



Report on the evaluation of the Regional Centre of Excellence in Occupational Health and Safety

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SUMMARY

The Republic of Zambia is one of the four participating countries in the Southern Africa Tuberculosis Health Systems Support (SATBHSS) project. The others are the Republic of Malawi, the Kingdom of Lesotho, and the Republic of Mozambique. With support of the project, Zambia established the Centre of Excellence (CoE) in Occupational Health and Safety (OHS) in 2018 with the following objectives: to improve the quality of medical and work environment surveillance for the prevention and early detection of occupational lung diseases, including tuberculosis (TB), in Zambia and the sub-region by 2021; to improve capture, storage, analysis, and use of data at the Occupational Health and Safety Institute (OHSI) through an integrated central management system by 2019; to increase human resource capacity and skills in selected fields in occupational health and safety (OHS) and TB by 50% at the OHSI, to support Zambia and the sub-region by 2019; and to develop a patient-centred approach to occupational health examinations (remodelling OHSI services to focus on informing miners about their health) at the OHSI by 2019.

To achieve these objectives, the CoE brought together the Ministry of Health, the OHSI, the Ministry of Labour and Social Security, the Ministry of Mines and Mineral Development, and the Workers' Compensation Fund Control Board (the Consortium).

The multiple changes and systemic gaps in Zambia and the other SATBHSS-participating member states, in the provision of occupational health services and occupational hygiene, motivated the creation of the CoE. These included inadequate human resources coupled with low proficiency in the provision of occupational health services, limited access to occupational health services, lack of specialised equipment, and dilapidated infrastructure.

The East, Central and Southern Africa-Health Community (ECSA-HC), together with the African Union Development Agency-New Partnership for Africa's Development (AUDA-NEPAD) and the country team, conducted an evaluation of the CoE with the objective of documenting the outcomes of interventions implemented under the CoE – and the lessons learned.

The evaluation of the CoE revealed that it was an excellent, paradigm-shifting concept, and is essential in the provision of occupational health services. Under the CoE, routine occupational health services have been decentralised to the North-Western and Lusaka provinces, and to other Zambian provinces through outreach services. The number of medical surveillances increased by 6% in the first year of implementation of the CoE from the baseline year, 2017. The increase in medical surveillance was sustained until 2020, when the CoE was affected by the COVID-19 pandemic.

The number of cases compensated increased from about 90 in 2018 to at least 130 in 2022. The CoE provided support to other SATBHSS member states, mainly in human resource development. The CoE was open to other countries in chest radiography reading training, as Zambia is the only one of the four countries with B-reading equipment. The procurement of assorted equipment enabled the execution of specialised services.

The objectives of the CoE have been achieved. It has been enabled and capacitated to provide much-needed essential and specialised occupational health services. Each of the member institutions of the Consortium provided strategic and complimentary services, contributing to the goals and objective of the CoE. The CoE has huge potential to scale up its operations, as a firm foundation has been laid and most of the essential equipment is available. Key to the sustainability of the CoE is the completion of the remaining infrastructural works and the Strategic and Sustainability Plans.



Front Row from left: Mr Norman Khoza, Dr Kingley Ngosa, Dr Benedict Mushi, Prof. Dingani Moyo. Back Row: Dr Patrick Lungu, Ms Patricia Chilaisha, Prof. Muzimkhulu Zungu and Mr Zakeyo Mvula

Photograph: courtesy of the AUDA-NEPAD

INTRODUCTION

The Republic of Zambia has made tremendous progress in reducing the high burden of tuberculosis (TB), which is responsible for at least 40% of deaths among people living with the human immunodeficiency virus (HIV) in the country. As a mining country, Zambia also has an extremely high risk of developing occupational lung diseases. In the last five years, Zambia has accelerated the fight against TB, thanks to both international and domestic funds provided by the donor community and the Government of the Republic of Zambia. The prevalence of TB has decreased substantially, through concerted efforts anchored in a multi-sectoral approach.

One of the objectives of the SATBHSS project is to build regional capacity in TB and occupational health. Each of the participating countries has an area of focus under the umbrella of the centres of excellence (CoEs). Lesotho established a CoE in community-based drug-resistant TB (DR-TB) care, Malawi in community TB and integrated disease surveillance, Mozambique in the management of DR-TB and paediatric TB management, and Zambia in occupational health and safety (OHS).

