TIMS

TB in the Mining Sector in Southern Africa

REPORT OF THE DISSEMINATION WORKSHOP FOR THE EVIDENCE GENERATING STUDIES CONDUCTED UNDER THE TIMS GRANT

10 – 11 MAY 2017, SOUTHERN SUN HOTEL, JOHANNESBURG

ABSTRACT

This report serves to give feedback on a workshop that was held in Johannesburg South Africa in response to a Global Fund Regional Grand for TB in the mining sector in Southern Africa. Feedback was given to address knowledge gaps about the TB epidemic in Southern Africa using four different studies was and recommendations to improve the effectiveness of the study were also stated in order to improve the utilization of the findings. The four studies used were, The Epidemiological Baseline Study(Baseline Epidemiological Study on TB, MDR-TB, Silicosis and HIV amongst Mineworkers and ex-mineworkers in Southern Africa), Geospatial mapping study (Regional Mapping Study of Key populations, mining communities, health services and mines in Southern Africa, Geospatial mapping of mineworkers, ex-miners and health services) ,the Knowledge Article and Practice Study (KAP) survey related to TB, HIV and silicosis and last but not least Legislation Review (Review of the existing standards, legislation and regulations of mine health safety).

The expected output of this workshop was to give rise to wider knowledge of the results commissioned through the TIMS grant, reach a general consensus of the accuracy and robustness of the findings and recommendations of the studies and last but not least give indications of possible ways the results of the studies commissioned through the TIMS Grant can be used to improve the utilization of the findings.

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1. WELCOME REMARKS

After setting the tone of the workshop by Dr Reidawaan Pillay, the Regional Coordinating Mechanism's business representative, Dr Khanyile Baloyi, Deputy Medical Head – SA Chamber of Mines welcomed the guests and gave a short brief on the reason why the workshop was held by emphasising its main focus on TB in the mining sector in Southern Africa. Furthermore, he told the delegates that there was need to fill the knowledge gap through evidence generation and expressed satisfaction that the studies were completed. He said that, "we are delighted in the fact that all studies have been completed." He emphasised focus on the four studies that were used to come up with the results that were to be discussed in the workshop and also the need for the stakeholders to engage themselves in giving critical input that would help in improving the utilization of the findings. Additionally, the TIMS Chief of Party, Dr Julian Naidoo told the gathering that the TIMS' implementing partners had started using the preliminary findings/outputs of the studies to inform programming. He went further to explain the objectives and also emphasized that these studies can help significantly in preparation of the countries' applications. He explained the process to be followed at the workshop that researchers would present first; subject matter experts would sit on the panel and interrogate the quality of the studies. The discussion would then be opened to the plenary for further discussions.

2. OVERVIEW OF THE WORKSHOP AND OBJECTIVE

2.1 FACILITATOR: PRINCIPAL RECIPIENT (PR)

The Principal Recipient explained that the objectives of the dissemination workshop were as follows:

- To share results of the knowledge generation studies conducted for the TIMS Grant.
- To validate results of the studies by technical participants from the ten countries which were included and
- To engage stakeholders on ways in which the knowledge generated through the TIMS Grand can be utilized.

The Principal Recipient also gave reasons why the research had to be done and these were the lack of data for Hotspots in infections and the need to create a new era of evidence and data that would be used to fight TB in the mining sector in Southern Africa to mention a few. Information that some of the vaccines are already in use but there was reason to share information in order to create more

efficient practice in how to maximise the findings of the above mentioned studies was also given. Last but not least emphasis that all inputs given were to be captured and used to finalize the outcomes was also given.

3. PRESENTATION OF EPIDEMIOLOGICAL STUDY RESULTS

3.2 PRESENTER: PERINATAL HEALTH RESEARCH UNIT (PHRU)

The facilitator gave a background on why it was important to do this study by explaining the following points of concern:

- Mining contributes significantly to the Southern regions and the global economy yet health and safety concerns in the mining industry continue to compromise miners and their communities' wellbeing.
- The World Bank estimates that US$886 million is lost due to healthcare costs which includes losing existing workers, decreased productivity and the expense of training new personal.
- Tuberculosis (TB) remains one of the world's greatest health threats and the African region has the highest burden relative to population.
- Sub-Sahara Africa is the epicentre for HIV and Aids epidemic.
- Miners particularly deep level gold miners are at extreme risk of TB because HIV and silicosis exacerbated by working conditions and living conditions creating a "triple disease burden".
- TB is the leading cause of mortality in HIV infected miners.
- The mining sector increases the risk of miners contracting HIV and TB and also sharply increase the risk of TB spreading in the community.
- Migration to and from different regions and across the country borders disrupts the continuum of core for miners jeopardizing their health and their families.
- Exposure to silica dust found to be highest in mining and quarrying industries causes silicosis an incurable disease and also impairs the ability of the immune system control of the TB infection and prevention of the TB disease

3.2.1 METHOD

- The method on how the data was collected was given, the facilitator outlined that a systematic secondary data review of published English language literature for the ten countries was

conducted by a multi-disciplinary team that included epidemiologists and researchers. Unpublished sources and sources in the published literature were reviewed and included into the collated data. Apart from the systematic data a list of Key Informants per country was developed and interviewed and the main objective of this practise was to gather additional data and reports that the team could not access during the literature research. Descriptive statistic, frequencies, medians and proportions were then used to summarise the data at a country and district level on TB, HIV and Silicosis. Graphs and tables were then developed to visually display the data. A clear outline was also given that where data was not available for miners, adjusted district or country level estimates were use as proxy.

3.2.3 FINDINGS: MAIN FINDINGS

The facilitator went on to give the presentation of the main findings and these included the following:

- 950 publications describing TB, HIV and Silicosis disease in the mine workers and their communities in the ten countries were reviewed and 449(47%) were reported studies on South African miners. Tanzania, Malawi and Lesotho were the next reported countries with 71 (7%), 58 (6%) and 46 (5%) publications and reports respectively and Namibia had the least 7 (0,7%) publications on TB,HIV and Silicosis.
- Data is still scarce, not recent and does not give a description of country level TB and HIV prevalence in miners, ex-miners and labour sending areas.
- Best estimates are that in the general population. HIV amongst 15-14yrs and TB incidence per 100 000 varies from a high of852,(29%) to a low 0f 227 , (5%) respectively. In the miners HIV prevalence and TB prevalence varies from 7200, (47%) and 700, (9%) respectively.
- TB incidence varies with Lesotho having the highest at 852/100 000 followed by South Africa 834/100 000 and Swaziland with 733/100 000.
- Malawi has the lowest TB incidence of 227/100 000.

The proportion of TB patients diagnosed with MDR-TB has increased in many Southern African countries and it ranges from 0, 3% in Zambia to 7.7% in Swaziland and like many other countries in Southern Africa these countries also have high HIV prevalence.

- Amongst 15-49 year olds HIV prevalence ranges from 4, 7% in Tanzania to 29% in Swaziland.
- Many TB patients are also infected with HIV (35%-79%).

