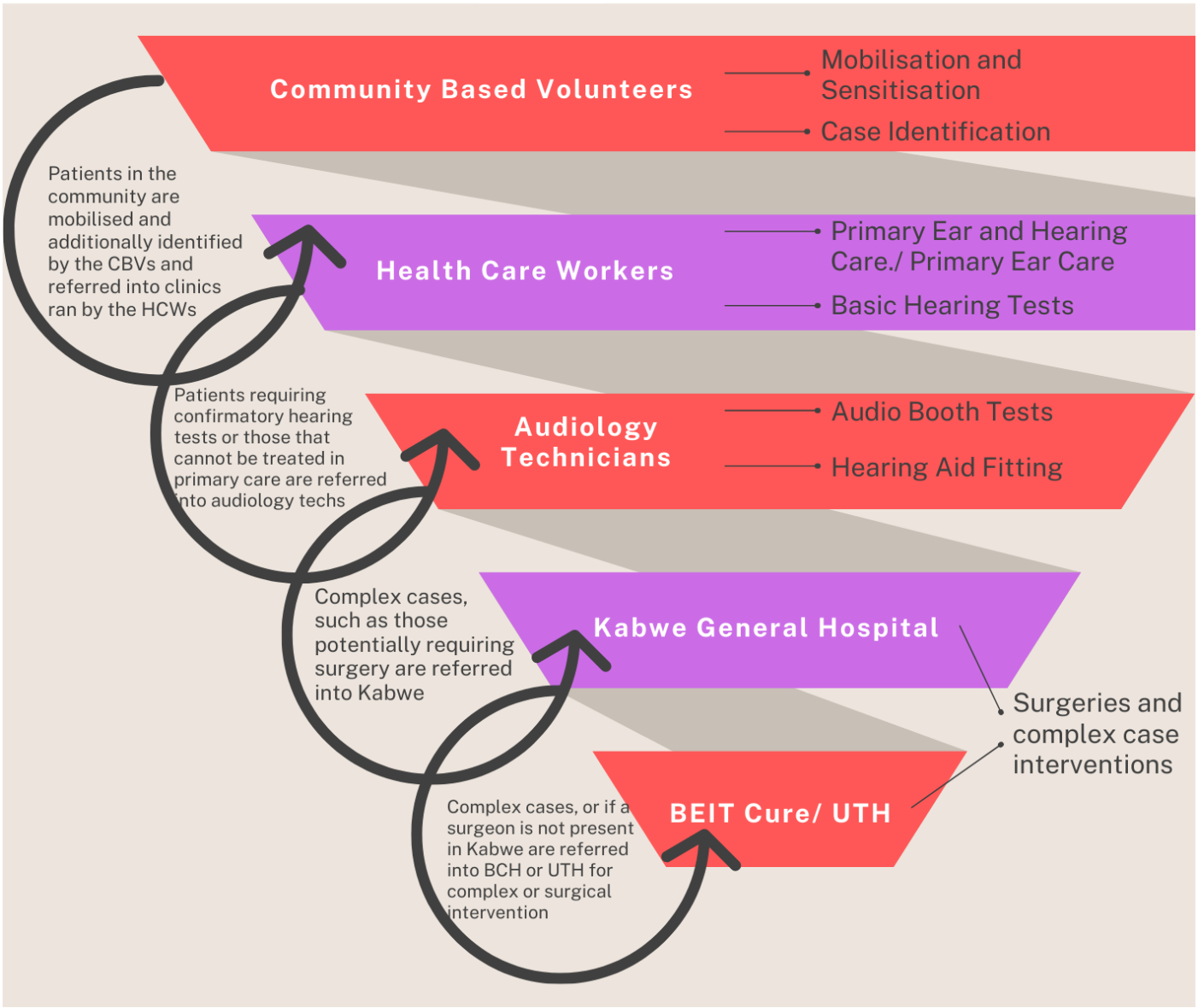
DeafKids International is a UK based organisation which assists BEIT Cure Hospital with the provision of second-hand hearing aids, which are refurbished by BEIT Cure Hospital to make them available for the project beneficiaries.

Broadway Secondary School is a school based in Kabwe with provision for students with disabling hearing loss. They have been collaborating with BEIT Cure in the district since 2020.

The University of Edinburgh is attached as a technical partner on the project supporting the mid-term and end-term project evaluations.

4. Description of the Intervention

Implementation Overview



Infographic of the Model adopted

The PrevENT Project: Community Ear and Hearing Health Care and Rehabilitation of Disabling Hearing Loss is a four-and-a-half year project valued at £1,251,578 funded by the Scottish Government.

This project contributes towards the strengthening of community and primary health systems through access to quality ear and hearing healthcare to a wider range of people in the three districts of Chibombo, Kapiri Mposhi and Kabwe in Central Province. The project improves the quality of life for people who have a hearing impairment or at risk of acquiring a hearing impairment.

It focuses on treating and preventing hearing loss through strengthening clinical capacity and the enabling environment in Central Province Zambia in line with Sustainable Development Goals (SDG) 1, 3, 4, 8 and 10.

SDG 1: "To end poverty in all its forms."[12]

SDG 3: "To reduce or eliminate a number of health-related problems and prevent suffering from preventable diseases"[13]

SDG 4: to "ensure inclusive and equitable education and promote lifelong learning opportunities for all"

SDG 8, to: "promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all, the international community aims to achieve full and productive employment and decent work for all women and men, including for persons with disabilities, and equal pay for work of equal value."

SDG 10, to: "reduce inequality within and among countries by empowering and promoting the social, economic and political inclusion of all, including persons with disabilities."

It aimed to strengthen community and primary health systems promoting increased accessible quality ear and hearing healthcare to a wider number of vulnerable people. The National ENT Plan will be introduced in its first province, emphasising community health and utilising the WHO primary ear and hearing care model to support capacity development of Zambian health workers in the field of ENT and Audiology.

The project planned for the training of 100 nurses/ clinical officers from Kabwe, Chibombo and Kapiri Mposhi Districts to be trained in Primary Ear and Hearing Care (PEHC) including in; hearing loss identification, treatment of common ear diseases, referral, health promotion and inclusion at Beit CURE Hospital, with the concurrent procurement of equipment and supplies for the 106 primary health facilities which these health care workers represented. These health care workers were to then be trained in the training of trainers (ToT) methodology, in order to disseminate health promotion training to community health workers.

[12] There are robust correlations between hearing loss and poverty as persons with disabling hearing loss struggle to access education and employment. As such this project aims to prevent disabling loss and improve care for those with hearing loss, which in turn should reduce poverty.
[13] This intervention aims to introduce primary ear and hearing care in a region which did not have these services prior to the intervention and is specifically focused on preventable hearing loss.

240 Community Health Workers were expected to be trained in the ear and hearing health promotion through the ToT methodology, with links to maternal health, hygiene and referrals into the primary health care facilities through coordination with the health care workers.

12 of the health care workers were to be selected from the pool of those trained by BEIT CURE in PEHC to undergo training to become the country's first community hearing aid and audiology technicians.

This project operationalises the 2017-2021 National ENT Strategic Plan in Central Province and constitutes the range of services which are required to establish primary care prevention, identification, treatment, rehabilitation and support for persons with ear disease and disabling hearing loss. As the intervention is based upon National agreed plans, it was designed to be integrated into government health structures and to maximise coordination with the Ministry of Health and Provincial and District Level Health Services.

This project stands as the first initiative to bring PEHC and related public health information to provinces in Central Province. Prior to the intervention, there was a total absence of formal ear and hearing services. In Kabwe, Chibombo and Kapiri Mposhi Districts (within Central Province out of a population of over 900,000, there are an estimated 45,000 persons (55) with disabling hearing loss, and 72,000 (8%) with an ear disease causing or risking hearing loss.

Audiology Technicians

The audiology technicians test hearing levels, treat basic ENT infections, remove ear wax, treat throat and nose infections, fit and programme hearing aids. A majority of studies indicate that Hearing Loss is associated with a reduced Quality of Life (QoL) and that the provision of hearing aids is indicated to improve QoL at one-year post intervention follow-up[4].

The audiology technicians are attached to clinics in which soundproof booths have been constructed in each of the three districts on the programme. The technicians receive patients who have been referred following primary screening by the HCWs in the field for further testing. The testing in the booths can ascertain whether the hearing loss will be improved by a hearing aid and the technicians are then able to effectively fit and programme the hearing aids for use by the patients. Prior to the project the only audiology booths in the entire country were located at BEIT Cure Hospital in Lusaka.

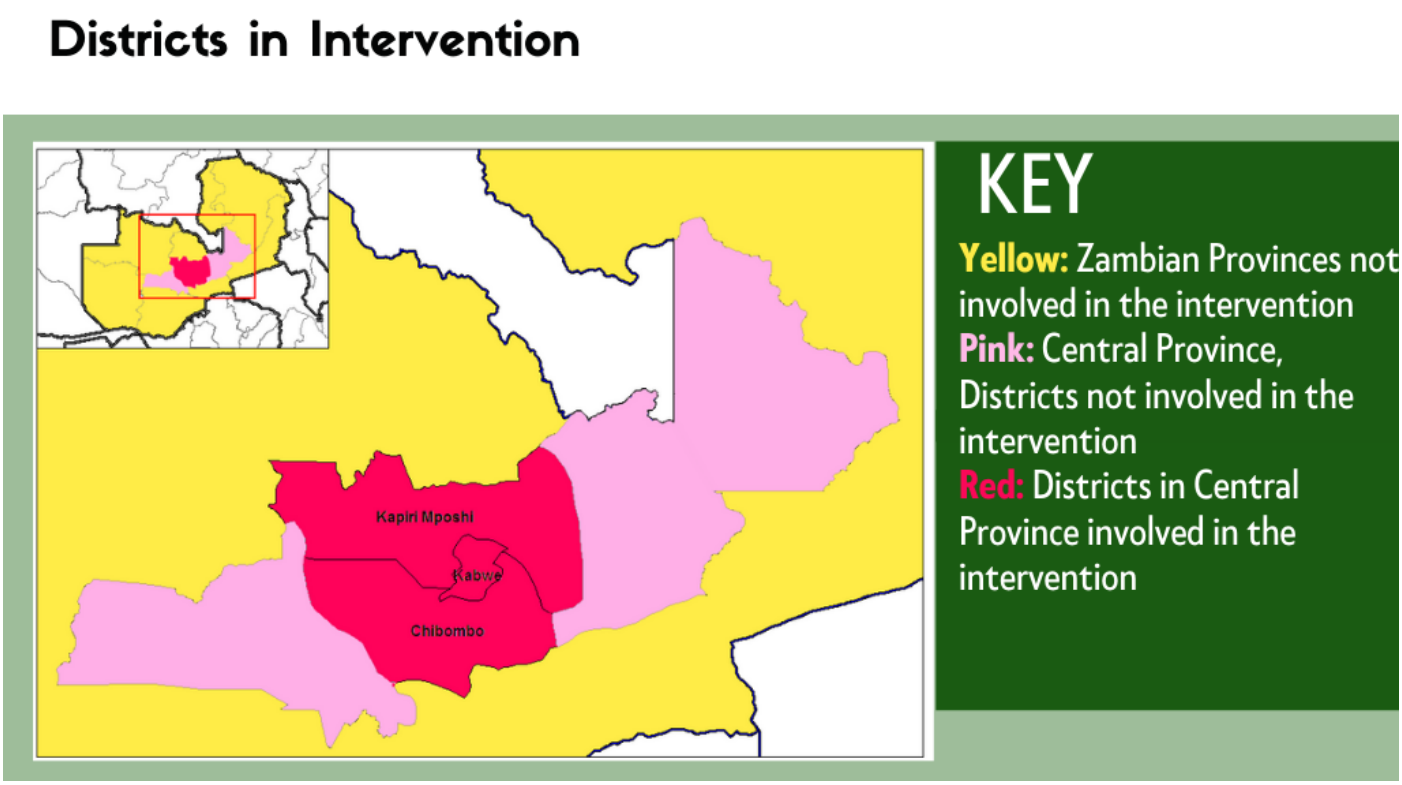
Clinical Officers and Nurses

The health care workers trained in PEHC on the project do ENT clinics in their facilities where they conduct screening, diagnosis, treatment and referrals.