The CoE for Zambia has been implemented under a Consortium within two ministries: 1) the Ministry of Labour and Social Security (MLSS) responsible for three CoE institutions (the Occupational Health and Safety Institute (OHSI), Occupational Safety and Health Services Department (OSHSD), and Workers' Compensation Fund Control Board (WCFB)); and 2) the Ministry of Mines and Mineral Development (MMMD), which is responsible for the Mine Safety Department (MSD).

The OHSI is mandated by the Workers' Compensation Act No. 10 of 1999 to carry out medical examinations of all prospective, current, and former miners in Zambia. The Occupational Health and Safety Act No. 36 of 2010 expanded this mandate to include other

industries, but this has not yet been operationalised. The OHSI administers initial, periodic (annual), discharge, and post-career medical examinations of miners, and is charged with analysing and reporting surveillance data on occupational lung diseases in the mining sector.

Examinations of miners working in the Copperbelt province are performed at the OHSI facility, while miners from other provinces are offered services through mobile outreach programmes run by OHSI staff. All examinations include the recording of medical and occupational histories, a physical examination, a chest X-ray, and a pulmonary function test (spirometry).

Miners deemed unfit for work at the initial examination are either deferred (pending further examination) or rejected permanently; miners deemed unfit for work during periodic examinations are referred to a hospital for treatment or are 'certified' as having lung disease resulting from their work, making them eligible to apply for workers' compensation.

Before the establishment of the CoE for OHS, the country experienced the following challenges:

1. High patient volume incommensurate with staffing levels, which compromised quality of clinical services for public health action
2. Absence of standardised criteria for exclusion from work
3. Outdated radiography equipment
4. Low proficiency in the classification of chest radiographs for occupational lung disease
5. Workflow practices that introduced bias into the radiograph classification process
6. Limited capacity for the OHSI to conduct outreach and examinations for miners working in geographically remote provinces
7. Digital and paper-based information management systems and lack of data back-up systems



Objectives of the Centre of Excellence

The implementation of the CoE started in 2018. Its main objective is to attain the highest capacity in prevention, diagnosis, medical surveillance, capacity building, and research in occupational lung diseases and TB, including the promotion of health and safety in the mining sector by 2021. The ECSA-HC, in collaboration with the country team, documented the CoE's performance.

Specific objectives

1. To improve the quality of medical and work environment surveillance for the prevention and early detection of all cases of occupational lung diseases, including TB in Zambia and the sub-region by 2021
2. To improve data capture, storage, analysis, and use at the OHSI through an integrated central management system by 2019
3. To increase human resource capacity and skills in selected fields in occupational health and safety, as well as TB, by 50% at the OHSI, to support Zambia and the sub-region by 2019
4. To develop a more patient-centred approach to occupational health examinations (remodelling OHSI services to focus on informing miners on their health) at the OHSI by 2019

EVALUATION OF THE CENTRE OF EXCELLENCE

The aim of the evaluation was to document the outcomes of the interventions implemented under the CoE.

Objectives

1. To assess progress towards achieving the objective of establishing the CoE
2. To explore the functionality of the model used to implement the CoE (consortium approach)
3. To assess the performance of the CoE in terms of service coverage, quality of service, data capture, and human resource capacity
4. To assess the impact of interventions on clients (beneficiaries)
5. To assess the prospects for sustainability of the CoE interventions post the SATBHSS project.
6. To document lessons learned, and challenges and barriers to implementation

METHODS

Both qualitative and quantitative methods were used for the evaluation of the CoE, which involved key informant interviews of strategic stakeholders and the use of structured intermediate outcome indicators. Trends in the number of workers screened for, and diagnosed with, occupational diseases, and the numbers submitted for compensation, were analysed. Using a structured questionnaire, we assessed the relevance of the CoE, existence of policies, regulations, and guidelines; and documented achievements, challenges, and gaps. We also assessed satisfaction of recipients of service. Other methods of assessment included desk reviews of documents, data mining, and on-site data validations.