- South Africa, Mozambique and Zimbabwe have the largest geographical areas with mining operations mining different minerals and contributing (21%-35%) to the countries' GDP.
- Mining in Malawi and Lesotho is still underdeveloped though there are plans for expansion.
- The most mined minerals are gold, copper, diamonds, platinum, coal and tanzanite.
- South Africa has the largest formal mining sector with an estimated half a million current employees and Tanzania is estimated to have 1,5 million miners and most of them work in the artisanal or small scale mining sector.
- The contribution of mining to GDP is substantial in many of the countries with Botswana having the highest at 24, 5% and Swaziland the lowest at 2%.
- It was also noted that in most of the reports reviewed miners were found to have higher TB and HIV disease as compared to the general population, in most of the countries TB prevalence was two times higher for miners compared the general population whilst in some countries it was 6-8 times higher.
- In Mozambique HIV prevalence in miners ranges from 26% to 42% compared to 11, 6% amongst 15-49 year olds in the general population.
- In Tanzania HIV prevalence is 9% among miners compared to 4, 7% in general population.
- Silicosis prevalence was also found to exist in five countries and ranges from o, 1% in Zimbabwe to 32% in South Africa.
- It was also noted by the facilitator that Epidemiological Literature on HIV, TB and Silicosis is not available for most of the Southern African countries and the countries with the least available data on epidemiology of HIV, TB and Silicosis among miners are Malawi and Mozambique and epidemiological surveys are recommended in these countries.
- Last but not least it was also noted by the facilitator that Swaziland, Zambia and Zimbabwe have data gaps that require further research.

After dissemination of the above mentioned information to the audience the floor was open for discussions where questions and areas that required were addressed by the respective personnel. Below just to name a few are examples of some of the questions and answers.

Q1 Why countries like Swaziland, Zambia and Zimbabwe had data gaps?

A1 There is still need to do more research in countries like Swaziland, Zambia and Zimbabwe in order to fill the data gaps, delay in ethical clearances contributed to data gaps in some of the countries like Zimbabwe for example.

Q2 How estimates were in other countries obtained if there were ethical clearance issues for instance in countries like Zimbabwe?

A2 Key Informants were used to obtain data in some countries ethical approval was an issue and the information was used to come up with estimates.

Q3 Why was information on silicosis not given for example in Zambia since information is available.

A3 Efforts to acquire more information are being undertaken and updates will be regularly made.

Key: Q – Question

A- Answer

3.2.4 SUMMARY OF THE FINDINGS

3.2.4.1 COUNTRY SPECIFIC SUMMARIES ON TB, HIV AND SILICOSIS.

After the presentation of the Epidemiological study results in summary form and the facilitator had responded to the questions, country specific summaries on TB, HIV and Silicosis disease burdens were then given for the following countries in the following order: Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe.

a. BOTSWANA

It was stated that in Botswana the mining industry contributes 25% to GDP and employs 3% of the total employed. The country has an HIV prevalence that is estimated at 18, 5% but it is higher amongst mine workers at 24%. The national TB incidence for Botswana is 385/100 000 and some of the mining districts TB incidence rates of (438-520) are higher than the national average. The proportion of TB cases with MDR-TB is 2, 5% and pneumoconiosis prevalence in ex-miners in Botswana is 10%. The facilitator also highlighted that there is no specific data on mineworkers about TB and that the priority areas of occupational health services (OHS) in Botswana are the central and eastern districts where most miners reside and TB and HIV prevalence is high within these areas.

b. LESOTHO

From the information given on Lesotho it was deduced that in the country many Basotho men are employed in the mining industry in South Africa with a few working in the mines located in Lesotho however it must be noted that since the decline of the mining industry in South Africa many of the mine workers have been retrenched. Most of the workers both ex and current workers live in Berea, Leribe, Maseru, Mafeteng and Mahales Hoek. The national TB incidence of Lesotho is 852/100 000 with an overall HIV prevalence of 235 in the 15-49 years age category. TB and HIV disease burdens are highest in Berea and Maseru but the highest number of TB cases in miners and ex-miners were diagnosed in Mafeteng, It was also noted that miners have a higher HIV prevalence than the general population (14% vs 10, 6%) in Butha-Buthe. Silicosis prevalence in ex-miners was 26% and the recommended districts for OHS are Maseru, Leribe and Mafeteng for current miners that work in South African mines. Last but not least it was also emphasised that most miners are based in Butha-Buthe, Mokhlotlong and Berea, although the numbers are small these miners have no access to occupational health service (OHS).

c. MALAWI

According to the information given on Malawi, the mining industry contributes 2, 3% of the country's GDP, with an estimated value of 54 000 people working in the mining industry and with room for expansion. In Malawi most of the mines are located in the northern region and there are very few ex-miners from South African mines. Malawi has a national TB incident rate of 227/100 000 and the northern region has the lowest number of TB cases reported based on evidence from viewed reports. HIV prevalence is lower (4,7% vs 91%) in mine workers as compared to the general population however there is no data provided on silicosis and TB amongst the mine workers. Emphasis on the need for primary studies on TB, HIV and silicosis prevalence in mineworkers in Malawi was made.

d. MOZAMBIQUE

Based on the information given on Mozambique by the facilitator, most of the men have historically been employed and are still employed in South African mines. The national HIV prevalence of Mozambique is 10, 5% amongst people aged 15-49 years old and the TB incident rate is 554/100 000. From a few studies that were reviewed the HIV prevalence in Mozambique men employed in South African mines was found to be between 15%-42% and there was no data specific to mineworkers from Mozambique on TB disease. Last but not least it was also explained that districts like Xai Xai, Chibuto, city of Maputo and Manakazi had the greatest number of mine workers and are supposed to

be prioritised for OHS and that more data is still required on TB disease burden in mineworkers in Mozambique.

e. NAMIBIA

Having an injection of 11, 5% into its economy from mining with diamond as its biggest contributor, Namibia has managed to create for itself a stable economic environment. The mining industry employs 2% of the labour force but only 17, 3% of these people work in the formal mining sector and the rest in artisanal mining and quarrying. The national TB incidence of Namibia is 627/100 000 with the mining regions having the highest TB incidence (1000-1380). The population HIV prevalence is 16% and is higher in the labour sending areas (Caprivi) and in some mining areas (Kavango and Erongo) 20-25%. Having no records on TB, HIV and silicosis specific to mine workers in Namibia primary studies can therefore be used as fillers for the data gaps. Districts like Caprivi (labour sending area) and Erongo were recommended for OHS.

f. SOUTH AFRICA

According to the research, the facilitator outlined that South Africa is one of the highest contributors to the worlds mining industry with about half a million currently employed miners in the formal sector, the latter having seen a reduction due to retrenchments. In recent years several studies have been documented on TB, HIV and silicosis in mine workers and HIV and silicosis are evident to contributing to higher rates of TB (1200-3000) among mine workers compared to the national TB incidence of 834/100 000. HIV prevalence is also higher (24%) amongst mine workers compared to the adult average of 19, 2%. Eastern Cape (labour sending area), North West and Gauteng province are the major priorities for OHS for mine workers.