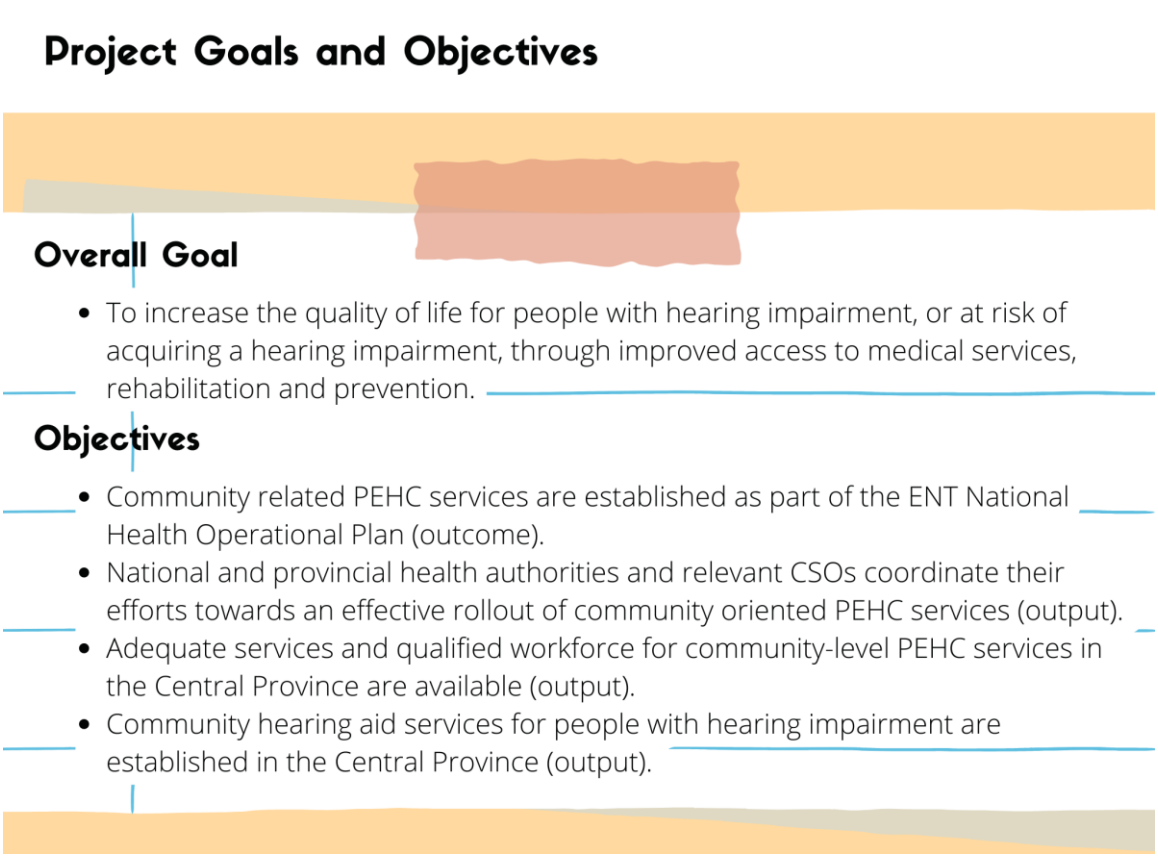
In a two-week course at BEIT Cure Hospital, the health care workers were provided training in orthoscope use, audiology equipment, foreign body removal tympanometry and tuning tests. They were provided with otoscope, overhead lamps, receivers and forceps

Community Based Volunteers

The volunteers provide sensitisation information about the importance of ear testing, and the common behaviours which risk hearing loss or diseases associated with hearing loss; such as the playing of loud music and self-medicating ear problems with dangerous substances (such as cooking oil or urine). Additionally, the volunteers help identify potential cases of hearing impairments and make referrals into health facilities. Beyond this the volunteers provide general promotion about the PrevENT programme and advertise outreach and screening programmes in the community. The volunteers also keep records of those in their catchment areas with hearing impairments to assist the health workers and their facilities in effectively tracking patients.



Infographic 4: Map of Zambia highlighting the districts involved in the intervention

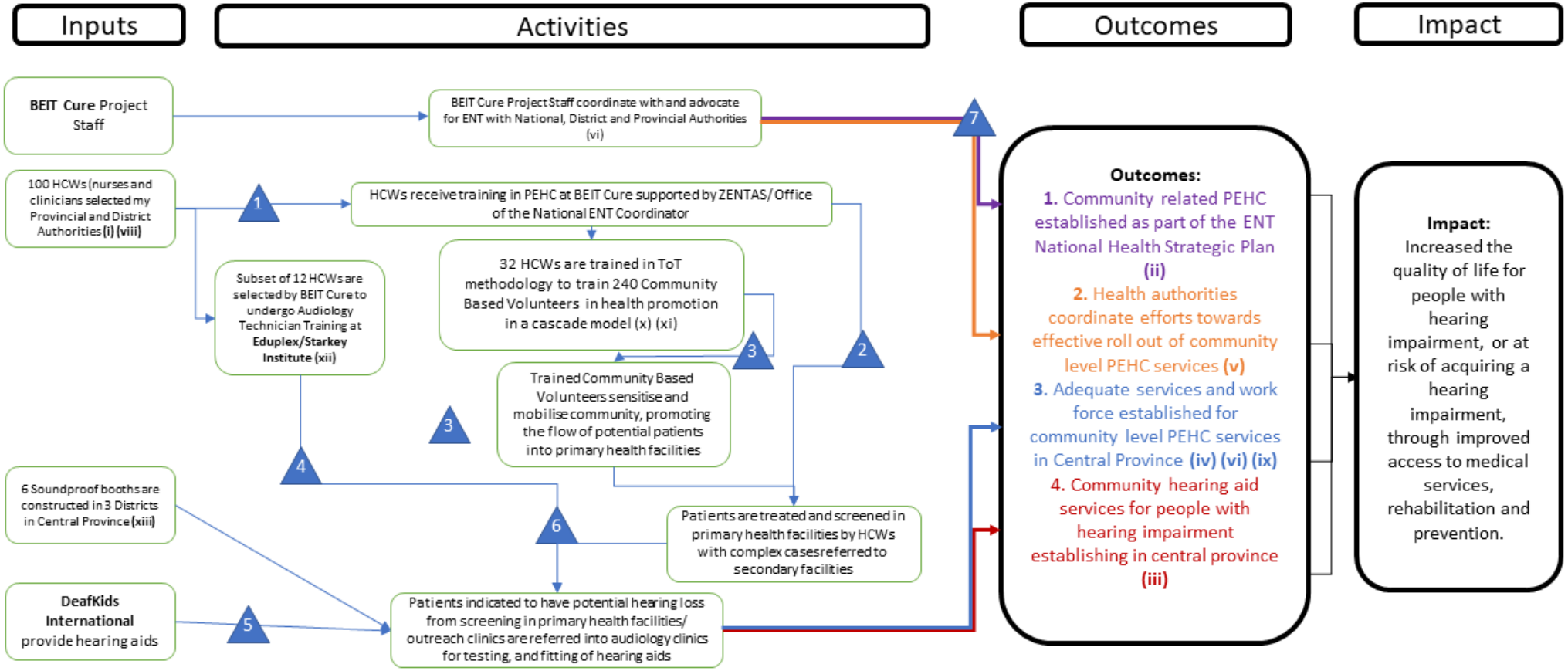


Infographic 5: PrevENT Project Goals and Objectives

5. Evaluation

As outlined in the Methodology section, the evaluation uses the MRC Process Evaluation Framework to build up a theory of change to chart how the programme activities produced the resulting changes. This was conducted through a set of questions to interrogate the intervention and guide the analysis. The evaluation section is split into two sections.

1. The first outlines the Theory of Change and interrogates whether the outcomes sought by the project design have been achieved, and whether this can be held attributable to the intervention(s) by interrogating the assumptions required for causal relationships to be demonstrated.
2. The second section of the evaluation outlines a review of the questions agreed as part of the terms of reference to evaluate specific aspects of the project.



Assumptions

1 – HCW selection is good, and selected HCW are motivated
2 – HCW training equips them well for their roles
3 – Cascade model allows for effective transfer of knowledge to CBVs to ensure communities are sensitised and prospective patients are mobilised into PEHC services
4 - Audiology training is effective
5 - Sufficient supply of hearing aids are provided
6 – All levels of the intervention (CBVs, HCWs and AT) are horizontally integrated and patients flow from the community, through mobilsiation to PEHC and when required through to audio techs/ further care
7 – The project are able to sufficientlt engage government to shape policy (national, provincial and district levels)

Indicators

i – No. people per ENT-trained HCW in Central Province
ii – Development of new National ENT Plan
iii – No. consultations for people with or at risk of hearing loss by trained audiology technicians
iv – No. consultations of people with ENT conditions seen by trained HCWs
v – No. provincial coordination events with National ENT planning office
vi – No. radio advertisements and events at outreach clinics in public areas to raise and generate public awareness
vii – Mid-level medical staff developed recommendations on how to improve qualification around ENT and PEHC
viii – 100 HCWs trained in hearing loss identification, management of common ear diseases referral, health promotion and inclusion
ix – Health facilities equipped with necessary equipment to provide PEHC services
x – 32 HCWs undergone ToT training to train community based volunteers on health promotion
xi – 240 community based volunteers trained in health promotion with links to maternal and child health, hygiene, emergency referral and inclusion
xii – 12 HCWs enrolled in audiology technician training and equipped to serve as hearing aid technicians
xiii – 6 clinics fitted with necessary audiology equipment to treat persons with disabling hearing loss

Theory of Change

Based on the evidence reviewed, the project has succeeded in establishing primary ear and hearing services in Central Province and by extension, succeeded in its overall goal in "increasing the quality of life for people with hearing impairment, or at risk of acquiring a hearing impairment, through improved access to medical services, rehabilitation and prevention." This is impressive considering the significant delays which have beset the project throughout the cycle.

A significant majority of the project's objective indicators have been achieved, in particular those regarding the establishment and development of human resources, training and health infrastructure. This has ensured that primary health care services are in a healthy position at the cessation of Scottish Government Funding. The project has fallen short of targets regarding direct impact on patients (with regard to number of consultations), but this is largely explicable through factors beyond the control of the project, including, COVID-19, a gassing incident, and training delays. Moreover, now that the full set of practitioner cadres are in place, the rate of consultations has considerably increased and it seems plausible that if the support outlined by BEIT Cure is extended, there is no reason that these targets should not be met in the year following the closure of the project.

It is, however, important to note that a significant amount of work needs to be done in the coming months and years to crystalize the successes of this project, many of which have only just begun to be realised in its final year. If this support which has been outlined is not ultimately realised, there are significant risks that continuity of services are not maintained and people in Central Province will lose access to Primary Ear and Hearing Care. With that said it is clear that given the aforementioned contingencies, the project is in an impressive and strong position. The fundamental work that needs to be done here is pushing the government to take ownership of services (at a local level) and allocate resources and attention to ENT (at the national level). This is clearly understood by all associated with the project and there is significant promising work being done in this space. Meanwhile there is good evidence that in the intermediary period there is real desire to extend support beyond the project end to ensure that the successes the project are not transient and are instead nurtured in the coming years so that they can develop and grow as they are iteratively transferred to government and permanently embedded in the national health care system.

Questions used in the focus groups and key informant interviews were specifically targeted to interrogating the assumptions outlined in the theory of change, which is pictured in Annex A. This was to investigate whether causal links between the inputs and the log-frame indicators mapped against the outcome could be supported. The following section evaluates the support for the proposed theory of change using qualitative evidence from the fieldwork and quantitative evidence from the log-frame to evaluate the outcome indicators (to demonstrate effect) and underlying assumptions (to demonstrate evidence that the effects were plausibly caused by the intervention).

Assumptions

Assumption 1 – HCW selection is good, and selected HCWs are motivated

There is strong evidence that the selection of HCWs was generally very good and that they were motivated in their roles, although there are recognised issues, at least in reporting, for those operating in hard to reach and remote areas.

In order to maximise the probability of HCWs remaining in post throughout the project, and for them to remain motivated throughout and beyond the length of the project the decision was taken to delegate the selection of HCWs to the Provincial and District Authorities. This was specifically highlighted as a good decision by the authorities and the project implement team and is supported by the fact that a significant majority (over 95%) of health posts in the project are supported by at least one trained HCW.

With regards to the reporting variances, it is worth noting the use of paper records at the start of the project and the lack of initial provision of phone data support made getting responses from these HCWs difficult, which was later remedied through the rolling out of digital records and data for HCWs.