RESULTS

Relevance of the Centre of Excellence and progress towards achieving its objectives

The SATBHSS project supported the four government institutions in Zambia (the MSD, OHSI, WCFCB and OSHSD) to become the CoE for OHS to serve the country and the needs of the SADC region.

The CoE is responsible for primary, secondary, and tertiary prevention of diseases and injuries in mining areas. It offers primary prevention services that include mine inspections, hazard identification, risk

assessments, and the implementation of an OHS management system across the mining industry. Secondary and tertiary prevention are provided by the OHSI and WCFCB authorities. The OHSI covers the greater part of the mining industry, and provides occupational health surveillance and impairment evaluations for workers. The OHSI centres in Kitwe, Solwezi, and Lusaka ensure good coverage in the high mining areas in Zambia. The WCFCB provides compensation for disabled or sick workers.

The SATBHSS project supported procurement of state-of-the-art equipment, which included:

- Six digital X-ray machines
- A portable lead shield
- Nine sets of B-reading machines
- Two GeneXpert machines
- Two spirometry machines
- Two diagnostic audiometry machines
- Two BioChem-VacuuCenter (BVC) control fluid aspiration systems
- A light-emitting diode (LED) microscope
- A hematocrit machine
- A benchtop centrifuge
- An X-ray diffractometer (XRD) for analysis of dust samples
- Two gas analysers
- Five gravimetric dust samplers
- Two sound level meters
- A digital industrial weighing scale
- Three motor vehicles
- A bus
- Servers
- Examination couches
- Extension of Community Health Outcomes (ECHO) equipment

The project also supported infrastructure development – particularly renovations of old structures that existed at the OHSI centres in Kitwe and Solwezi. It also supported human resource capacity development under long-term and short-term training programmes, to boost the capacity of the participating institutions to carry out their functions as the CoE.

The CoE has transformed the OHS landscape in Zambia, improving access to, and equity in, occupational health services, while enhancing service quality. It has aligned the operations of the key institutions involved in OHS service provision (the OHSI, WCFCB, OSHSD, and MSD). Additionally, the CoE has established strategic partnerships with Copperbelt University for research and human resource development in occupational health and hygiene.

The CoE united multiple institutions under a common agenda, breaking down the 'silos' that previously existed. As the central coordinating body, the CoE improved data sharing among Consortium members, enhancing their ability to deliver occupational health and compensation services. This collaboration has fostered greater appreciation of each institution's role, strengthening networking and enabling more comprehensive service provision.

The CoE established strong linkages with key institutions, enabling joint mine inspections that improved mine support and increased compliance with safety regulations. It also incorporated academia into a knowledge-sharing board that brings together experts and stakeholders. Additionally, the CoE enabled and facilitated the decentralisation of the provision of occupational health services across the country, which had not previously been possible. It mapped ex-miners with consultant support, facilitating targeted, cost-efficient service provision and raising awareness, resulting in a significant increase in compensated cases. The CoE has been a



strategic asset in building competencies in occupational health and hygiene across southern African countries, with the SATBHSS project-participating countries and other Southern African Development Community (SADC) countries receiving specialised A- and B-reading training in radiology.

Efficiency under the Centre of Excellence

Most of the planned interventions have been implemented in a timely manner. The availability of trained human resource staff and state-of-the-art equipment has enhanced the efficiency and effectiveness of service delivery at the CoE. The OHSI in Kitwe expanded its coverage by opening up new OHS centres in Lusaka (2019) and Solwezi (2021). This, in addition to investments in equipment and infrastructures, improved access and quality of OHS services in the country, targeting miners, ex-miners and workers in non-mining sectors (e.g. factory and agriculture workers, drivers, contractors, food handlers, etc.).

The increased access, coverage, and quality of the OHS services improved performance of the CoE over the years, especially in the areas of medical surveillance, OHS examinations and certification, joint inspections of mines, compensation for miners and ex-miners with work-related disabilities, and human resource capacity development.