g SWAZILAND

With few mining companies in Swaziland, South Africa employs most of the Swazi miners. Swaziland has a normal TB incidence rate of 733/100 000 and a TB prevalence of 5000/100 000 in mine workers and HIV prevalence is 20% in mineworkers which is just below its national adult HIV prevalence which sits at 29%. Hhohho and Shiselweni are the two districts with the highest numbers of mine workers and have high evidence of TB and HIV prevalence. According to the research no data was given on silicosis in miners or ex-miners from Swaziland.

h. TANZANIA

In Tanzania mining contributes 2, 5% to the country's GDP and most mine workers (over a million) are artisanal and small scale miners (ASM) whilst about 15 000 are employed in large scale mining. The country has a national TB incidence rate of 327/100 000 and adult HIV prevalence in ASM miners is estimated to be 8, 9% a value that is higher than the national average of 4, 5%. Peri-mining communities have been found to have high prevalence of adult HIV with estimated values of 16-18%. Some of the miner have been reported to have silica dust exposure that exceeds industry recommended limits, contributing to silicosis prevalence of 1.6% in mine workers. In Tanzania most of the miners reside in Gerta region, Mererani town and Kishapa district, making these areas appropriate for OHS.

i. ZAMBIA

According to the research in Zambia the mining industry is mostly in the copper belt and the Lusaka province and it has expanded swiftly in the North West. Zambia is the largest producer of copper and cobalt in Africa with mining sector contributing 13, 4% to its GDP. The country's national TB incidence are relatively low 406/100 000 and highest notification rates are highest in Lusaka and Copper belt provinces. Ndola, Kitwe and Solwezi have estimated TB prevalence rates of 600-2294/100 000 but have declined in both miners and the general population over the past ten years. Overall HIV is 12, 7% and 7-18% amongst mine workers and mining districts. In Zambia silicosis amongst copper mine workers was found to be 22, 7% and OHS is recommended for Copper belt and Lusaka provinces

j. ZIMBABWE

In Zimbabwe the mining industry contributes 10,3% to the country's GDP and is mostly found along the Great Dyke area which stretches for about 550 km and other multiple provinces and districts. In Zimbabwe artisanal and small scale mining is also growing employing 300-400 thousand miners. National TB incidence in Zimbabwe is 603/100 000 and there is no data available on TB mine workers or mining districts. HIV prevalence among adults is 15, 2% and Matabeleland and Bulawayo have the highest HIV prevalence. Pneumoconiosis prevalence is 0,8% and the possible priorities for OHS in the country are Bulawayo, Gweru and Bindura.

3.2.5 ARTISANAL AND SMALL SCALE MINING

After presenting the country specific summaries on TB, HIV and silicosis the facilitator also provided information on artisanal and small scale mining in order to better the audiences understanding of artisanal and small scale mining and its environment, According to the research the facilitator mentioned that the locations of artisanal and small scale mining (ASM) are mostly found in poorer communities and the participants are people with minimal education or limited employment opportunities. These types of mines are mostly illegal in some countries therefore are normally mobile and flexible. Because of the above mentioned conditions data to describe the populations and their disease burden is not available, however in some countries the majority of mineworkers are part of this sector and the numbers are increasing exponentially. Artisanal and small scale miners are at great risk because of exposure to harmful chemicals, gases, excessive noise levels and toxic dust inhalation during mining procedures since no protective gear is provided in most of the cases no or limited health services are provided. Alcohol, drug abuse, risky sexual behaviour, violence and criminal activities are reported to be common in artisanal and small scale mining sector (ASM).

Legislations on ASM vary from one country to another and some countries regard this type of mining as illegal. Provision of OHS has to consider the ASM sector as this is found to be the majority in some countries like Tanzania and Zimbabwe where the artisanal and small scale miners have limited access to special health care services unlike miners in large scale mining companies.

3.2.6 DATA GAPS AND LIMITATIONS

Following the presentation of the country specific epidemiological study results on the ten countries the data gaps were also noted as listed below

- Insufficiency of published literature restricted access to unpublished data.
- Mapping of mine workers studies was only for a few countries.
- Mine workers not categorised as high risk for HIV and TB.
- Silicosis diagnosis.
- Communication barriers in reports due to diversified languages.
- Movement of people from one country to another for the purpose of employment also affects results.
- Absence of ethics approval in some the countries.

3.2.7 RECOMENDATIONS

The following recommendations were given

- TB should be considered as an occupational disease in all countries.
- Update routine data collection tools like TB diaries must include occupation or mining exposure as a variable.
- Terms like, at risk mine workers, quarries, silicosis and pneumoconiosis should be standardised to help produce comparable data within countries.
- Occupational health services strategies should be considered for the ASM sector since it constitutes of the majority of mine workers in some Southern African countries.
- OHS planning and implementation should be in collaboration with departments of ministries of health. Available epidemiological data was used to identify possible priority areas for OHS however for efficient and sustainable use of scarce health resources, further assessment of data, existing health services and appropriate models of intervention are desirable. This will improve targeting and decision making on whether to use vertical or integrated models and static or mobile OHS.
- Initiatives of providing health services should be extended to other African countries like Democratic Republic of Congo and Angola where the mining industry is developing.
- Primary epidemiological research is encouraged in areas like Malawi, Namibia, Mozambique and Zimbabwe where there is limited secondary data on TB, HIV and silicosis in mine workers and their communities.

4. PRESENTATION ON THE RESULTS OF MAPPING STUDY

4.1 PRESENTER: TOMTOM CONSORTIUM

The mapping study presentation was done by the TOMTOM consortium. The team successfully identified and mapped the mining and labour –sending populations for Botswana, Lesotho, Malawi, Namibia, Mozambique, Swaziland, Tanzania, Zambia and Zimbabwe. They used the results they got to identify TB Hotspot areas for field surveying of health care facilities in order to confirm the existence of TB screening and treatment. Their methodology approach was unique in that it required both advanced GIS and statistical analysis on a scale that is normally associated with long term projects .Whilst undertaking this project their main objectives were to identify the key populations of current and ex-mine workers, identify key mines and health facilities, determine TB Hotspot areas and

inventory and targeting of health care facilities in particular areas. This needed each consortium members' prompt feedback on individual objectives and responsibilities as the final Hotspot and HCF target analysis was interdependent on accurate and complete information for all the above listed Southern African countries.

The three main risks the team encountered in this exercise that had great impact on their methodology approach were, accessing mine workers address lists, obtaining existing health care inventory lists and timely ethical clearance in order to limit delays in the project finalisation, however regardless of experiencing most of the above mentioned risks at varying degrees the team managed to mitigate the majority of the problems.