Assumption 2 – HCW training equips them well for their roles

In focus group discussions with HCWs it was unanimously reported that they thought the training delivered through BEIT Cure prepared them for the work they needed to do in their roles. Special praise was extended to the tuition they received during this from the ENT Specialists at BEIT Cure Hospital.

In discussion with the National ENT Coordinator, she reported that she had been impressed with the competence demonstrated by the HCWs throughout the training programme. The ENT Specialists, including the National ENT Coordinator maintained contact with the trained HCWs throughout the project using WhatsApp, to help them when they were unsure or faced with a complex case but also as a way to gather feedback and to improve trainings, which were delivered in several follow-up sessions throughout the programme. Collectively this helped to ensure that HCWs were continually supported to perform well in their roles.

Assumption 3 - Cascade models allow for effective transfer of knowledge to CBVs to ensure communities are sensitised and prospective patients are mobilised into PEHC services

The cascade model was widely regarded as effective by health care workers and community-based volunteers, and health care workers who did not receive the training to train the volunteers demonstrated a strong desire to receive this training in Focus Group Discussions undertaken in the evaluation. The training was delivered to double the planned 32 participants in recognition of this which should provide additional resilience moving forwards.

District Health and Hospital Officials made specific reference to the performance of the community-based volunteers which is reflective of the success of the cascade model. Moreover, the use of the cascade model allowed the efficient delivery of training locally to over 200 participants, which would have otherwise proved

financially constraining if held centrally in Lusaka through BEIT Cure. Additionally, in equipping the HCW with the ability to transfer skills this has allowed them to train additional CBVs moving forwards and also to transfer skills in post to their colleagues, which will be critical in the coming years to ensure that as people inevitably move around that skills can be bonded to health facilities and local areas.

Assumption 4: Audiology training is effective

The standard of the training, and the technicians' performance on the programme was well received by the project team. Multiple stakeholders praised the decision taken to augment the training (both Eduplex and Starkey) with a substantial practical element undertaken in BEIT Cure Hospital in Lusaka.

The Starkey Institute noted that the performance of the technicians from the project was excellent and better than the average of the rest of the cohort. For the 3 technicians trained in the Eduplex methodology it was reported by BEIT Cure that their performance in the South Africa practical element was recognised as significantly better than others on the programme who had not received the BEIT Cure practical support.

Assumption 5: Sufficient supply of hearing aids are provided

See the full analysis section for a full discussion but there is likely to be supply for the next 2-3 years for Central Province of hearing aids. In parallel BEIT Cure is running a pilot on rechargeable batteries and hearing aids.

Many of the audiology technicians have only recently started their roles in January but no concerns were raised in the FGDs regarding the supply of hearing aids from BEIT Cure to their facilities. However, it is important that regular and consistent supplies of hearing aids are ensured to make sure that smooth and regular availability of hearing aid supply is maintained following the formal cessation of the project. As discussed in the full analysis section, HCWs have raised some concerns regarding the continuity of consumables generally so it is important that robust distribution of all equipment, inclusive of hearing aids (and batteries, moulds and tubings), is central to long term sustainability plans of the project team.

Assumption 6: All levels of the intervention (CBVs, HCWs and AT) are horizontally integrated and patients flow from the community, through mobilisation to PEHC and when required through to audio techs/ further care

Practitioners from all levels of the intervention reported good relationships with the other elements and confirmed that they liaised regarding patients and that referrals between them were functioning generally well. Some community-based volunteers did highlight that sometimes they would refer patients into services and either the HCWs or medication were not available.

With regard to referrals to further care there was a noted issue whereby there was not a continuous presence of a surgeon in Kabwe General Hospital, which meant that either patients had to be referred into Lusaka or added to a waiting list for surgical missions. The project adapted well to this given the difficult circumstances, by providing a clinical officer with enhanced 3-month training at BEIT Cure to provide

advanced triage. Additionally, HCWs on the project have access to ENT specialists on a WhatsApp group to seek advice and expedite referrals in emergencies which has helped bolster and improve patient pathways in critical cases.

Assumption 7: The project is able to sufficiently engage government to shape policy (national, provincial and district levels)

This assumption is covered in more detail in sections in the full analysis. In summary this is an ongoing process and continuing work is critical to ensure that the significant groundwork which has been laid, is nurtured to deliver long term and robust changes in governmental approach to ENT services.

There are certainly lots of positive signs, particularly at the provincial and district level with Ear and Hearing services having permanent infrastructure and beginning to have some consumables reflected in budgets, reporting metrics and plans. At the national level the clearest success is the recognition of audiology technicians as a profession.

To develop enduring support at the national level it is critical that the ENT National Coordinating Committee is constituted, and project partners advocate for resource allocation through the committee as a primary forum of influence.

Indicators

In the Theory of Change indicators from the log-frame are mapped to outcomes and impacts. These indicators are discussed below, drawing from the Log-Frame which can be found in full in Annex B. Additional information against these indicators is found in more detail in the full assessment which follows.

Impact Indicator 1: Number of people per ENT-trained nurse/clinician in three districts of Central Province (903,023 cumulative forecast population). End of Project Target: 9,030 (population to nurses/clinicians)
Awaiting final figures for this target (LogFrame data XX). The understanding of the evaluators is that this target has been exceeded as 127 nurses and clinicians have been trained, so on the assumption that <27 may have been lost due to attrition (an estimate higher than likely) this target has likely been met. We will update this once this understanding is confirmed
Impact Indicator 2: The development of a new National Ear, Nose and Throat Strategic Plan (NENTHS) post 2020 reflects the learning and recommendations derived from the mid-term evaluation of the PrevENT programme. End of Project Target: to have achieved
The understanding emerging from key informant interviews is that the new National ENT Strategic Plan will likely mirror the same recommendations as that of the previous plan, and that much of the specific work moving forwards will be advocacy and work with the Ministry of Health to ensure that the recommendations in the plan, which were explicitly piloted in Central Province in this project are funded and owned by Government moving forwards. However, the National ENT plan is concordant with the successful piloting of this plan in establishing PEHC services in a Province, and with the understanding that for long-term sustainability the government will need to take responsibility for the funding of the elements of the strategic plans. Moreover, it was confirmed to the evaluators that BEIT Cure, under the related BMZ project, are working on the successor National ENT Strategic Plan.
Outcome Indicator 1: Number of consultations for people with, or at risk of, hearing loss to receive diagnostic, treatment and rehabilitation by trained hearing aid technicians. End of Project Target 26,928
This target has not been achieved (4,928) but it is important to reflect the deeply disruptive effects that Covid had on both training and practising within the country. The BEIT Cure Project Manager outlined that Covid took away over 2 years of productive time from the project and the consequence has been that the majority of the Audiology Technicians only began practising at the start of this year - 2022. Projections provided by Beit CURE indicate that the rate of consultations being provided is increasing substantially now that the audiology technicians are in place with an additional 1,493 consultations estimated between now and the end of the year.
Outcome Indicator 2: Number of consultations of people with ENT conditions seen by nurses trained. End of Project Target: 247, 800

As with the prior indicator Covid has disrupted both training and practising of the healthcare workers trained as part of this programme, although in this instance training was disrupted to a significantly lower extent (milestones for training only missed in Year 3 of the project) and the more substantial effect was seen in the practicing of the health care workers on the project (see full analysis for evidence that patients were wary of attending clinics through fear of contracting). It is also worth noting that the figures listed in the Log Frame are likely an undercount for the first three years of the intervention. For the start of the intervention paper records were used which proved difficult for HCWs located in hard-to-reach areas to reliably use. Mobile records were adopted later in the project and reported by the Beit CURE M&E officer to be a more robust reflection of the interventions been undertaking by the HCWs on the project.
Output Indicator 1.1: Number of provincial coordination events with the National ENT Planning Office. End of Project Target: 18
Despite the acknowledged problems with the ENT Coordinating Committee (see full analysis) this target was achieved; an impressive achievement given the known issues surrounding coordinating during covid (when limited coordinating health care resources are already stretched to accommodate the pandemic response).
Output Indicator 1.2: No of radio advertisements and events at outreach clinics in public areas to raise and generate public awareness. End of Project Target: 9
This project target was significantly exceeded with 19 radio advertisements/ and outreach events held to raise and generate public awareness in the target districts. During the evaluation concrete evidence of the efficacy of these targeted advertisements was evident, as a significant number of patients in the FGDs in both Kapiri Mposhi and Kabwe reported that they had heard about the outreach clinics and the services offered through either directly hearing the advertisement spots themselves or via a friend hearing about it through the radio spots and relaying it through to them. (See Patient Vignettes for example). Additionally, the project report that radio advertisements were generally effective in that they consistently had well attended outreach clinics for which radio advertisements used to mobilise support.
Output Indicator 1.3: Mid-level medical staff developed recommendations on how to improve qualification around ENT and PEHC.
This project indicator concerns the enhancement of the role of Nursing schools that train nurses in Zambia and ensuring that they implement the ENT component of the Nursing curriculum as they train nurses. In collaboration with the National ENT Coordination Office, Beit CURE conducted a Trainer of Trainer (ToT) trainings (co-financed with the BMZ project) to strengthen the capacity of 16 Nursing schools in Zambia (as part of a pilot) with the BMZ financing the procurement of basic EHC screening equipment so that practicals could also be implemented within these training schools. Beit CURE, in collaboration with the Ministry of Health (National ENT Coordinators Office), monitors the progress by visiting some Nursing school sites to check if the proper implementation of the nursing curriculum is being actualised.
Output Indicator 2.1: 100 Nurses/clinical officers from Kabwe, Chibombo and Kapiri Mposhi districts have been trained in hearing loss identification, management of common ear diseases, referral, health promotion and inclusion

(PEHC intermediate) and other ENT conditions at Beit Cure Hospital. End of Project Target 105.
This target has been significantly exceeded with 128 health care workers (70 nurses and (58) clinical officers having been trained, providing robust capacity in the face of any future attrition. Despite a noted issue (see full analysis) regarding internal staff redeployments and the creation of some new health posts, 95% of primary health facilities are reported by BEIT Cure to remain staffed with a healthcare worker trained in PEHC at project close, a substantial achievement which, at least as far as human resources are concerned, provides a good indication that primary services have been embedded and integrated throughout the province; a reflection shared by multiple stakeholders (including health care workers themselves, BEIT Cure, CBM Zambia, and district health officials). These HCWs are evenly distributed across the three districts (reflecting the intention to locate a HCW at each health post), with 41 trained in Chibombo, 43 trained in Kapiri Mposhi and 45 in Kabwe.
Output Indicator 2.2: Health facilities within the Central Province have been equipped with necessary equipment to provide ear and hearing care services. End of Project Target: 105
As per the above this target has been exceeded, in this case related to the creation of additional health posts since the start of the project. In slight contrast to the above however there are more concerns around the sustainability of the equipment (consumable supply, equipment repair and calibration). See the full analysis for the detailed discussion but the evaluator was relayed evidence that support for equipment will extend for a couple of years beyond the end of the project through BEIT Cure, district health authorities are beginning to take some responsibility for equipment (mostly medication in the first instance) and BEIT Cure and the National ENT Coordinator are continuing to advocate the Ministry of Health to take increasing ownership of the material support required to support enduring primary ear and hearing services in the country.
Output Indicator 2.3: 32 Nurses/clinical officers have undergone training of trainers to train 240 community health workers in hearing health promotion. End of Project Target: 32
This target was exceeded by 100% as the decision was taken to substantially increase the number of healthcare workers who could train community-based volunteers on health promotion. This is a significant success as this provides primary health facilities long term sustainability in the model whereby volunteers play a fundamental role in sensitisation, mobilisation, promotion, and follow-up and doubles the number of health posts who will be able to ensure that new volunteers in their catchment are able to support services at their facility. This training is well regarded amongst the health care workers and those who had not received it in Kapiri Mposhi relayed a strong desire to receive this training.
Output Indicator 2.4: 240 community health workers (PEHC basic) have been trained in ear and hearing health promotion, with links to maternal and child health, hygiene, emergency referral and inclusion
This target has been exceeded by 33 community-based volunteers. See the analysis section for a full appraisal of the vital and well received role these volunteers have played in the successes of this project which has been recognised as high as district health administrative level.