The OHSI's mandate is to conduct medical examinations across all industries, investigate and detect occupational diseases and injuries, and refer workers with occupational diseases (including TB) to health facilities for treatment and to the WCFCB. The joint inspection of mines, under the umbrella CoE, promotes community sensitisation and awareness, leading to improved compliance with mining health and safety regulations, thereby increasing the numbers of miners and ex-miners screened, and the number of ex-miners compensated from 2018 to 2022; 570 claims were approved and 58 were rejected.

Human resource development

Capacity building of doctors, nurses, and occupational hygienists has included spirometry and audiometry skills training, basic occupational health services, and the International Labour Organization (ILO) International Classification of Radiographs of Pneumoconioses. The radiology staff, occupational health technicians, and occupational hygiene personnel are very competent in the performance of their duties. There is ongoing training and professional development of hygienists under the CoE. Forty-four local doctors have been trained in the ILO International Classification of Radiographs of Pneumoconioses; 19 officers have been trained in conducting baseline risk assessments in occupational settings.

The OHSI staff have also been supported to develop their skills through long-term courses, such as Bachelor's and Master's degrees, which has improved capacity and efficiency of the CoE in implementing its mandate of serving local and regional needs. The CoE has played a key role in building OHS capacity across the region, as originally envisioned. Since 2018, it has initiated short-term training programmes, training 94 doctors from Mozambique, Malawi, Lesotho, South Africa, and others in the ILO International Classification of Radiographs of Pneumoconioses. These programmes are expected to continue post the SATBHSS project, with the CoE signing a memorandum of understanding with the National Institute of Public Administration to offer a Diploma in Occupational Nursing. Similar efforts are underway with Copperbelt University to ensure the sustainability of these training programmes.

Centre of Excellence contribution to overall performance in the SATBHSS project

The investments under the CoE have contributed to improved performance in the SATBHSS project. The CoE was responsible for monitoring and reporting of performance indicators linked to project investments in OHS, including:

- TB case notification in target geographic areas
- TB cases identified through active TB case finding (screening) in vulnerable populations
- Miners and ex-miners successfully screened for occupational lung diseases
- Proportion of mines inspected at least twice a year, complying with national mine health regulations
- Numbers of miners and ex-miners successfully referred for continuity of treatment for TB and other occupational lung diseases, between and within participating countries

Effectiveness of the model used to implement the Centre of Excellence – the consortium approach

Although the concept of a CoE, involving three government ministries and four institutions, initially seemed complex and undesirable, it became evident that there were significant synergies between the organisations. While each maintained separate governance, they met the CoE's requirements through effective coordination of their OHS activities, facilitated by a capable and empowered administrator.

It is crucial for external audiences interacting with the CoE to understand its administrative, legal, governance, and service mandates to avoid confusion. The CoE brings together separate government institutions, each operating under mandates from Acts of Parliament to protect workers' health and safety in Zambia. Outside of the CoE, these institutions had shortcomings, such as duplication of efforts, inefficient resource use, and poor information sharing. Coordinating their activities under the CoE has improved efficiency and effectiveness.

Development of a strategic plan for the Centre of Excellence

The CoE-OHS, with technical assistance from the AUDA-NEPAD, developed a five-year implementation strategy, and a monitoring and evaluation plan. The strategy was reviewed by the Regional Expert Advisory Panel (REAP) appointed by the Permanent Secretary for the MLSS. Although some activities are being undertaken, the strategy is yet to be officially adopted by the Government. Some of the achievements are shown in Table 1.

Impact of the Centre of Excellence

The CoE has focused on strengthening systems for medical surveillance, OHS examinations, certification, and joint mine inspections to ensure compliance with health and safety regulations, and to provide compensation for miners and ex-miners. It also established an integrated information management system for better cross-sector data sharing. Investments in equipment, infrastructure, and new sites have improved access to, and quality of, OHS services, benefiting miners, ex-miners, and workers in non-mining sectors. The OHSI now conducts 200–300 medical examinations per day. The Zambian Government, through the CoE-OHS, has contributed immensely to the development of OHS in the region.

Impact of the Centre of Excellence on beneficiaries

The evaluation of the CoE included a client satisfaction assessment, with both miners and ex-miners providing feedback on the services offered. These results augmented findings from the Client Satisfaction



Survey conducted by the OHSI in 2022. The survey involved 295 respondents and evaluated satisfaction with various services, processes, and procedures.