The team used the GIS methodology because of its individual components like geocoding , mapping of built up areas and mines via remote sensing and the use of Theissen polygons to represent the partitioning of cities, towns, villages or settlements into sensible regions of influence for Hotspot analysis and that they are widely used and tested.

Linear approach was used to blend the population density and observed mines, the team achieved this by combining the standardised population density per square kilometre with standardised observed miners for each polygon with a weight that was determined with some quantitative criteria after combining all the fields the team them came up with the statistical values for all the Thiessen polygons for each country. Variability of the health care facility data available in the individual countries then required the team to physically identify each target facility, careful consideration and interpretation of factors like locality within the Hotspot areas, TB equipment present, access to electricity and water , access to major road networks just to mention a few was practised.

The team then used the derived outcomes of the mapping exercise (the identification and mapping of key populations of the mine workers and ex-mine workers throughout the region, visitation and TB equipment inventory of relevant health facilities in the Hotspot areas) to produce a target list for facility set up therefore the mapping provides valuable information and new insights on TB affected communities in the region and can be used to improve access to strategically placed services for mine workers and ex-miners.

4.1.1 METHODOLOGIES USED

4.1.1.1 HOT SPOT ANALYSIS

-According to the facilitator the team used two different methodologies (A and B) analyse the Hotspot areas in the region. This was mainly because of the unavailability of information related to mine workers in all the countries with the exception of South Africa and labour sending countries around South Africa.

4.1.1.2 METHODOLOGY A: (used mine workers data)

This was used for Botswana, Mozambique, Lesotho, Swaziland and South Africa.

South Africa was only used as a labour receiving country and no Hotspots were identified in South Africa according to TIMS mandate. After collecting the remote sensing data, collecting data from desktop studies and field work and geo-located data from TEBA the team designed an approach to enable a consistent and objective evaluation of Hotspots areas. The geo-located TEBA was used as the main source of information for specific countries in order to locate current and ex-miners. Miners and ex-miners were then geo-located to their relevant towns where they live/lived and for all successfully geo-located miners and ex-miners the records were then allocated to the relevant Thiessen polygon.

4.1.1.3 METHODOLOGY B: (No mine worker data used)

This was used for Namibia, Malawi, Tanzania, Zambia and Zimbabwe.

In situations where no accessible data did not exist on the number of miners' data fields to identify Hotspots were limited to towns within a 10 kilometre radius to large Gold, Copper, Coal and Diamond mining operations and the population density per square kilometre for each Thiessen polygon. This methodology was applied in Namibia, Malawi, Tanzania, Zambia and Zimbabwe. In these countries historic or government identified TB focus regions were obtained from the local health departments and helped to focus on specific areas of interest.

4.1.1.4 TARGET ANALYSIS

Due to variability of the data available in each country the team used a manual process for each target facility whilst they were interpreting the several contributing factors. (Only health facilities in Hotspot areas were considered in the target analysis) .For countries where location of the TEBA recruitment offices were present this formed part of the analytical parameters for target analysis as the general population are very familiar with the location thereof. For the other countries the target analysis was

determined in consultation with various departments of health and other source. The team took the following factors into account:

- Inside a Hotspot area or focus region (depending on the country)
- Near a TEBA Office (for countries where TEBA Offices are present for example Botswana, Mozambique, Swaziland and Lesotho.
- TB equipment present: chest x-ray or Genx machine
- Electricity and running water availability.
- Size of facility (number of healthcare patients and reported TB patients under treatment.) Preference was given to larger facilities.
- Access to major road network.

Taking the above factors into account the team identified a variable number of targets, for each Hotspot area one or more target facilities were listed with the most likely candidate listed first.

4.1.1.5 OUTCOMES

The team derived the following outcomes from the mapping exercise

- Key populations (Hotspots) of mineworkers and ex-mineworkers were accurately mapped through the region using two distinct methodologies.
- All relevant health facilities in the Hotspot areas were visited and TB services were documented in the GIS data base.
- Health facilities in Hotspot areas were analysed in terms of key population areas, locations and other social economic factors to produce a target list for facility scale up.

Through the mapping exercise the team then came up the following deliverables:

- Geo-data base of mines built up areas, affected mineworker communities and location and inventory of health facilities services' in Hotspot areas.
- Target list of health facilities best located for up-scaling of relevant services and equipment.
- Spatial database of the whole region with relevant roads, towns, rivers, main admin boundaries and project specific data just to mention a few.

4.1.1.6 CHALLENGES

According to the facilitator the team encountered the following challenges in their pursuit to come up with their findings:

- Mine workers addresses, a major part of the success of the project depended /depends on obtaining address lists for mine workers and ex-mine workers in the region and the majority of the mine workers and ex-mine workers do not exist for majority of the countries except for South Africa.
- Existing healthcare inventory lists. In order for the team to access this data it required/ requires permission from MOH in each country (except the SPA) and countries are not willing or are unable to provide required data.
- The teams major challenge in delivery delays were encountered by obtaining ethical clearance for the purpose of doing healthcare facility data collection in each country. Initially the team had been informed that ethical clearance for TIMS regional mapping study would not be required. Letters were produced and ethical clearance was obtained for most of the countries except for Zimbabwe and Swaziland therefore no field work could be done in these two countries and alternative methods were used in collecting the required data for doing healthcare analysis.

4.2 EVALUATION PER COUNTRY

4.2.1 METHODOLOGY A COUNTRIES

4.2.1.1 LESOTHO

Local insight: Based on a study by the Clinton Health Access initiative (CHAI), the regions of Maseru, Mafeteng and Leribe were identified as focus areas for selection of health facilities. According to the study that was done among ex-mine workers most mine workers had worked for many years in gold mines in South Africa. The above mentioned regions are the priority areas in Lesotho.

HOTSPOT ANALYSIS

A Hotspot analysis by TOMTOM consortium involved geo-locating data on miners and ex-miners from TEBA database employed in Southern Africa and identifying areas where there are high concentrations of miners and ex-miners in highly populated areas.

8 Hotspot areas were located mainly around urban centres in the Mafeteng, Maseru, Berea and Leribe regions.

TT LESOTHO HCF TARGET ANALYSIS

The qualitative criteria used by the team to identify best possible HCF for scale-up were the following:

- TB equipment present in facility.
- Access to electricity.
- Access to water.
- Access to major road network.
- Proximity to labour-recruitment office.

4.2.1.2 SWAZILAND

Local insight: According to the international organisation for migration (IOM) 8-10% of Swaziland households have family members employed in South African mines. Most of these miners take on short renewable contracts mainly in Gauteng and North West province in companies such as Anglo Gold Ashanti, Gold fields, Harmony, DRD ,Anglo Platinum and Implants. Since 2001 female mine workers have also been employed.

HOT SPOT ANALYSIS

Analysis by TOMTOM Consortium involved geo-locating data on miners and ex-mineworkers from TEBA data base employed in Southern Africa and identifying areas where there are high concentrations of miners and ex-miners in highly populated areas

The health facilities for Swaziland were overlaid into the identified Hotspot areas. Although the study by IOM identified Hhohho, Manzini and Shiselweni as the priority areas at the request from the Ministry of Health in Swaziland the health facilities within all Hotspots were selected including those in Lubombo.