Output Indicator 3.1: 12 local nurses/clinical officers have been enrolled at the Starkey Hearing Foundation Institute and equipped to serve as hearing aid technicians in public health care facilities within the Central Province.
This was exceeded by a single technician as 13 audio technicians were trained as part of this project (although it should be noted that 3 of these were trained using a different methodology; Eduplex). These Audiology Technicians were chosen from the pool of HCWs designated for the project by district and provincial health authorities and included 3 nurses and 10 clinical officers.
Output Indicator 3.2: 6 clinics are fitted out with necessary audiology equipment to treat persons with disabling hearing loss.
This target has been slightly missed at time of writing as 5 rather than 6 of the planned 6 clinics have been constructed and fitted with the necessary audiology equipment to treat persons with disabling hearing loss. During the evaluation 2 of these facilities were visited and a hearing test was demonstrated in one of the soundproof booths. The equipment and quality of the build projects appeared to be excellent and was well appreciated by the Audiology Technicians trained in its operation.

Full Assessment

What Impact did the PrevENT Programme have on access to treatment and diagnosis of hearing loss in 3 Districts within Central Province, Zambia

Overall, the project has had a transformational impact on Ear and Hearing Care in Central Province in Zambia. It has enabled a clear transition from a situation whereby there was a total absence of primary ear and hearing services in the province to one whereby primary services have been established and begun to be effectively embedded into government services. The successes and lessons learned from this project will be vital for advocating for and rolling out PEHC services in other provinces in Zambia which do not yet have any provision for primary ear and hearing care.

It is clear that much work remains to ensure the long-term sustainability of these services in the district, but there is clear evidence that stakeholders throughout the system are committed to ensuring this. This achievement has seen clear advances in the diagnosis and treatment of hearing loss in the 3 District involved in the intervention.

Establishment of Primary Ear and Hearing Services in the Province

The **Kabwe Senior Clinical Care Officer** (with a reporting line to the **District Health Director**) reported that the project has succeeded in its aims to establish PEHC in the district, noting that prior to the intervention there was no capacity for any services at all, and "all cases were referred to the central hospital [Kabwe], which causes significant congestion". He reflected that following the intervention there are now trained personnel and equipment in almost all of the primary health facilities in the district, which has importantly significantly reduced the burden of ear and hearing problems in the central health facilities, as many cases can be treated in situ, in

primary facilities, allowing more complex cases which arise through the referral system to be attended to effectively.

This was corroborated by the **deputy District Health Director from Kapiri Mposhi**, who outlined that before the intervention, many patients would not receive services, and that the programme has reduced the number of people having to travel to Kabwe or Lusaka. This has been very well received by the authorities and the community as such, reflecting that the intervention "had really taken [the] district to another level, and that people had really benefited from the programme".

The **Head of Clinical Care at Kabwe General Hospital** noted that prior to the intervention "people have been suffering away from the facilities, not knowing where to get health care [for ear and hearing conditions]". He added that a specific success was an increased flow of patients requiring specialist care in the community referred into Kabwe General Hospital but qualified this by reflecting that General Practitioners were limited in what they could do, and in many cases, patients still need to either be referred to Lusaka or wait for a surgical outreach. This was supported by the **Head Clinician at Kabwe General Hospital**, who reported that 40% of the patients that he saw in the facility were referrals from people or facilities trained through the project, demonstrating the scale of impact of the project in the province.

The **Executive Director of the Starkey Institute**, Dr. Alfred Mwamba, commented that the project was the "foundation for future programmes in Zambia". He extended specific praise for the model adopted, developing integrated services of community based volunteers, HCWs trained in PEHC and Audiology Technicians, so that patients mobilised through outreach are able to access enhanced services. He concluded that "without a united approach like this, which develops comprehensive services, you can overdevelop outreach without services and it cannot work. This model needs to be recognised as a success".

Dr Uta, who led on the design of the project, noted how prior to the intervention health care workers would be presented regularly with common ear and hearing problems but were not equipped with the knowledge or equipment to diagnose and treat them. In some instances, this would even lead to the establishment of new problems, sure as causing the perforation of an ear drum through trauma caused by an untrained health care worker.

Overall, it is clear that the project has succeeded in establishing primary ear and hearing care in Central Province.

Treatment and Diagnosis

Clinical Health Care Workers in Kapiri Mposhi reflected that there had been a significant increase in both diagnosis and treatment, with one Clinical Officer commenting that "the project has been a success in that we are able now to diagnose patients early and treat them" with another commenting that "we are seeing so many clients now". However, one Clinical Officer cautioned against complacency countering that "I can't say it has been successful, as there is still a lot to do, and we are always finding more cases, the programme is moving well but there is still a lot to do and we need to reach more in our community."

Common problems the health care workers report being presented with are Chronic suppurative otitis media (CSOM), impacted wax, pharyngitis, hearing loss and fungal infections. Complex cases are referred to District Level Hospitals or Lusaka for intervention.

One audiology technician from Kapiri Mposhi district highlighted that a key success of the project was the work it had been doing in schools and reflected positively on outreaches in education institutions where they have been able to screen every student. Full school screenings have been conducted in at least 61 schools reaching over 15,000 students[14].

BEIT Cure reflected that training the community-based volunteers who are also trained in maternal and child health was particularly effective as this allowed for the early identification of cases where the potential for the positive benefits of intervention are greater. It also encouraged women to engage with the programme.

Sensitisation

In a Monitoring and Evaluation visit during Year 2 it was reported that it was clear from their observations and fieldwork that the Community Based Volunteers were key in raising awareness of ear health issues and available services once HCWs had been trained. This was corroborated by the evaluation with a range of stakeholders, including the volunteers themselves, all reflecting positively on their role.

The **community-based volunteers** reported significant misinformation in the community about ear and hearing conditions prior to the intervention. In a FGD in Kapiri Mposhi, one volunteer reported that in the community people would self-medicate discharge from the ear with the "insertion of urine, cooking oil, tomato leaves and cannabis leaves". Another volunteer commented that misconceptions and belief in traditional healing methods was a significant barrier to sensitisation efforts.

One of the volunteers raised concerns about outreach capability – reporting that their outreach activities were potentially (though unintentionally) excluding people meant to be targeted by the intervention who had significant hearing impairments and communication problems and requested visual aids to help communicate with this community.

A **clinical officer** in Kapiri Mposhi commented that "people do understand more, yes, but communities are not fully sensitised as there are many communities which are far from urban centres". A **nurse** developed this point to note that the problem was that the communities which were served by the community-based volunteers were extremely large, but also noted that messages were reaching far, as evidenced by the extensive distances some of the patients had travelled as they came to access services. In one FGD, the respondents were unanimous in their opinion that either the number of volunteers attached to a facility should be increased, or that transportation or supportive equipment should be provided to ease their roles. Specifically, one respondent recommended that each zone should have 1 volunteer (currently a facility has ~5 zones and is assigned 2 community-based volunteers).

[14] Per BEIT Cure School Screening Database for Central Province

One of the **audiology technicians** from Kapiri Mposhi noted that in their first outreaches there was significant distrust. As they went into the market to educate people, they found significant resistance and attracted few clients. However, they reflected that over time there has been a clear impact of the continuous education led by the community-based volunteers, and now clients are "flocking to receive services as people adapt and acclimatise to what is happening in the clinic".

Stigma

The overall view given by the project practitioners is that the project has had a positive effect in reducing stigma

One respondent in the FDG in Kapiri Mposhi with **Community based volunteers** noted that they had noticed people making up "bad things about people with hearing impairments, but that overall people are responding positively to the programme". Another respondent in the same focus group agreed, saying that "stigma does exist, and most people are subject to vulgar comments and exclusion from most community programmes, but the overall response to the programme has been positive, and that over time there has been a reduction in stigma".

Interestingly one community-based volunteer (from Kapiri Mposhi) advanced that stigma associated with diagnosis and receiving treatment was a more significant problem than having a hearing problem itself; saying "if you tell people that they have a hearing impairment and they should go get a check-up, that is when people can look at you differently". A nurse from Kabwe thought that stigmatisation had reduced in the community and that in general there were still issues that people were more helpful to those with hearing impairments.

Training and Equipment

Health Care Workers

The **Health Care Workers** were trained using World Health Organisation (WHO) PEHC advanced level training manual, which was delivered by 4 **ENT surgeons** at BEIT Cure Hospital in a 2-week intensive programme. After the initial orientation refresher training was delivered periodically through the programme for upskilling and sharing experiences and lessons learned between the practitioners.

The quality of the training provided was well received by the government health institutions, with the Kabwe **Senior Clinical Care Officer** commenting that the "handling of the training was outstanding" and that they had "received no negative feedback from the training" from the Health Care workers they had delegated to receive training through the project.

Dr Uta, compared the training received in comparison to a similar intervention in Botswana, noting that there they were not provided with the appropriate equipment to do what they needed to do. She noted that the strength of this training was that the health care workers were immediately able to apply the knowledge they had acquired with the tools required to do it.

The **health care workers** in FGDs in Kapiri Mposhi reflected that their training was relevant and adequate and provided them with the skills needed to provide primary

ear care. A nurse commented that the training "was interesting and inspired an interest in PEHC". Some commented that they had not received ToT training that their peers had been provided with and they would appreciate this training to better enhance their relationships with community-based volunteers and support the additional training of more volunteers in the future.

In another focus group discussion specific praise was extended towards the training provided by **Dr Hapunda**, noting in particular the value of the excellent encouragement she provided towards the HCWs.

In general, the HCWs appreciated the equipment but some issues were raised in Kapiri Mposhi around the provision of sufficient forceps for the removal of foreign bodies, and jammed syringes without smooth function were highlighted by some health care workers.

Audiology Technicians

Dr. Alfred Mwamba was highly impressed by the quality of the students enrolled on the 9-month programme at his institution, noting that the cohort of students from BEIT were of a higher standard than the average[15]. He attributed this to both the selection process chosen (from a larger pool of ~100 healthcare workers) and the provision of PEHC training at BEIT Cure which provided a good foundation and zeal for ear and hearing care. The pedagogy as well as the content and the care with which it was delivered mattered. Furthermore, graduate students attended outreach missions with the Starkey Institute, providing effective follow-up on performance and there have been no complaints regarding their capability and competency.

One of the **audiologists** from Kapiri Mposhi was extremely positive about the training provided by the Starkey Institution, reflecting on how the extensive 9 months training enabled them to treat much more complicated ear related problems than the 2-week PEHC training had provided. They reflected that "working on the missions across provinces has created an appetite wanting to do more. I feel I have found my purpose and it feels great when you see a patient's smile when you have restored their hearing".

Another audiology technician reflected that they thought those trained in Eduplex had received less intensive training and that those trained on the Starkey methodology had received more robust education and were better prepared to provide the services provided to them. Unfortunately, the evaluator was unable to speak to any of the practitioners trained in Eduplex due to their unavailability to be interviewed during the evaluation period.

One audiology technician highlighted that continuous supply of hearing aids was a problem and that some patients were arriving from the Copper Belt (Province North of Central Province) to access services but left disappointed when supply issues prevented the audiology technicians from being able to help. In light of supply issues, the technician commented that they were focusing on testing, so that as supply increased, they would follow up with patients to fit hearing aids. While the evaluator was in Kapiri Mposhi this was witnessed in action as the team travelling from BEIT

[15] Both in terms of examination performances and in hands on experience

Cure with the evaluator delivered a resupply of key consumables including hearing aids, batteries and wax moulds.

Dr Uta did raise some concerns over the training provided by the Starkey Institute to the Audiology Technicians, remarking that there had been concerns over the light touch approach the Institute had to the diagnosis of hearing loss, and subsequent provision of hearing aids. However, **CBM Zambia** reported that the training at the Starkey Institute was augmented with practicums with BEIT Cure and field follow ups to upskill trainees in the more technical approach to diagnosis and hearing aid provision which is practised at BEIT Cure. This was confirmed to have been a sensible approach by Dr Uta.

Community Based Volunteers (CBVs)

The **Community Based Volunteers (CBVs)** were trained by HCWs using training based on the WHO basic level PEHC Manual, in a cascade model, whereby the HCWs would be trained to train the CBVs. Many of the volunteers received their training through Mwachisompola Training school in Chibombo District[16]. The result of this decision was that the training was able to be conducted at a lower than initially projected cost and for a greater than planned number of CBVs to be trained through the project.

In FGDs the general opinion shared with the evaluators was that the training was effective, and it enabled them to do their jobs. In fact, a common request from multiple respondents was for additional training so they could further develop their interest in ear and hearing care.