Overall, responses indicated a positive experience with the process; the cleanliness of the facility, including the ablution block, was rated well. While 89% of respondents found the directional signage helpful, there is room for improvement to make navigation easier. Ex-miners were very satisfied with having separate examination facilities from current and prospective miners, which reduced feelings of stigma. They now feel more comfortable seeking medical services, benefiting from quicker, more private care. The annual TB and silicosis screenings were also appreciated, allowing clients to be examined for both occupational and other diseases.

Sustainability of the Centre of Excellence

The CoE was designed to operate through existing public institutions such as the MSD, OHSI, WCFCB, and OSHSD, creating a foundation for sustainability and allowing the Government to maintain activities when the SATBHSS project ends. The CoE is progressing positively towards sustainability due to the capacity building in OHS, and the procurement of state-of-the-art equipment.

Currently, the CoE is finalising a sustainability plan that outlines strategies, governance, goals, and targets for key operational initiatives, based on the balanced scorecard perspectives: internal processes, learning and growth, people, and financial perspectives. This plan aims to ensure self-sustenance by focusing on quality improvement, financial adequacy, and human resources.

In collaboration with the AUDA-NEPAD, the CoE engaged a consultant to develop the sustainability plan, along with a quality management plan and monitoring and evaluation plan. Key resource mobilisation activities and partners have been identified to support the CoE. The draft sustainability plan will be reviewed and endorsed by the REAP and the CoP-OHS in April 2023, in Lusaka, Zambia.

Based on the currently available resources (infrastructure, equipment, and human resources or available skill sets), the sustainability plan has four strategic areas of resources mobilisations, namely:

- **Capacity development** of both short-term and long-term attachment and mentorship programmes in partnership with local and international universities and research centres;
- **Laboratory services** in microbiology and occupational hygiene analysis, servicing the private sector (including mining);
- **Research and grants** in collaboration with local academic and research institutions and developmental organisations; and
- **Consulting services** in the public and private sectors through occupational health services, such as occupational hygiene monitoring, risk assessment, advisory services, research, etc.

CHALLENGES IN IMPLEMENTATION OF THE CENTRE OF EXCELLENCE

Despite significant achievements and improved performance under the CoE, several issues need to be addressed to enhance and sustain its operations beyond the SATBHSS project.

1. **Organisational structure:** The CoE lacks a clear governance structure and a designated lead agency. Although the OHSI has the necessary infrastructure and equipment, its potential leadership role in the Ministry of Labour and Social Security, which also houses the OSHSD and WCFCB units, is not developed.

Table 1. Key achievements against the strategic objectives of the CoE-OHS

| Strategic objective | Achievements |
|---|--|
| To reduce occupational incidents and diseases (TB and pneumoconiosis) | <ul style="list-style-type: none"> • 264 active mining companies inspected; 80.29% inspected once, 71.9% visited at least twice • Supported formation of 12 ex-miners' co-operatives in nine districts; 240 ex-miners trained to run the cooperatives. • Decline in reportable incidents and fatal accidents in past 6 years: fatal accidents decreased from 22 (2015) to 14 (2022); reportable incidents decreased from 78 (2015) to 53 (2022) |
| To promote and undertake OHS research | <ul style="list-style-type: none"> • Supported regional baseline studies on OHS laws and workers' exposure to respirable crystalline silica dust • Supported local and regional project countries' development and revision of OHS laws, regulations, and guidelines • Supporting development of the regional occupational exposure limits guidelines, ASM OHS guidance, occupational health services frameworks, etc. • Conducted silicosis prevalence study • Supported mapping of miners and ex-miners in Zambia |
| To undertake timely evidence-based occupational medical surveillance and strengthen the compensation system | <ul style="list-style-type: none"> • Developed regional ILO ICRP curriculum and trained > 150 officials to harmonise medical surveillance approach • Developed regional code of practice on management of occupational lung diseases to strengthen evidence-based medical surveillance and compensation systems |
| To increase sub-regional capacity for the provision of OHS services | <ul style="list-style-type: none"> • Trained 150 local and international doctors on ILO ICRP • Engaged and collaborated with 11 internationally recognised ILO ICRP experts • Appointed and worked with the REAP from several countries and institutions, including ILO, to advise the CoE-OHS |
| To implement an integrated management system | <ul style="list-style-type: none"> • Conducted joint inspections and held NTC meetings where reporting was done to Permanent Secretaries responsible for health, mines, and labour • Implementing inclusive and integrated OHS programme that encompasses primary, secondary, and tertiary prevention interventions through different implementing agencies during joint inspections |
| To promote an exchange of knowledge and sharing of best practices | <ul style="list-style-type: none"> • Hosted experts from > 20 countries • Hosted Government of Malawi high-level delegations, comprising the Chair of the parliamentary committee on health, Directors of health, mines, and labour • Hosting and mentoring of students from local and international universities; 2 PhD students from Copperbelt University were attached and mentored • CoE-OHS chaired regional community of practice on occupational health and safety and mine regulations |