TT LESOTHO HCF TARGET ANALYSIS

The qualitative criteria used by the team to identify best possible HCF for scale-up were the following:

- TB equipment present in facility.
- Access to electricity.

- Access to water.
- Access to major road network.
- Proximity to labour-recruitment office.

4.2.1.3 MOZAMBIQUE

Local insight: Interview reviews?? Indicated a high prevalence of TB and HIV in the provinces of Sofala, Manica and Zambezi. However after consultation with the Ministry of Health (MOH) the focus was shifted to the provinces of Maputo Gaza and Ihambane. A list of the clinics was prepared and presented to the MOH however this list was changed in consultation with the MOH for focus to be prioritised on areas they felt were high priority areas where large concentrations of miners live/lived and where there is high TB prevalence

TT MOZAMBIQUE HCF TARGET ANALYSIS

The qualitative criteria used by the team to identify best possible HCF for scale-up were the following:

- TB equipment present in facility.
- Access to electricity.
- Access to water.
- Access to major road network.
- Proximity to labour-recruitment office.

4.2.1.4 BOTSWANA

Local insight: The Central, Francistown, Southern Kweneng and Gaborone regions were identified as TB focus areas

According to the studies done the facilitator pointed out that in Botswana the Hotspots are feeder areas to the mines in South Africa however there are other communities especially in Ghanzi which have high prevalence of TB and are feeder areas to the mines in Botswana.

The qualitative criteria used by the team to identify best possible HCF for scale-up were the following:

- TB equipment present in facility.
- Access to electricity.
- Access to water.

- Access to major road network.
- Proximity to labour-recruitment office.

4.2.1.5 SOUTH AFRICA

Local insight: According to the facilitator the team used data on TB provided by the Department of Health at a district and health facility level as well as the distribution of gold, platinum and coal mines in South Africa. Two Hotspot areas were identified, one being around the gold and platinum mining belts in the North West and Gauteng and the other being in the rural district of OR Tambo District Municipality that has the highest prevalence of TB and an area known to be the largest feeder area of mine workers to the mines in South Africa.

4.2 METHODOLOGY B COUNTRIES

4.2.1 NAMIBIA

Local insight: According to Namibia's country operation plan (COP) of 2015 the prioritised regions and Hotspots in focusing on TB and HIV are the Kavango, Ohangwena, Omasati, Oshana, Oshikoto and Zambezi.

TT NAMIBIA HOTSPOT

The Hotspot analysis by TOMTOM consortium did not involve the integration of geo-coded mineworkers but was limited to towns within a 10km radius to large gold, copper and diamond mining operations and the population density per square kilometre for each Thiessen polygon. According to the facilitator, because of the lack of an industry accepted theorem that prescribes the relationship between population density and the spread of TB it was considered reasonable to use a linear approach to blend the population density and the observed miners by combining the standardised population density per square kilometre with the standardised observed miners for each polygon with a weight that was determined with some qualitative criteria

TT NAMIBIA HOTSPOT RESULTS

The qualitative criteria used by the team to identify best possible HCF for scale-up were the following:

- TB equipment present in facility.
- Access to electricity.

- Access to water.
- Access to major road network.
- Proximity to labour-recruitment office.

4.2.2 ZIMBABWE

Local insight: According to the citizen health watch (CHW) TB advocacy brief of October 2015 the provinces of Matabeleland South, Midlands and Masvingo were identified as areas with high prevalence of TB and HIV. Using this as a starting point the information on the miners was overlaid in the provinces of Zimbabwe.

TT ZIMBABWE HOTSPOT ANALYSIS

The Hotspot analysis by TOMTOM consortium did not involve the integration of geo-coded mineworkers but was limited to towns within a 10km radius to large gold, copper and diamond mining operations and the population density per square kilometre for each Thiessen polygon. According to the facilitator, because of the lack of an industry accepted theorem that prescribes the relationship between population density and the spread of TB it was considered reasonable to use a linear approach to blend the population density and the observed miners by combining the standardised population density per square kilometre with the standardised observed miners for each polygon with a weight that was determined with some qualitative criteria.

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- TB equipment present in facility.
- Access to electricity.
- Access to water.
- Access to major road network.
- Proximity to labour-recruitment office.

4.2.3 ZAMBIA

Local insight: There is very little information on the prevalence of TB or of the areas that are feeder areas for the mines however studies on HIV prevalence have identified Lusaka and the Copperfield

region as Hotspots. Clinics in the Copper belt and Lusaka represent only high HIV prevalence but are also the largest mining belts in Zambia.

TT ZAMBIA HOTSPOT RESULTS

The Hotspot analysis by TOMTOM consortium did not involve the integration of geo-coded mineworkers but was limited to towns within a 10km radius to large gold, copper and diamond mining operations and the population density per square kilometre for each Thiessen polygon. According to the facilitator, because of the lack of an industry accepted theorem that prescribes the relationship between population density and the spread of TB it was considered reasonable to use a linear approach to blend the population density and the observed miners by combining the standardised population density per square kilometre with the standardised observed miners for each polygon with a weight that was determined with some qualitative criteria

TT ZAMBIA HOTSPOT RESULTS

The qualitative criteria used by the team to identify best possible HCF for scale-up were the following:

- TB equipment present in facility.
- Access to electricity.
- Access to water.
- -Access to major road network.
- Proximity to labour-recruitment office.

4.2.4 MALAWI

Local insight: In consultation with the Ministry of health of Malawi information provided revealed that there are 8 districts in Malawi that have high concentrations of mine workers namely Karonga, Mzimba, Nkhata Bay, Nkhotakota, Mangochi, Machinga, Malunje and Thgolo, An initial agreement was done to focus on the Districts of Malunje and Thgolo that were regarded as areas that were most likely to provide mine workers for the surrounding countries including South Africa, however after consulting with the Ministry of health and using Malawis' service provision assessment (MSPA) undertaken in 2013-14 which was an invaluable source of data on health facilities and their access to the TB services and equipment a decision was then established that the Hotspot areas for Malawi are in the districts of Mzimba, Nkhotanga and Mangocha.

TT MALAWI HOTSPOT ANALYSIS

The Hotspot analysis by TOMTOM consortium did not involve the integration of geo-coded mineworkers but was limited to towns within a 10km radius to large gold, copper and diamond mining operations and the population density per square kilometre for each Thiessen polygon. According to the facilitator, because of the lack of an industry accepted theorem that prescribes the relationship between population density and the spread of TB it was considered reasonable to use a linear approach to blend the population density and the observed miners by combining the standardised population density per square kilometre with the standardised observed miners for each polygon with a weight that was determined with some qualitative criteria.