Horizontal Integration

In a FGDs with CBVs in Kapiri Mposhi and Kabwe, the integration between the **volunteers and the health care workers** in primary clinics was well commended by multiple respondents, with one remarking that "the health facility we work with support us tremendously, especially in our outreach programmes" and "the relationship with health care workers is good and smooth, as they understand us well and respect us and the work we do". This was corroborated by the FGD with HCWs in Kabwe, with one nurse commenting that "we work well with the volunteers, without them we couldn't manage our work as health care workers, we rely on their support, they know who has a problem and it is they who are able to communicate with them and bring them to the facilities". This was also backed by other nurses who spoke of the value of the volunteers providing follow-up with patients.

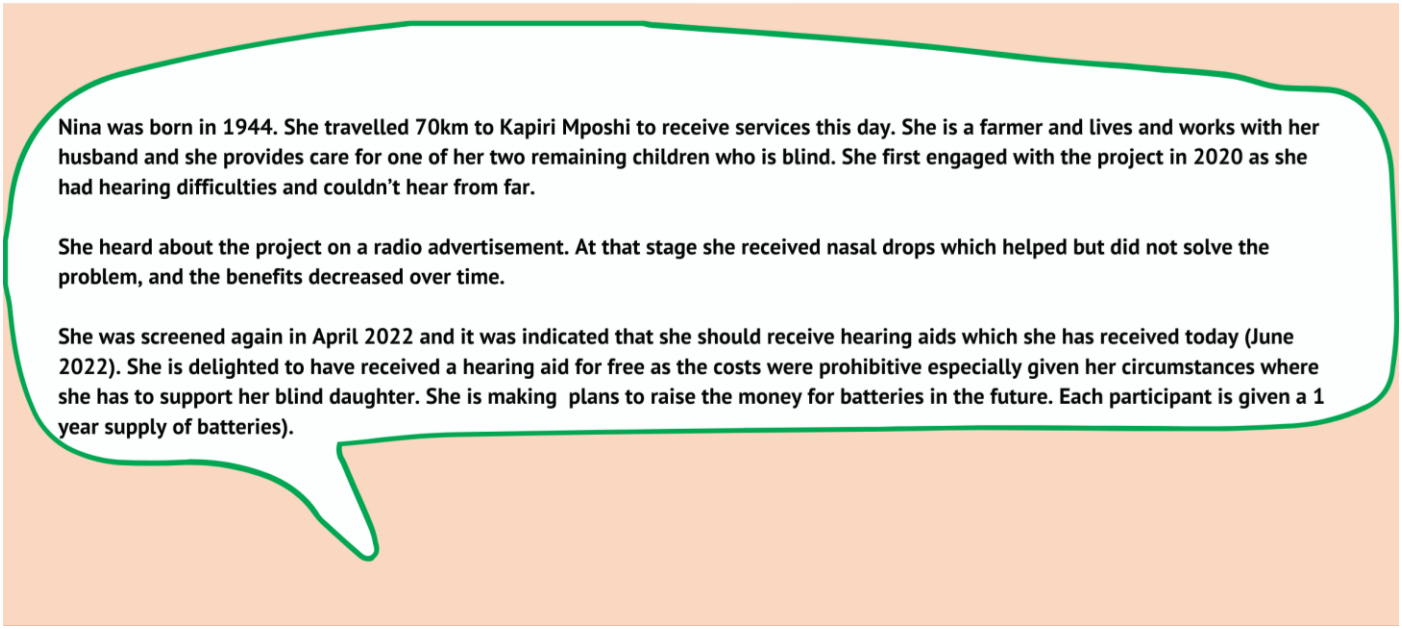
Likewise, the **Audiology Technicians** also commended the integration with the CHWs, with one reflecting that "the relationship has been great, and we receive so many clients through this process. Additionally, we have successfully integrated their roles into work they are doing with other programmes, such as HIV, which has worked very well". Furthermore, they reported good integration with the other HCWs, that they maintain effective relationships and referrals which cannot be managed by

[16] This had previously been planned to take place in Lusaka, but was moved within Central Province to provide easier access to the participants.

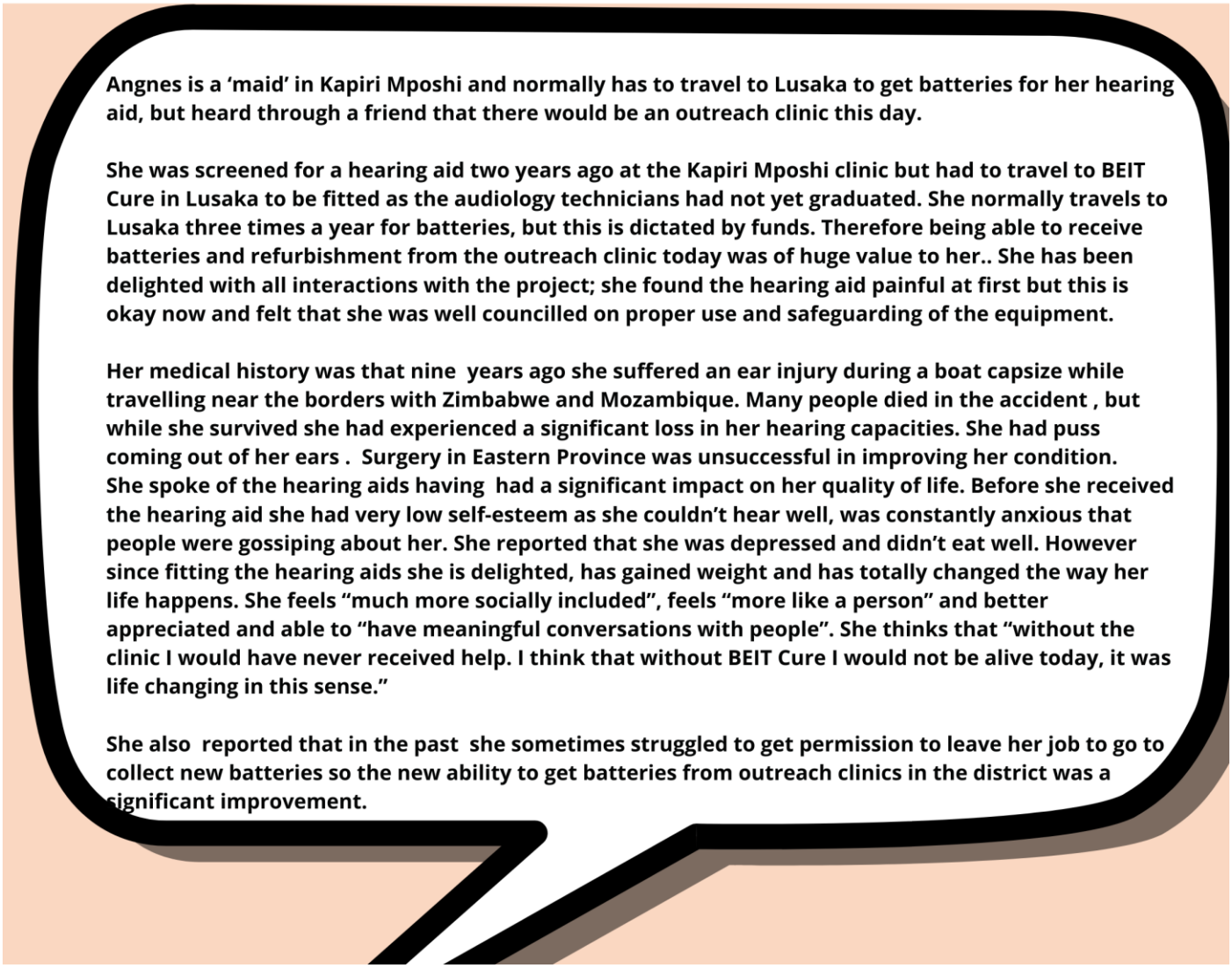
the HCWs are well referred to the audiology technicians who have received additional training and can provide more services.

Patient Vignettes from outreach clinic (names changed to protect identities)

Patient Vignette 1 - Nina



Patient Vignette 2 - Angnes



Has the programme had any effect on public policy (either national or district level)

Changing public policy is critical if ENT services are to grow and become established in Zambia, and central to this is ensuring that the National Government takes active ownership over its development. There have been some key successes and promising signs with specific reference to Government Ownership and District Plans and budgets, increased visibility and professional recognition and training curriculums.

Government Ownership

The **CBM Director** highlighted the challenges of getting Government to engage with ENT issues in contrast to other issues such as communicable diseases, "with ear related challenges the issue is people do not immediately die, so it is not taken as seriously, but the project has helped so much. The government has many competing priorities, and the work has just begun but there is a need for us to continue this work and get the high-level buy-in when resources are so limited".

Cooperation with the MoH at all levels (National, Provincial and District) helped to maximise the effectiveness of the outreach and was targeted towards developing governmental ownership of the programme. For example, the project was launched on World Hearing Day in 2018, in an event co-coordinated with the Ministry and which was attended by over 500 people. Additionally, the project has collaborated with the Ministry in particular at district and provincial level for promotional activities; coordinating closely with the promotional officers at each level to use their platforms to discuss what the project was doing and to disseminate messages.

The collaboration with district health institutions was demonstrated to be particularly strong and was starting to bear fruits in engendering changes to district level policy planning with regard to embedding ENT services. For example, the **Kabwe Senior Clinical Care Officer** reported that they are now planning to conduct their own outreach services in the community setting. This success was attributed in part to the strong relationship between the government institutions and BEIT Cure as an implementer, with the Senior Clinical Care Officer remarking that "from inception all the way up to this point, communication was excellent". Particular praise was extended to the decision made to delegate the selection of nurses and clinical officers to receive training in PEHC to the districts, which established a strong relationship of trust.

There are promising signs that district health services are assuming increasing ownership over the established services. Permanent space has been designated to ENT services in government facilities in Central Province and ENT consumables are starting to be reflected in budgets and annual strategies. The **Executive Director of the Starkey Institute** relayed that he believed that "the seed has been planted and as the project comes to an end, it now needs to be infused into government programmes". While this is true, it is clear that enduring support will be required to ensure that this happens.

Increased Visibility

BEIT Cure contributes regularly to the ENT National Coordinator's report to the Ministry of Health, Permanent Secretary and Head of Clinical Care and diagnostic services, which through the course of the project has provided a mechanism through which governments are kept updated on the course of the project and its impact. In parallel at district level, district officials are updated at quarterly meetings which are also used to get their engagement with the project in key decisions such as HCW selection.

The **Head Clinician at Kabwe General Hospital** noted that Ministry of Health officials are now visiting the hospital to understand the specific ear and hearing problems they are facing so that they can outline how they can help in the future. He noted that while specific help had not yet been forthcoming, their demonstrated interest was a significant development compared to the situation prior to the intervention.

Recognition of Audiology Technicians as a Profession within the Health System

Multiple stakeholders including **BEIT Cure**, the **National ENT Coordinator** and the **Starkey Institute** highlighted the recognition of Audiology Technicians as a profession by the Health Professions Council and General Nursing and Midwifery Councils as a significant success of the project. This was achieved through engaging the Permanent Secretary[17], Council for Clinicians and the National Midwifery and Nursing Council.

This has been well received by the trained **audiology technicians**, with one reporting that this helps their full integration into departments and may help their salaries and career

[17] Most Senior Civil Servant within the Ministry of Health

progression. Another commented that this would make the training much more attractive to health care workers and could lead to the opening of more training places beyond the Starkey Institute in Zambia and should help long term retention of staff within Zambia. The Executive Director of the Starkey Institute reported that this was an encouraging sign that the MoH were taking ENT seriously and wanted more people trained.

General Nursing and Midwifery Council Curriculum

The **National ENT Coordinator** reported on a significant engagement with the Nursing Council to try and embed national primary ENT skills in new cadres of nurses. This engagement has successfully convinced the council on the need for improved ENT capabilities and benefits which could be realised by building this into the national curriculum. They have now met with tutors in the Nursing Colleges and are running a pilot using the ToT methodology whereby Dr. Hapunda trains the tutors who thereafter train the students in the course of their studies. The plan is to take the results of this pilot to the Ministry of Health to seek support to extend this model if successful nationally.

What was the effect of the COVID-19 pandemic on the programme and how have risks been mitigated?

It is unsurprising that COVID-19 has had a significant disruptive effect on the programme. The **BEIT Cure Project Manager** outlines how at multiple times and for extended periods activities had to be halted, and in total they "lost close to two years of a five-year project". Overall COVID-19 affected the project in the following main ways: (1) outreach clinics and promotional activities halted due to restriction, (2) patients being afraid of attending clinics for fear of transmission, (3) virtual promotional channels restricted in their effectiveness in hard-to-reach rural communities, (4) delays and disruptions to training, and (5) administrative attention and resources focused on pandemic response.