ASM: artisanal and small mining, CoE: Centre of Excellence, ICRP: International Classification of Radiographs of Pneumoconioses, ILO: International Labour Organization, NTC: national technical committee, OHS: occupational health and safety, REAP: Regional Expert Advisory Panel



2. **Staffing:** The CoE faces inadequate staffing, exacerbated by the SATBHSS project's budget constraints, which only allowed for capacity building rather than hiring of new staff. The OHSI centres in Lusaka, Solwezi, and Kitwe urgently need more staff to improve efficiency.
3. **Equipment and Infrastructure:** Delays in acquiring and utilising specialised equipment, such as dust sampling machines and an XRD machine, have hindered the CoE's ability to provide specialised services. Ongoing civil works at the OHSI in Kitwe have affected service delivery and increased turnaround times for some tests.
4. **Funding and resource allocation:** Delays in fund disbursement, particularly in the final year, have affected the implementation of planned activities. Joint mining inspections are costly and require more trained inspectors and resources.
5. **Regulations and service provision:** There is a lack of regulations compelling non-mining sectors to conduct worker screenings. The current occupational health surveillance is not risk based, and there are gaps in impairment evaluation for compensation purposes. The temporary testing facilities are small and congested. Additionally, the OHSI needs to expand its research portfolio.
6. **Capacity building and coordination:** Limited funding for capacity building restricts the number and type of personnel that can be trained. There is a lack of clarity on stewardship and coordination of CoE institutions post-project. An accountability framework and clear communication strategy are also missing.
7. **Collaboration:** Collaboration with the Ministry of Health (MoH) is threatened since the OHSI is no longer an entity of the Ministry. The MoH is better suited for health service delivery due to its nationwide infrastructure and human resources, which are crucial for decentralising primary health care (PHC) and the District Health System (DHS) to enable effective screening, diagnosis, and treatment of occupational health diseases and injuries.
8. **Legal framework:** Zambia has a National Occupational Safety and Health (OSH) policy, but lacks the necessary OSH laws to support the CoE-OHS as a statutory body. The existing OSH laws and regulations are outdated and inadequate. Additionally, there is no resource mobilisation plan, and domestic funding commitments from stakeholders are inadequate. The CoE-OHS also lacks full-time administrative, coordination, and marketing professionals.

LESSONS LEARNED

Occupational safety and health spans all sectors, presenting opportunities for the MSD, OHSI, OSHSD, and WCFCB to collaborate, enhance efficiency, and reduce duplication of efforts.

The CoE has effectively fostered joint efforts to advance OHS in Zambia. By streamlining service delivery and increasing efficiency, the Consortium under the CoE has demonstrated its value. Decentralised services have expanded sector coverage.

Given that ex-miners are spread across the country, with the largest populations in the Luapula, Central, and Copperbelt provinces, there is a clear need to further decentralise services and enhance outreach efforts.

The CoE has huge potential to provide strategic support and human resource development in OHS for the entire southern African region. A coordinating board is essential for this purpose.

While the institutions within the CoE have always had the expertise, ability, and drive for OHS, the CoE has harnessed this potential to efficiently coordinate their activities. As the need for occupational health services is large, further expansion is required. The CoE institutions now have greater visibility and potential to attract resources, locally and externally.