TT MALAWI HOTSPOT RESULTS

The qualitative criteria used by the team to identify best possible HCF for scale-up were the following:

- TB equipment present in facility.
- Access to electricity.
- Access to water.
- Access to major road network.
- Proximity to labour-recruitment office.

4.2.5 TANZANIA

Local insight: The team used a combination of literature researches from national structures studies and health reports and location of health facilities in close proximity to the relevant mines to identify focus areas. A report on the First National Tuberculosis prevalence Survey in the United Republic of Tanzania done by the Ministry of Health and Social Welfare identified areas where there was high prevalence of TB.

The location of active mines was sourced from the Ministry of Energy and Minerals. The location of gold mines was extracted and overlaid on the districts of Tanzania and a number of areas where there are high concentrations of gold mines were noted and these were North West, East, South east and the South western border of Tanzania. However it is the North West where there is the highest number of gold mines and it is in this area where there is the highest prevalence of TB, because of this the team therefore decided to focus on this area and conduct fieldwork in selected health facilities.

Taking into consideration the districts with high TB prevalence and the location of gold mines health facilities within a 1,2km distance from the concentrated gold mines in the North west Tanzania were selected and this included the following districs, Chalo, Geita, Sengerema, Bukombe, Mbongwe, Nyang'hwale, Kaha Township Authority, Shinyanga, Msungwi, Kwimba, Nzega and Igunga. In Tanzania a total of 50 health facilities formed part of the fieldwork, 6 in Meru/Simanjiro area and 44 in the North Western region of Tanzania.

TT TANZANIA HOTSPOT ANALYSIS

The Hotspot analysis by TOMTOM consortium did not involve the integration of geo-coded mineworkers but was limited to towns within a 10km radius to large gold, copper and diamond mining operations and the population density per square kilometre for each Thiessen polygon. According to the facilitator, because of the lack of an industry accepted theorem that prescribes the relationship between population density and the spread of TB it was considered reasonable to use a linear approach to blend the population density and the observed miners by combining the standardised population density per square kilometre with the standardised observed miners for each polygon with a weight that was determined with some qualitative criteria.

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The qualitative criteria used by the team to identify best possible HCF for scale-up were the following:

- TB equipment present in facility.
- Access to electricity.
- Access to water.
- Access to major road network.
- Proximity to labour-recruitment office.

5. PRESENTATION OF THE KNOWLEDGE, ATTITUDES AND PERCEPTION STUDY BY SELECT RESEARCH

The presentation was facilitated by Select Research from Zimbabwe. An introduction of KAP studies was given. The facilitator explained that it was a knowledge, attitude and practices survey that was carried out in ten SADC countries in order to provide information to the TIMS project which aims to design and implement interventions to combat TB, HIV and Silicosis amongst mine workers. A

cross-sectional survey was carried out in 10 SADC countries and Select Research put in place an experienced team of research experts to design, implement and oversee the study. According to the facilitator the core team was made of five researchers with varying areas of specialisations which were mainly TB specialists, statisticians, systems analysts and demographers. The project benefited from the technical expertise of external advisors with expertise in health research. Select Research also appointed co-principal investigators from 9 other countries who worked closely with their team to develop the study methodology including training and data collection. The co-principal researchers and their respective countries were as listed below

Name	Company	Country
Dr Eddie Marinda	Health Infor Matrix	South Africa
Mr George Cossa	Field Africa Mozambique	Mozambique
Dr Penehalo Angula	University of Namibia	Namibia
Mr Tov Manene	Select Research	Zimbabwe
Dr Jumbe	University of Malawi/ E&C Consultants	Malawi
Mr Charles Maibvisa	University of Swaziland	Swaziland
Dr Isabel Nyangu	University of Lesotho	Lesotho
Mr Tendai Kureya	Development Data Zambia	Zambia
Dr O Seitio-Kgokgwe	University of Botswana-Institute of Developmental Management	Botswana
Mary Majuma	Consumer Options	Tanzania

5.1 OBJETIVES

The specific objectives of this study were to:

- Assess the levels of knowledge of mining populations and surrounding communities on TB, HIV and Silicosis in 10 SADC countries
- Describe the above population's attitudes towards TB, HIV and Silicosis in 10 SADC countries.
- Describe the population's practices on TB, HIV and Silicosis in 10 SADC countries.

- Compare the results of the above mentioned variables across the 10 SADC countries and make recommendations for IEC

5.2 METHODOLOGY

5.3 STUDY DESIGN

The study was a population based cross-sectional household survey assessing knowledge, attitudes and practices on TB, HIV and Silicosis among mine workers, ex-mineworkers and their families and their surrounding communities in 10 SADC countries

5.4 STUDY POPULATION

In each country the study targeted people aged 15 and 59 years and the specific target populations included:

- Current mineworkers.
- Ex-mineworkers
- Families of both current and ex-mineworkers and
- Communities around the mines and communities labour-sending areas.

5.5 INCLUSION CRITERIA

To be eligible in the study a person had to be:

- a man or woman aged 15-59 years,
- a member of a selected household for at least 12 months,
- present at the time of interviewing process,
- a current mineworker, ex-mineworker, or family member of ex-mineworker or current mineworker and should have,
- Consented to voluntarily participate in the survey.

5.6 EXCLUSION CRITERIA

- Don't meet the inclusion criteria,
- Has physical /mental/emotional disabilities.
- Non-consenting.

5.7 SAMPLING PROCEDURES

A multi-stage cluster sampling technique was employed in all the countries. In the first sampling stage, study locations were selected and in each country recent statistics on mining localities were sought from various relevant sources that could be accessed within the limits of the study. This required the use of different sources in each country. Critical data that was required for the sampling process of each country included:

- Major mining companies and the minerals mined,
- Provinces/Districts within which the mines operated;
- Provincial/District population;
- Mining populations for each mining concern identified.

The final stage was the selection of the actual respondent in each selected household. One eligible respondent per household was interviewed and if a household had more than one respondent a Kish Grid Method was used to select on respondent.

5.8 SUBSTITUTION

If the eligible respondent was absent during data collection, one return was scheduled and if the respondent was still absent, a replacement was made from those present during the second visit. The substitution was done in two parts, first it was within the same household and secondly, if there was no eligible person in the household then a substitution of the household was done. The next household was chosen as a replacement. Since there were four distinct categories of key populations, the study was quota controlled to ensure all quotas were proportionately represented in the sample.

5.9 DATA COLLECTION

A structured questionnaire was developed and programmed into the Survey-To-Go a mobile data collection system. The questionnaires were translated into all native languages which were likely to be encountered in each country and incorporated into the system. The Survey-To-GO data collection system uses the Android operated devices like tablets and smartphones and it was preferable for this exercise because of the following benefits:

- Clean data, with logic checks built in and faster project turnaround as data was exported direct into SPSS for analysis.(no data capturing)

- Reduced cost since data collection time was reduced and other functions like data editing, capturing and questionnaire printing were removed.
- Automatically captures GPS coordinates for fieldwork monitoring ensuring uniformity since all data from 10 countries was uploaded on a single server at the Head Office in Harare.