The **deputy District Health Director** in Kapiri Mposhi noted the specific effects that COVID-19 had on planned outreach activities, as "many people would just not come as they did not want to be exposed". This limited outreach activities in some cases to simply the provision of posters with public health messages[18]. This was supported by the FGD with HCWs in Kapiri Mposhi with a nurse commenting that "people would shy from facilities for fear of contracting [COVID-19] and there was a reduction in our number of clients".

A **clinical officer** from Kapiri Mposhi noted the effect it had on the HCWs themselves, highlighting that "during the peak most of us contracted, which prevented us doing our jobs during this time", with another highlighting the significant effect on the provision of services as "I was down for two months myself, which created a huge challenge as I was the only trained one at the facility so the work could not continue".

Audiologists trained at the Starkey Hearing Institute had to end their practicums at BEIT Cure early due to Covid restrictions but all audiologists who were interviewed reported that online training was well integrated in response and that they did not think this adversely affected their ability to do their jobs. However, once it had begun the main training at Starkey Institute was generally unaffected by the pandemic as a decision was taken for students to remain in residency on campus in a protected way, allowing training to continue

[18] The project worked closely with the Zambian Agency for Persons with Disabilities (ZAPD) to help disseminate information on ear and hearing in the context of the pandemic.

through the pandemic. As a result, the required 200 hours on campus contact hours were realised for the graduates of the programme at Starkey.

Finally, the pandemic was raised as a key reason to explain why the National ENT Coordinating Committee was not formed. This Committee is planned to be a critical forum on influence through which the project could advocate for ENT services and for resource allocation to support the long-term provision of services established by the project. It is vital that work continues here to ensure that the Committee is constituted and the government can be engaged to collaborate on the long term development of Ear and Hearing Care.

What have been the challenges and successes of the activities from the perspectives of different stakeholder groups?

Practitioners

A commonly noted challenge of the project was attrition of health care workers trained in PEHC. In the project design it is implicitly assumed that a trained health care worker would remain attached to their existing health care facility, but throughout the programme there was an issue whereby, often at short notice, practitioners would be reassigned to another facility by Government, potentially even outside the intervention districts. The primary issue this presented was leaving some facilities without staff trained in primary ear and hearing care. The **Senior Clinical Care Officer** in Kabwe remarked that the impact of this was mitigated in the District through the strong collaborative relationship with BEIT Cure, to influence the movement of staff members to reduce the number of facilities, and therefore patients, without a practising health care worker trained in PEHC. BEIT Cure confirmed that the ultimate result of this was that 95% of primary health facilities maintained their staffing with trained HCWs.

The Senior Clinical Care Officer in Kabwe noted that intrinsic to the design of the project was the issue of practitioners based in facilities in hard-to-reach areas, in remote primary health care facilities. He noted that this created some issues in monitoring the work that they were conducting and the way in which they were documenting their activities.

Another key issue has been the lack of continuous representation of an ENT surgeon at Kabwe Hospital. At the start of the project there was a Zambian surgeon associated with the hospital for six months before being referred to Lusaka and for 2-3 years of the project there was a volunteer surgeon from Ukraine, who returned to Ukraine at the onset of the invasion of Ukraine. The primary consequence of this has been that complex cases requiring surgical intervention which are referred into Kabwe from the 3 Districts in the intervention site cannot be treated in Kabwe and are still therefore required to be transferred into Lusaka for intervention.

One way that the project has mitigated this has been through the provision of further training[19] to a Clinical Officer (**John Cloud, Head Clinician**) in Kabwe Hospital in advanced triage, to indicate those requiring specific surgical intervention, to either be

[19] 3 month training residency provided in Lusaka at BEIT Cure

referred immediately to Lusaka for intervention, or to be added to a waitlist, to be mobilised for surgical missions, from BEIT Cure to Kabwe Hospital. Additionally, BEIT Cure are training two registrars at the University Training Hospital (UTH) and plan to use them to help cover Kabwe through rotations and surgical camps to conduct minor surgical procedures, while they consider options for ensuring more permanent representation at Kabwe General Hospital.

Community Based Volunteers

In discussion with the **CBVs** it was established that they serve large communities, with respondents accountable for catchment areas between 5,263 and over 22,000 community members.

One problem highlighted in two different FGDs in Kapiri Mposhi with CBVs was that sometimes when they refer patients to health facilities, they find that "there are not health care workers or medication" and that "they get tired of going as there is no proper treatment". In the second FGD one volunteer reflected this was a communication problem, and that the provision of phones or data would improve "communication and the better sharing of information".

Additional commonly highlighted problems are a lack of appropriate incentivised motivation and transportation in rural areas. **BEIT Cure** explained that this was a significant problem for the programme as they were competing against better funded and incentivised interventions from large NGOs for a limited pool of volunteers with limited time. The volunteers reported that even if financial remuneration was not possible, supportive equipment beyond the provision of T-Shirts (such as umbrellas for the weather or bikes for transportation) would go a significant way towards establishing gratitude for the services they offer through the programme.

The volunteers provided good evidence that they were creative and resourceful in their roles, reporting that they decided to engage local church leaders and headmen[20] in their health promotion and community mobilisation activities to ensure good relations with an assured audience with the communities in which they operated.

Health Care Workers (Nurses and Clinical Officers)

In a FGD in Kapiri Mposhi, one **Clinical Officer** relayed a problem regarding an inconsistent supply of consumables, in particular, he reported having problems regarding cipro ear drops and wax softener. When they do not have supplies the HCWs report that they will make prescriptions to their patients, but this can be too expensive for some patients or pharmacies will themselves face their own stock-outs.

Another **Nurse** reported that she had never received cetirizine or antibiotics, although most other HCWs reported that while antibiotic supply was a problem, that they did have antibiotics over 50% of the time, with one reporting having stock issues in 4 months in the past year.

Public Sector

[20] Local community leaders in Zambia

CBM Zambia spoke of how all the successes of the project have only been realisable through the "strength of the collaboration between the project and the districts. We have always felt that we could approach them at any time". The strength of this collaboration is reported to have been resilient enough to withstand a change of government occurring towards the end of the project; with CBM reporting that "even with the change of administration, we have managed to continue to work very well with the authorities".

Mobilisation of the ENT Community and embedding the National Coordinating Committee have been difficult processes however, which is attributable to a range of different issues. Many respondents, including **BEIT Cure** and **CBM Zambia** highlighted Eye Health as an analogous model which ENT should aspire to emulate, but note that this process is not quick or easy and will take time to embed.

The National Coordinating Committee has not met as much as had been planned, which was primarily attributed to COVID-19, although it was noted that the demands on the time of Dr. Hapunda, the National Coordinator are substantial. This is an unavoidable problem in the current system as the National Coordinator needs to be an ENT specialist, but as there are so few ENT specialists, this means any time taken in the coordinator role, risks cannibalising time spent providing ENT specialist care or education and training. These problems were exacerbated by the administrative upheaval turmoil because of the change of government which affected executive and administrative government alike (as many positions in the civil and healthcare services are appointed by the elected government). This reflection was shared by the **CBM Director** who noted that the change of government set back advocacy with the MoH significantly "in 2021 we had built up a strong relationship with the Minister and were close to some key agreements on the national strategy, now with the change of government there is a new Minister and they of course are dealing with settling into their roles. We are just now trying to get a meeting with the technical Permanent Secretary[21] to get engagement with the new Minister. This is the high-level buy-in we need going forward."

However, despite these political system challenges, **Dr. Hapunda** reported that she had been working with the MoH on the National Health Plan 2022-2027 and that ENT was being incorporated into these plans, which is a key success. Included in this they have managed to secure; (1) Training of ENT health care workers (nurses and clinical officers), as an continuation of the model adopted in the PrevENT programme, to provide interim support, while ENT specialists are trained, (2) Temporal Bone Lab at UTH, and (3) Universal New Born Screening for congenital problems.

Alongside the relationship with the MoH, BEIT Cure has maintained strong links with the Ministry of Education (MoE) through the project, supported by the fact that Dr. Hapunda is formally located within this Ministry through her University work. This relationship enabled the project to direct targeted screening work to children through conducting whole school screening activities throughout the project, with the MoE

[21] In Zambia departments have two Permanent Secretaries; technical and administrative and the Technical PS is the key Civil Servant to engage on strategic and resource allocation matters in the Ministry of Health

helping direct the project to schools with provision for children with hearing impairments.

NGOs/ other organisations

Through the support of the project the National Society for Ear Nose and Throat, Audiologist and Speech Therapists (ZENTAS) has been successfully constituted[22]. The **Beit Cure Project Manager** relayed that "the Society has functioned like the technical working group for ear and hearing" and in some ways has filled the gap left by absence of the ENT National Coordinating Committee (see below). ZENTAS was effectively used by the project to disseminate information about the successes and challenges on the project and to get their expertise and input to review training as they were reiterated through the project cycle.

Funding for ZENTAS was cost shared and supported by the project, and through these meetings, the group were able to finalise the National Strategic Plan. BEIT Cure identified that although the group are no longer meeting at the frequency they were at initial formation, it is highly likely they will continue their activities. Moreover, there are significant opportunities for the Society to develop relationships and attract investment such as through the UK ENT Society which provides significant opportunities to grow the sub sector of ENT in Zambia.

The project also worked with Police Scotland which directed the team to working more closely with students with disabling hearing loss in the third year of the project. This led to an ongoing collaboration with Broadway Secondary School in Kabwe District which has over 50 students with disabling hearing loss enrolled in their sign language unit. Through this collaboration, comprehensive hearing assessments were undertaken in the school, with hearing aids provided to those who would benefit from them.

During the course of the evaluation a FGD was undertaken with some of these students, where they reported significant benefits to their lives delivered by the hearing aids which had increased their ability to communicate with other people in their lives without disabling hearing loss.

Finally, there is a network of other projects in Zambia which receive funding through Scottish Government development grants. This network was effectively used during the pandemic to coordinate response to COVID-19, through information sharing, and collaborative work on disability inclusion, security, livelihoods and education. This also included collaborations with the Scottish Government, such as a roundtable held with the Minister for Europe and International Development.

Wider Community

The **Senior Clinical Care Officer** in Kabwe, expressed his appreciation and was very impressed by the integration of services into the community and associated sensitisation provided by the community-based volunteers, noting that "many though this couldn't trickle down to community level engagement, but having the

[22] Formally registered in 2020

[community based] volunteers orientated to health promotion and education has been a big success".

The **Deputy DHD for Kapiri Mposhi** noted that people previously had no knowledge or understanding about ear and hearing problems, and did not think many treatable conditions were in fact treatable, remarking that "our community have learned a lot, and have now come into the light, they have been enlightened and so stigma has also reduced".

While the project has reduced the need of patients to travel to District Hospitals and Lusaka for many services, this remains a problem for complex cases requiring further intervention. The Deputy DHD for Kapiri Mposhi noted that especially for rural patients this remains a substantial challenge commenting that "while we can sometimes help with transportation this is a major hindrance generally.

One problem faced was the high drop-out rates of those who have been issued with hearing aids[23]. This is not a problem which is unique to Zambia, and high dropout rates, for example, are also experienced in the UK. **The Executive Director of the Starkey Institute** (Dr Alfred Mwamba) stated that the difficulty lies in striking the right balance between distributing free equipment (to encourage take-up) and charging some small fees (to cover costs but also encourage ownership in the equipment by the patients, to encourage long term utilisation). This reflects the views of the project team also, who reasoned that the supportive services around hearing aids, were critical to maximising long term usability. To try to maximise long term utilisation, HCWs on the project have been instructed to keep close contact with beneficiaries and provide maintenance services and follow ups; which was more difficult prior to the completion of the booths and the audiology technicians completing their training and beginning formal work in their districts. This should be significantly easier now that the audiology booths have been constructed and all 13 of the audiology technicians are now practising in their roles

Institutions Delivering Services and Training

During the intervention, and prior to the pandemic, the project team faced a disruption to services when several violent gassing incident attacks occurred across the country in early 2020, during which BEIT Cure were unable to carry out activities[24]. This was because the chemical used for gassing was also used as anaesthetic in hospitals, and which made HCWs were made potential targets for retribution. A member of another organisation was killed during the course of their work due to this.