The establishment of the regional CoE-OHS represents a unique and innovative initiative aimed at advancing OHS across Zambia and the continent. Equipped with state-of-the-art technology, the CoE-OHS is positioned to offer services and generate revenue, both domestically and regionally. However, it currently relies on government and partner funding for some activities.

Centralised procurement systems have significantly impacted the development and implementation of the CoE-OHS. Issues stem from insufficient technical knowledge among procurement specialists, and inadequate consultation during the acquisition of OHS infrastructure and equipment.

The CoE-OHS has been instrumental in garnering high-level political support, which led to the OHSI's integration into the MLSS, thus reducing function duplication. The CoE-OHS has also played a critical role in integrating primary, secondary, and tertiary OHS interventions, promoting evidence-based practices in the country. It has influenced the recognition of OHS as the Ministry of Labour's primary responsibility, in line with ILO conventions and recommendations.

The REAP is essential for ensuring the sustainability and quality of services and research, adhering to international best practices. However, the four CoE institutions do not have regular meetings, and cannot rely solely on the biannual REAP meetings.

RECOMMENDATIONS TO IMPROVE FUTURE IMPLEMENTATIONS OF THE CENTRE OF EXCELLENCE

1. There is potential for income generation to sustain CoE activities from the newly established centres in Solwezi and Lusaka, as well as at OHSI Kitwe. To maximise this potential, these centres need adequate human resources to scale up operations, reduce turnaround times for results, improve service efficiency, and enhance client satisfaction.
2. Planned renovations should be completed before the project's closure, and all procured equipment must be functional. The OHSI should focus on building local capacity for staff in equipment maintenance and calibration.
3. The CoE should establish a coordinating mechanism with a clear governance structure recognised by all four participating agencies. It is recommended that the OHSI be appointed as the lead technical agency and Chair of the implementation.
4. The OHSI should implement a risk-based medical surveillance system once risk profiles are developed. The MSD needs to urgently create risk profiles for all mining areas to support this approach. Additionally, the OHSI should conduct external occupational health audits to ensure service quality.
5. The CoE has drafted a strategic plan based on the concept note, which has been adopted by the relevant ministries and institutions. This plan still needs government endorsement before it can be rolled out for implementation.
6. The sustainability plan must also be adopted alongside the strategic plan. A statutory instrument, specifying user fees for various services, such as inspections, is needed.
7. The signing of a memorandum of understanding with Copperbelt University should be expedited to enhance human resource development.



8. The AUDA-NEPAD should continue supporting regional interventions for the CoE, to facilitate implementation and coordination. It should also help the CoE to refine the training curriculum in occupational health, in collaboration with local universities.
9. An internal consortium should be established to identify joint income generation activities, through research and training grants, in collaboration with local, regional, and international stakeholders.
10. The CoE should develop and display a client charter to help clients understand procedures and expected service processes. Front office staff and those interacting with clients should improve their customer relations skills.
11. Sub-technical working groups focused on resource mobilisation, research and development, and marketing should be created to enhance the sustainability of the CoE-OHS.

CONCLUSION

The evaluation revealed that the objectives of the CoE have been achieved. The CoE has been equipped to deliver essential and specialised occupational health services. Each consortium member

has provided strategic and complementary services, contributing to the CoE's goals and objectives. To ensure the CoE's sustainability, it is crucial to complete the remaining infrastructure work and the strategic and sustainability plans. These plans will be fundamental in coordinating the CoE's interventions. We recommend that Zambia urgently finalises the development and adoption of these plans, and accelerates the completion of the infrastructure.

POLICY IMPLICATIONS OF FINDINGS

1. The absence of a coordinating mechanism for the CoE threatens the continuity of joint missions and efforts. It is, therefore, crucial to urgently establish the mechanism for coordinating the interventions under the CoE and post the project.
2. The project's duration should be extended to allow completion of the remaining infrastructure work and outstanding procurements that are essential for the CoE's sustainability, particularly given the significant capital investment in equipment such as the XRD.
3. The CoE should strengthen its connections with academic institutions to ensure ongoing human resource development, which is critical for the delivery of specialised services. 📌