5.10 FINDINGS

The team's findings were as follows:

- DEMOGRAPHIC AND SOCIAL ECONONIC CHARACTERISTICS

The teams study population comprised of young adults aged 15-40 years. 65% of their sample at regional level was within this age group. Malawi and Tanzania had the youngest population with about 70% falling within this age group whilst Lesotho had an older population with 60% falling between 40-60 years. Their sample was male dominated with 71% comprising of males at regional level. The proportions are high in Namibia and Mozambique with proportions of 89% to 90% respectively. 60% of the respondents were married however the lowest proportions were in Malawi and Mozambique at 31% and 33% respectively.

The population is predominantly Christian 85% at regional level ranging from 60% in Swaziland to 99%. Education is moderate with about 8% reporting not to have attended school at all at regional level with a range from 1% in Zimbabwe to 21% in Botswana.

TUBERCULOSIS KNOWLEDGE, ATTITUTES AND PRACTICE

The select research facilitator pointed out that knowledge is universal across the SADC countries as 100% of the participants in the study, regardless of their employment category had knowledge about TB. 75% of the participants reported that they were aware of the main sources of TB. And awareness ranged from 46% in Namibia to 92% in Mozambique. Approximately 69% of the regional participants had knowledge on TB signs and symptoms and these proportions ranged from 47% in Tanzania to 93% in Zimbabwe. Knowledge on how one can be infected by TB was moderate at 74% and ranging from 55% in Malawi to 87% in Zambia and South Africa.

Knowledge on the link between HIV and TB is 88% at regional level, 94% of the regional participants knew how TB can be treated and this proportion ranged from 85% in Mozambique to 100% in Botswana and Zimbabwe.

TB diagnosis was reported to be free by 71% at regional level and the proportion ranged from 49% in Tanzania to 89% in South Africa. Free treatment of TB was reported by 71% of the regional participants with a range of 50% in Tanzania to 92% in Lesotho.

About 78% of the respondents at regional level reported TB as a serious health issue in mines and perceived risk of getting infected by TB was high, 84% at regional level and ranging from 78% in Tanzania to 98% in Swaziland. Compassion towards people with TB. 72% respondents at regional level felt that they would be compassionate towards people with TB. 91% respondents at regional level reported that they believed that they would get support from family if they were to be on TB or HIV treatment. This proportion ranged from 85% in Mozambique to 100% in Botswana

98% of the respondents reported that they would visit a health facility if they were found to have TB however knowledge on when to seek for treatment was moderate, 68% at regional level and ranged from 44% in Mozambique to 100% in Botswana and South Africa.

- MDR-TB KNOWLEDGE

According to the facilitator knowledge on MDR-TB is fairly low only 18% reported ever hearing about MDR-TB at regional level. Awareness ranged from 7% in Malawi and Zambia respectively to 69% in Swaziland. Approximately 63% of the participants at regional level reported that symptoms of MDR-TB are the same.

77% of the participants at regional level reported that MDR-TB emanates from TB that would have become difficult to treat. This relationship was reported by a proportion ranging from 63% in Zambia to 91% in Swaziland. 58% of the participants reported that MDR-TB is caused by drugs that refused to work and the proportion ranged from 45% in South Africa, Namibia and Zambia to 80% and 82% in Botswana and Malawi respectively.

53% of the participants at regional level reported that MDR-TB is caused by taking wrong TB drugs and the proportions ranged from 25% in Lesotho to 80% in Malawi. 73% of the participants at regional level reported that MDR-TB is caused by not taking TB drugs as instructed and the percentages reporting this cause ranged from 46% in South Africa to 86% in Malawi. Approximately 465 of the regional level participants reported that MDR-TB cannot be cured. The proportions reporting that TB cannot be cured ranged from 33% in Zambia to 71% in Lesotho.

- HIV AND AIDS KNOWLEDGE, ATTITUDES AND PRACTICES.

Information and knowledge reception on HIV and AIDS was universal, 100% across countries and population and 92% participants were aware of the signs and symptoms of HIV and AIDS. Proportions ranged from 74% in Namibia to 98% in Zimbabwe.

According to the facilitator knowledge levels on how people get infected were quite high, 95% at regional level with proportions ranging from 88% in Mozambique to 100% in Namibia and Zimbabwe respectively. Knowledge on prevention of HIV infection was also high 97% at regional level with a range of 93% in Mozambique to 99% in Botswana, South Africa, Zambia and Swaziland.

80% of the regional participants reported HIV to be a serious health problem in mines and this proportion ranged from 68% in Malawi to 92% in Botswana and South Africa. Approximately 17% of the respondents at regional level reported that maintenance of ART would cure HIV and this proportion ranged from 6% in Zambia to 45% in Botswana.

A moderate proportion reported to have been tested within the last 12 months and this was about 66% at regional level with a range of 52% in Mozambique and Tanzania respectively to 89% in Swaziland. 29% of the participants at regional level participants reported that they had sex with someone other than their spouse 12 months prior to the survey and these portions ranged from 18% in Malawi to 42% in Lesotho. About 12% of the participants at regional level accepted to not using a condom with a non-regular partner and this ranged from 5% in Mozambique to 31% in Malawi. 21% of the respondents at regional level confirmed partner refusal as the main reason for non-condom use and the proportions ranged from 26% in Zambia, Tanzania and Mozambique to 38% in Lesotho. 11% of the respondents at regional level reported that they failed to use the condom and the proportion ranged from 2% in Malawi to 32% in Swaziland

- SILICOSIS

According to the facilitator only 22% of the respondents at regional level reported to have knowledge of Silicosis. The proportions of participants who reported knowledge of Silicosis ranged from 2% in Malawi to 51% in Swaziland. Knowledge on the sources of Silicosis was only 9% at regional level with a range of 1 % in Malawi to 195 in Lesotho. Knowledge on signs and symptoms of Silicosis was also low, 19% at regional level and ranged from 1% in Malawi to 41% in Swaziland.

Knowledge on the causes of Silicosis was also extremely low, about 18% at regional level with a range of about 0% in Malawi to 46% in Swaziland. 19% of the respondents at regional knew about

preventative strategies against Silicosis and this proportion ranges from 1% in Malawi to 45% in Swaziland. 18% of the respondents at the regional level indicated that there was a link between Silicosis and TB. 12% reported that Silicosis could be treated and this proportion ranged from 1% in Malawi to 25% in Zambia.

18% of the population at regional level reported that Silicosis is a serious problem in mines and this proportion ranged from I% in Malawi to 51% in Swaziland.90% of the participants agreed that consistent medical tests were necessary and the proportions ranged from 76% in Mozambique to 99% in Zimbabwe. Approximately 83% of the participants maintained that mine workers must have fitness certificates and this proportion ranged from 73% in Mozambique to 97% in Lesotho.