As noted, earlier COVID, a change of government and significant pressures on the time of the National ENT Coordinator, meant that the National ENT Committee was not formed during the course of the project, although work on this is continuing. The absence of this committee made it harder for the project to exert influence and shape policy during the project, although this still occurred, through direct relationships within government.

[23] As high as 90% in the 4th year of the Project

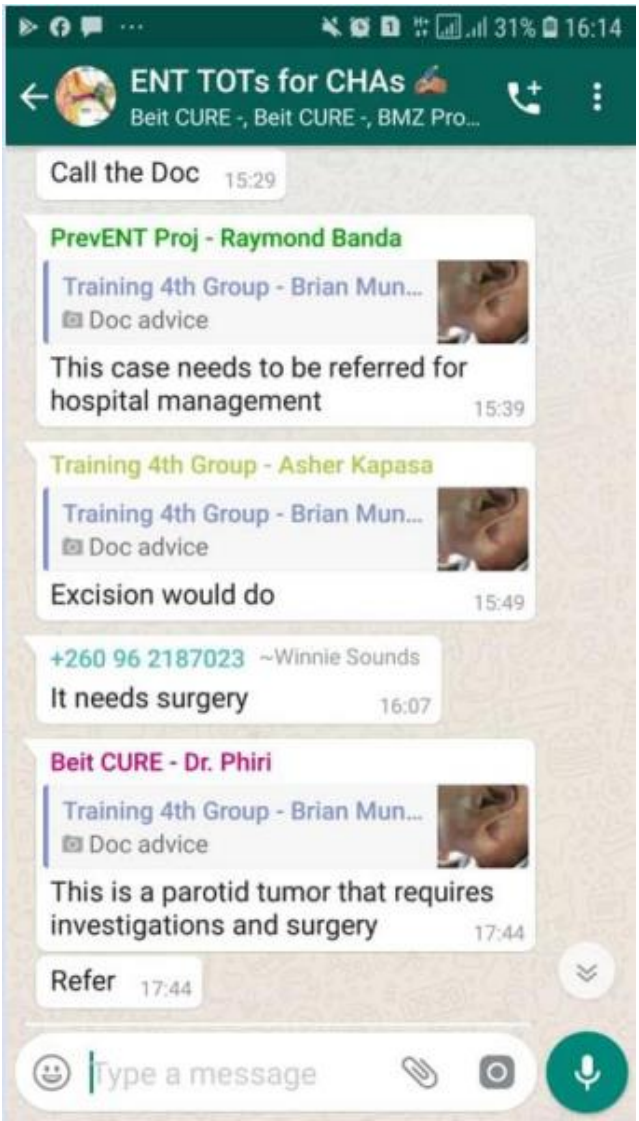
[24] See https://www.lusakatimes.com/2020/02/19/263617/

Ideally however, the committee would act as the gathering locus where the project would be in a position to advocate from. Advocacy such as the successful formal recognition of the Audiology Technicians, has occurred through bilateral engagements with officials. The **BEIT Cure Project Manager** argued that "with a national committee we would have had representatives of the National Midwifery Council represented at the meeting and we could have channelled requests through their representatives". As it stands, BEIT Cure have recently[25] secured an agreement with the Permanent Secretary for the formation of the Committee once BEIT Cure have agreements for representatives from Ministries of; Health, Education, Mines, Labour, Justice, Community Welfare in addition to the National ENT Coordinator, Organisation for People with Disabilities and ZENTAS.

What lessons can be identified from the programme for future implementation for ENT projects?

Use of WhatsApp for the Tele-Health Strategy

WhatsApp was very effectively used by the programme to ensure the maximum utility of very limited ENT specialists' resources in the countries and included the National ENT Coordinator Dr Hapunda. Those who received training at BEIT Cure and who had smartphones are able to at any time contact ENT specialists to help resolve cases they are unclear on and seek advice of referrals. Trainees can post pictures of complex cases and request for guidance. The project also uses this to disseminate information to trainees and to get feedback on training which was used to improve future training.



Dr Hapunda reported that the use of WhatApp has cut out lots of difficult processes and ensured complex cases could be confirmed from hard-to-reach communities. It has also ensured effective and quick referral outside normal patient pathways. This is critical as normally there would be multiple referrals through many locations before a patient who required surgery in Lusaka would be referred for such.

[25] May 2022

Staff Attrition

As the **Kabwe Senior Clinical Care Officer** reflected, a significant benefit would be realised if the basic training in PEHC and information about the intervention was provided to Government managers in district level health care facilities. This would reduce pressures on senior District Health staff and prevent trained staff members being moved, unless there were significant reasons from their facilities. Effective coverage of all primary health care facilities would be more effectively maintained throughout the project (and beyond). Additionally, this would promote stronger relationships between the implanting organisation and the personnel responsible for staffing decisions, which could further serve to maintain the percentage of staff associated with their facilities.

This was corroborated by the reflections of **Dr Uta**, who noted that in general, practitioners will train others in their facilities, and this can help to ensure that even if staff members are relocated the knowledge remains bonded to the facility. The evaluators witnessed this process in action, as during the evaluation field visit training of Doctors, Nurses and Clinicians was taking place within Kabwe hospital which was being led by the **Head Clinician, John Cloud**, who had received enhanced training in PEHC through BEIT Cure. Mr. Cloud reported that to date this programme had seen 12 Doctors trained in PEHC, with a further 2 in training, 30 nurses, with 20 more in training, and 30 clinical officers.

Adaptations to the model

Dr Uta reflected that less of a focus on audiology might make sense and wondered whether the amount of training of audiology technicians was 100% necessary and wondered whether it might have been better to focus some resources on other elements of PEHC, without such a specific focus on audiology.

The **Head of Clinical Care in Kabwe General Hospital** recommended that future interventions should carry out more outreach screening activities in the community as many undiagnosed patients could benefit from interventions which were now possible (both at primary level and through referrals).

Surgeon Support at Provincial Level

Contingency plans are being made to ensure surgical support is possible throughout (and beyond) the lifetime of the programme.

This is no doubt easier said than done as supply of this training and skillset is vastly outstripped by demand in the region (and explains why the one Zambian surgeon was reallocated to Lusaka during the programme by the Ministry of Health). Future designs should build in training of at least one ENT specialist who is bonded to a facility at least on a part time basis for the duration of subsequent interventions.

Beyond this, and outside the remit of an analogous intervention, the establishment of a domestically based National Training Programme for ENT specialists would help increase the supply of ENT specialists and ensure that provincially based specialists can be based in the province for the duration of the programme. BEIT Cure is currently working on supporting the establishment of such a programme.

Further development pathways for health care workers on the programme

Several healthcare workers relayed that they wished for further development pathways to increase their knowledge and skills in ENT care to ensure that they could increase their impact in the communities. The **Head of Clinical Care at Kabwe General Hospital** highlighted that there was no-one currently at the hospital who could carry out complex interventions, and that his advanced training helped with triage but was insufficient for the problems he faced. He wondered whether more developed, and professionally recognised training in ENT services, which reflected that provided to the audiologists, would help ameliorate these problems, to ensure more advanced services could be conducted in Central Province, without having to refer them to Lusaka or await surgical camps.

Smoother supply of consumables

In all districts HCWs highlighted issues of the continuity of the supply of consumables, with it commonly noted on how this made their jobs more difficult and also created issues of trust in sensitisation messaging, whereby patients would get tired of being told to go to services that they could not ultimately receive at the clinics due to supply issues. Future implementations of this programme must make sure to improve the continuity of the supply of medications and other consumables to maximise impacts and also maximise the efficiency of investments in human resources (HCWs and CBVs) to ensure that their hard work is translated into patient outcomes. However, it is recognised that supplies have been affected significantly by COVID, and this was outside the control of the project.

A key problem underpinning the supply issues is that the Ministry of Health Essential drugs list does not include drugs and supplies required for the treatment of ear conditions. Work is ongoing with the National ENT Coordinator to engage the government on this.

Enhanced support to Community Based Volunteers

It is recognised both by BEIT Cure (**Project Manager and M&E Officer**) and community-based volunteers that there are incentive challenges in the programme. This is both in respect to competition from larger programmes which provide financial remuneration, or purely with respect that the work is difficult and time consuming to do. It would be beneficial for future iterations to provide a minimal level of support which makes the difficult jobs of the volunteers easy. Common suggestions such as coats, boots, bicycles etc. would not only demonstrate the gratitude of the project to the volunteers (increasing engagement) but also enable them to conduct their jobs more effectively, especially considering the size of the communities they serve (up to 22,000).

The volunteers did recognise significant remuneration was unlikely but noted that any small support would be very helpful. **BEIT Cure** recommended that stipend remuneration is inadvisable as it makes long term sustainability problematic. They advanced a view that stipend remuneration should only originate within government for activities as opposed to originating within a project and thereafter trying to transfer these costs to government.

Inclusive Public Health Messaging and Outreaches

As highlighted by one of the **community-based volunteers** there is a potential problem in the current formulation of community outreach services they provide, in that they are not equipped with visual aids to communicate with some of those with disabling hearing loss. The volunteer suggested that the effective visual aids, and training in their use, should be provided to all community-based volunteers in future iterations of this project.

Stronger Evidence Base

Both the **National ENT Coordinator** and **Executive Director of CBM Zambia** relayed a belief that a stronger evidence base (both with regards to unmet needs in the population and the benefit of interventions on livelihoods) is absolutely critical for achieving buy-in from government to supply the required resources to meet the requirements of the ENT National Plan.

The Prevalence Survey conducted by the programme as part of the related BMZ project (and covering Central Province) is a key example of such an evidence base which will be critical for this advocacy. As concluded in the end of term evaluation of that project, such research would have been more advantageous earlier on in this programme, where the benefits of the results could have been realised during the course of the project; not only for advocacy purposes but for directing resources and tailoring services according to population level needs.

Training Audiologists earlier

Although many of the delays in the project were associated with Covid, some of the delays to initiating training of the audiologists were associated with not initially using the Starkey Institute. The ultimate impact of this is that some audiologists did not start practising until January 2022 because of the COVID associated delays, and this timing was coming closer to the end of the project which has delayed the integration of their services into government systems. Future iterations of the project should seek to be more decisive in organising training so that staff are able to begin practising and impacting patients earlier in the project cycle.

Data

It is important upfront to identify MoH members (at all levels) who carry responsibility for reporting and information management and to engage with them especially during the project design phase. For example, the Director of M&E should be engaged initially to get their buy in from the start. The MoH has a national reporting system (Zambian HMIS) in which staff report their monthly clinical stats into this system. There is an opportunity in future iterations to leverage this relationship to either build in the ENT statistics required on the project into this system and engage in information sharing. The result of this project was that paper records did not initially bear official ministry logos which was reflected in difficulties with some HCWs taking it seriously.

How sustainable is the programme likely to be after funding ceases? What obstacles do stakeholders identify for maintaining or securing sustainability

The **Senior Clinical Care Officer in Kabwe** provided a mixed picture on sustainability. In terms of human resources, he was very positive, believing that even in the face of some attrition a significant amount of the trained staff remained within the district and relayed confidence that as a district they would be able to sustain this.

Additionally in terms of infrastructure, physical space within their hospitals had been dedicated to providing Ear and Hearing services, and this space was government owned and not rented. It had also been committed to be assigned to these services beyond the end of the project.

The primary concern related to equipment and consumables, in the knowledge that procurement to replace broken screening equipment could be difficult. However, he noted that the responsibility for this was being transferred to government at the cessation of the project and confirmed that the district recognised this and assumed responsibility for doing so, commenting that as an institution "we are doing strategic planning, are aware of the requirements of the new services and that this is being factored into future budgeting". Overall, he reflected that the new services had been "integrated exceptionally well, and there was no demarcation [between existing services and those established by the project], and that PEHC is now one of the indicators on our performance reporting tools".

Likewise, the **deputy DHD (District Health Director) from Kapiri Mposhi**, Dr. Kalumba noted that "when a project comes to an end it is not easy, but when they go we [district health services] have to sustain this ourselves. The answer is yes, we will sustain". Like the **Kabwe Senior Clinical Care Officer**, she noted that the capability and commitment of those trained by BEIT Cure was very high, so there was no worry about the sustainability of the human resources required for long term continuity of services. Dr Kalumba provided good evidence that the district was taking its responsibility for the continuity of consumables and medication seriously but also noting the challenges of this, noting that "as a district we are working to help provide drugs and the disposables which are not readily available as they are not a service we had before". Encouragingly, she concluded that "services have been fully integrated, clinicians are well known, and others will refer to those trained in ENT, and in the community, people will refer to these services. People know these services are now offered and will even self-refer into the clinics. During outreaches for other conditions, we are even integrating and offering [ENT] services now".

The **Head of Clinical Care at Kabwe General Hospital** was positive about the sustainability prospects of the services he had sight of (not the community outreach aspects). He thought the hospital services (infrastructure and trained health professionals) were secure moving forwards, but also reflected the common concerns about the sustainability of the equipment (its lifespan and consumables).

Health Care Workers in Kapiri Mposhi were slightly more circumspect about the sustainability issues of consumables and equipment, having faced supply issues

during the project itself. One nurse commented that if BEIT Cure were to withdraw from the project completely, they did not have confidence that the government was ready to ensure the continuity of equipment and consumables. Another clinician reflected what government officials had said, commenting that "in terms of manpower it is sustainable, but in terms of supplies, we need more supplies". Likewise, an Audiology Technician shared that "government cannot be relied upon to provide the non-stop supply of resources that we need, so we need BEIT Cure to continue to supply this".

BEIT Cure demonstrated clear commitments to maintain support for several years beyond the cessation of the project to ensure that government is supported as it assumes responsibility for the services established by the project and to ensure the long-term sustainability of primary ear and hearing care is assured in Central Province. Stephen Chishimba, **ENT Project Manager at BEIT Cure** noted that they "wanted to ensure that continuing support for activities and the district" was maintained as "two years were lost to covid, and we are seeing the fruits of our efforts as the project is coming to an end". Concretely this support includes an estimated 2-3 years of continued provision of *new* hearing aids to Central Province, and the aforementioned commitment to provide batteries for at least a year following the cessation of project level funding.

Equipment Calibration

One aspect which is yet to be resolved is the issue of calibration of the screening equipment. Currently there is no identified Zambian company providing these services, so a South African company is relied upon (and is the single identified supplier of these services, creating a single point of failure and susceptibility to price gouging from this supplier. Moreover, a technician from SA was required to travel to Zambia to provide these services.

However, BEIT Cure have committed to continue responsibility for 2 years for finding a short-term solution for the equipment calibration but relayed an understanding that in the long term that the MoH will have to take on responsibility for this. To this end BEIT Cure and continuing discussions with the government to outline a long-term solution.

Provision of Hearing Aids

Government on not currently in a position to provide hearing aids as part of the integration of services. As such there is no long-term plan in place to ensure the continuity of this service. However, BEIT Cure has confirmed that DeafKidz International will continue their supply of hearing aids until September, at which point sufficient surplus supplies will have been provided to cover the next 2-3 years of provision in Central Province.

Batteries for Hearing Aids

CBM Zambia reported that efficiency savings from the project[26] have been used to build in costs for batteries and consumables for the hearing aids which have already

[26] Generated in part through the deterioration of the Zambian Kwacha against Pound Sterling

been provided for at-least one year, while considerations are made for longer term solutions. In the long-term BEIT Cure plan to work with the government to embed long term solutions, including potential provision within the national insurance scheme, allowing clients to access batteries (and hearing aids) through the scheme.

Additionally, BEIT Cure are working on two pilots on rechargeables; one associated with rechargeable batteries and one with rechargeable hearing aids, which are to be evaluated against each other for potential expansion to BEIT Cure's intervention areas. At the time of the evaluation the supply chain crisis had prevented the test kits arriving from China in Guangzhou, so the manufacturer was working with their Indian counterpart to fulfil the order. The hope is that this will allow the pilot to be conducted before the formal closing of the project.

Successful results from this pilot would represent a substantial opportunity for long term support to patients, as the current system requires the distribution of sets of 4 batteries which last about 3 months (requiring 16 batteries for a year's supply), while the manufacturer claims that a single set of rechargeable batteries should last up to 3 years.

Overall, it is clear that sustainability is possible, and that the Government is showing willingness to take ownership over primary ear and hearing care, but they are not currently ready to take on total responsibility for supporting the delivery of these services. If support continues to be offered as outlined, with parallel engagement with government at all levels long term sustainability is likely, but this support must be maintained.

What is the relation of the programme to the national Strategy and how has, and how will the programme contribute to national indicators and outcomes?

Gender and Inclusion

Outreach clinic events were balanced well to include a broadly equal number of men and women, with slightly more consultations delivered to women each year. In 2018, 58% of consultations were delivered to women, in 2019, 55% of consultations were delivered to women, in 2020, 58% were delivered to women and 2021 56% of consultations were delivered to women. 54% of the HCWs trained on the project were women, and of the 13 who received audiology technician training through the project 5 of the 13 were women (41%). Finally, 55% of the 273 CBVs trained for the project were women.

The **BEIT Cure Project Manager** outlined that inclusion of persons with disabilities improved significantly through the project. He outlined that although there was initially not much involvement, they thereafter started working with schools with provisions for those with disabling hearing loss, such as Broadway School which was visited as part of the evaluation. From the 3rd Year onwards persons with disabling hearing loss were included in all outreach functions[27] that BEIT Cure did in the community and provided them with a platform to outline the challenges they had.

[27] CBM and BEIT Cure used important visibility days such as the International Day of Persons with Disabilities and World Hearing Day to have functions to share information, learn from best practices and receive feedback from various stakeholders.

This was supported by a survey conducted by BEIT Cure on the hearing impaired and a subsequent pilot run by BEIT Cure on the use of transparent masks, which were distributed to students, to aid with lip-reading, as this was reported as a common problem by students on the survey.

A key recommendation of the Mid-Project review was to increase the inclusion of persons with disabilities in the intervention. This steer was successfully built into the project with BEIT CURE successfully advocating for the inclusion of Disabled People's Organisations (DPOs) working with the hearing-impaired on the National ENT Committee, which led to the inclusion of Zambia Association of the Deaf and the Association of Sign Language Interpreters were agreed to be included as key partners.

7. Conclusions

The project has successfully established primary ear and hearing services in Central Province in Zambia, in a manner which pilots and provides an effective proof of concept for subsequent interventions to establish primary services in resource limited areas with hard-to-reach populations. However, the long-term sustainability of these services is not assured and will require years of nurturing to ensure that it's fully and sustainably integrated into standard government services. This is not a fault of the project but a reflection of the conditions in which the project was working. With that said, the stakeholders on this project are well equipped with the skills, drive and dedication required to deliver this.

It is evident that the contrast between the situation prior to the intervention, when no services existed at all, is substantial and it is important that this is recognised. This is the greatest achievement of the programme and the achievement that will have the largest long-term benefit. Indeed, this will have had a transformational effect on the lives of many people living in these communities, and there is real potential for these services to not only be sustained, but in fact grow and develop as they become embedded and the knowledge of hearing loss and measures to prevent it increase in saliency over time.

For this to occur, what is required is for support to be extended for several years while the government is supported effectively to engage at all levels to ensure the steady transfer of responsibilities away from the project stakeholders. The skills and expertise have been well established and the physical infrastructure to support these services is concretely agreed with the district and provincial authorities in Central Province.

Where enduring support is most needed however is the supply of consumables and equipment maintenance. District authorities are taking some initiative here which is encouraging, as they reflect ENT services in their plans and budgets. However, it is highly unlikely that this provision will be sufficient to service the needs of the professional trained by this programme immediately. BEIT Cure have confirmed that they will continue to provide hearing aids for 2-3 years and maintain and calibrate the equipment for at least 2 years and are working on rechargeable hearing aids. That

this support is maintained as outlined is fundamental for the long-term success of the project.

As this support is wound down, engagements must continue with the government to hand over responsibility for this support to them. Fundamental to this is the formation and regular meeting of the ENT National Coordinating Committee. Once formulated CBM and BEIT will have a direct forum through which they can advocate for the resource allocation and supportive services to enable the government to take full and sustained ownership of the services established by the project. The project team maintains an extremely close and collaborative relationship with the National ENT Coordinator which will prove absolutely vital to delivering this.

Overall, the project has delivered impressive results amidst incredibly disruptive events, and in particular the pandemic and a change of government at a critical juncture for the project. The project provides good evidence of a model which with some adaptations should be rolled out more widely, both within Zambia and in analogous contexts with rural and hard-to-reach communities with no access to primary ear and hearing care.

7. Recommendations

1. This intervention and methodology should be implemented elsewhere both within Zambia and in analogous settings.
2. CBM/BEIT Cure Hospital should extend support where possible to Central Provincial PEHC Services, to ensure that continuity of services is maintained while the government steadily assumes complete ownership and responsibility for the services rendered.
3. CBM and BEIT Cure should establish an MoU with regard to what services are extended, with named persons/ organisation against specific responsibilities, and agree upon a (non-binding) mechanism to ensure mutual accountability of this service extension. Performance against delivery of these services should be reported mutually at meetings of a pre-agreed regularity.
4. Future iterations of the same project should develop more concrete evidence to strengthen understandings of the project and to relay information to the Government.
5. The project should collect better data on patient outcomes (post intervention). There is a good understanding of services rendered, but the understanding of the effectiveness of these interventions is more opaque.
6. Delays to training independent of Covid-19 are partly responsible for audiology technicians only commencing practising in January of the final year of the intervention. It is paramount that as much planning is put in place for future iterations so that delays because of external events do not cause a delay in training. This will also require that critical delays in decisions regarding training institutes are not repeated in a manner which leads to multi-year delays to training.

7. Visual Aids and wider considerations regarding the inclusivity of the programme need to be considered through the project, including in the design phase, to help ensure that potential beneficiaries of the programme are not excluded.
8. Future iterations of the project should include in their budget a political communications officer, who has a primary role is engaging and liaising with government at all levels. Ideally this person would have experience of either working in, or working with, the Zambian Civil Service, with a strong understanding about government structures, and how to generate policy change within government.

8. Project Timeline

Time	Event	Description
Y1 (Jan)	Ministry of Health Meeting	Agreement reached on number of trainees in each district
Y1 (Jan)	Kick off workshop	Workshop attended by CBM UK, CBM Zambia, National ENT Coordinator and MoH
Y1 (Mar)	Project Launch	Project is launched on World Hearing Day in Kabwe with representatives from the Ministry of Health and included screening of over 400 people (inclusive of follow up screening)
Y1	Coordination with National ENT Planning Office	4 Provincial Meetings held 1 National Workshop Held
Y2 (March)	Outreach Clinics	Outreach Clinics held in Lusaka and Kapiri Mposhi (screening over 500 patients)
Y2 (October)	Monitoring visit	Attended by CBM UK to establish info sharing platform for HCWs and provide patient registers and consumables
Y2 (October)	National ENT Stakeholder meeting	Reached agreements on harmonising ENT collection data between different organisations, formation of the ENT Society, identification of HCWs to be trained in audiology, relocation of the Kabwe ENT Clinic and to train Community based volunteers as the Mwachisompola Community Training School
Y2 (November)	Monitoring and Evaluation	University of Edinburgh carried out a M&E visit to review the M&E Framework on how data is collected against the long frame, roles and responsibilities on data collection, capture and development of post-training questionnaires created for nurses and technicians and the MTR parameters.
Y2 (November)	Clinical Visits	4 Clinic Sites visited including Central Hospital, to establish space for Audiology Centre in Kabwe General Hospital, inspect patients records from screening
Y2 (March)	Scottish Student Visit	CBM/BEIT Cure host student on Arclight (cost effective otoscope for low income setting) which are to be distributed on project for outreach and screenings
Y2 (March)	Kapiri Urban Clinic designation	Kapiri Urban Clinic designated as audiology sight and HCWs from district nominated for audiology training
Y3	Coordination Meetings	Two National ENT Technical Committee meetings held and attended by ENT/Audiology practitioners from CBM and BEIT Cure Hospitals with 6 MoH meetings held at district level and to ensure buy-in from government
Y3 (October)	Management Meetings	Visit from CBM UK to visit project team in Zambia, including Kabwe meeting with HCws and beneficiaries at outreach clinics.

Y3 (October)	Mid Project Review	Visit from UoE to prepare for mid-term evaluation
Y4 (August)	National General Election	General Elections held in Zambia, resulting in a change of government
Y4 (March)	World Report on Hearing	World Report on Hearing is realised on World Hearing Day, and features the PrevENT project as a case study

9. Annexes

Annex A: Theory of Change High Resolution PDF (separate attachment)

Annex B: Final Log Frame (separate attachment)