The facilitator also gave the audience information on the sources that respondents found as the most effective in using to communicate to the general public and these were the radio, health workers, television and the newspaper. These were reported by 73%, 60%, 48% and 26% respectively at regional level and the radio was the most preferred source in most of the countries with the exception of Mozambique where television was the most preferred.

5.11 EXISTING TB, HIV AND SILICOSIS CONTROL PROGRAMS IN THE MINING SECTOR

Botswana, Malawi, South Africa, Namibia, Tanzania and Zimbabwe do not have specific IEC strategic developed to guide TB, HIV or Silicosis programs in mine setting.

- Although they do not have a strong mining industry, Mozambique, Lesotho and Swaziland implement IEC interventions to guide TB and HIV programs in mine settings.
- Review of literature suggests that there has not been a recent comprehensive assessment of knowledge, attitude and practices (KAP) regarding TB among any part of the general population in including the mining community in most countries.

5.12 CHALLENGES

The following challenges were listed by the facilitator:

-Information on TB amongst mining populations remain limited in most countries from the health, labour and mining sectors.

- There is weak legislation on the prevention and control of Silicosis in all ten SADC countries, weak occupational health institutions to provide technical support to mining and poor funding towards research on Silicosis.
- In Lesotho the draft TB policy does not address management of TB amongst mining populations.
- In Swaziland there is no collaborative and/ or coordinated system or strategy for managing cross border mines.
- The major gap in both TB and HIV prevention in Malawi's the lack of explicit strategy targeting miners and mining communities. Neither are there concerted efforts to prevent miners and mining communities from Silicosis.
- In Tanzania, initiatives to address TB in the mining sector tend to be offered in large-scale formal mining sites leaving workers in small-scale mining sites.

5.13 RECOMMENDATIONS

The following recommendations were listed:

- Given the mobility of population across countries for varied reasons, it is necessary to develop and strengthen regional frameworks for coordination and collaboration for TB, HIV and Silicosis and other occupational diseases in the mining sector.
- Given the population composition in the mining sector, it is important to continue to increase information on prevention against HIV infection. Emphasis must be placed on condom use with non-regular partners.
- There is need to increase awareness and particularly correct knowledge, cause and preventive strategies against TB.
- There is need to increase awareness and particularly correct knowledge on causes and preventative strategies against TB.
- Knowledge on how TB can be treated can be treated and health seeking behaviour is quite high and there is need to sustain it.
- Knowledge on MDR-TB was found to be very low among the mining population. However it was also noted that among those that knew about it, there were high levels on the knowledge of the causes and symptoms of MDR-TB. It is therefore recommended that there should be

increased IEC on MDR-TB to all population types in the mining sector concentrating on cause, prevention and treatment.

- There is need to increase knowledge on the synergy between MDR-TB and HIV.
- HIV testing is fairly low in the mining populations, therefore there is need to increase awareness and knowledge on HIV testing and provide readily available testing centres in and around the mines.
- Silicosis awareness levels are very low across all populations types under study, there is need is need to increase awareness levels, knowledge on the causes and preventative methods.
- There is need for strengthening and monitoring on the prevention and control of Silicosis in all ten SADC countries, national occupational health institutions for the provision of technical support to the mining industry.
- There is need for increased funding towards research on Silicosis KAP studies on Silicosis should be conducted for both the general population and particularly for ex and current mine workers.
- Use of local languages should be encouraged in the dissemination of TB,HIV and Silicosis IEC materials in mining and surrounding communities, The packaging of the IEC materials must be user friendly of Radio, TV and Health workers.
- Legislation to enforce full participation of the mining sector is essential.

6. PRESENTATION OF THE LEGISLATIVE REVIEW STUDY BY HEALTH FOCUS SOUTH AFRICA

The Legislative review was presented by a facilitator from Health Focus. The facilitator introduced Legislative review and explained that it was done to review existing legislation and regulation of mine health and safety in the ten SADC countries and come up with recommended ways to strengthen the existing regulations in order to improve working conditions in the mines based on the findings.

6.1 METHODOLOGICAL APPROACH

The methodological approach incorporated a thorough desktop review of the Legislative review framework and qualitative data collection during country consultations with key informants within a tripartite arrangement (government, employers, organised labour) in the ten countries.

According to the facilitator the review was structured as follows:

a) Macro-assessment of each country to build a national profile for mine health and safety and this included:

- A micro-economic assessment.
- A review of the policy and legal framework for occupational risk protection particularly dust control in the mining sector.
- Organisational and management framework for occupational health and safety in the general context and mine health and safety including institutional mapping.
- Determining the organisation and management framework for other social protection funds.

b) Meso-assessment: Implementation status of occupational risk and occupational health surveillance systems in the countries and their reach and effectiveness with emphasis on small scale artisanal mining.

c) Micro-assessment: Application of occupational risk reduction regulations at an enterprise level.

According to the facilitator a three-person team including two international experts and one national expert was used to undertake country visits and the data collection methods used included the following:

- In-depth face to face telephonic interviews with key informants.
- Group interviews.
- Observations of occupational health services provision and
- Mining and health safety system assessments during mine visits.

The team's findings and results of the review were tested and validated during a country stakeholder workshop conducted at the end of each country mission.

The following reference framework was used for the legislative review:

- The ILO conventions.
- The SADC Charter of Fundamental Rights.
- WHO programme on the Elimination of Silicosis and
- The Global Post -2015 End TB Strategy with three pillars

i) Bold and supportive systems,

ii) Integrated patient-centred care prevention and

iii) Research innovation

The Occupational health service provision was evaluated against the Basic Occupational Health Service Model (BOHS)

6.2 FINDINGS

6.2.1 MINING SECTOR

- South Africa, Botswana, Namibia, Zambia: Mining sector dominated by large-scale mines fully or partly owned by transnational mining corporations. Considerable medium-size mining segment, with small-scale and particularly artisanal small-scale mining exists but is rather a side issue.
- Tanzania, Mozambique and Zimbabwe: Important large-and medium scale mining segment, all three countries have a significant artisanal small –scale mining segment which provides informal jobs to several hundred thousands of people
- The mining sectors in Swaziland, Lesotho and Malawi are still small and underdeveloped, artisanal small scale mining exists but is not prominent.

6.3 FINDINGS LEGISLATION

- South Africa is the only country with a National Programme for the Elimination of Silicosis.
- All Countries make reference to the importance of dust control in their legislation (labour or mine industry), but mostly very general with no clear instructions on how systems need to be designed and controlled.
- South Africa, Tanzania, Namibia and Mozambique have already, occupational exposure limits for crystalline silica (and also others e.g. asbestos) in legislation.
- Apart from South Africa the legislation is not prescriptive to how dust monitoring should be conducted (spot sampling versus personal dust monitoring and the related equipment)a

6.4 FINDINGS: INSPECTORATES

- South Africa: Mine Health and Safety Department in the Department of Mineral Resources well captured to inspect the mining sector in South Africa.

- The Mine Safety Departments (and/or labour) in all other countries are understaffed, lack the technical competence, equipment and budgets to perform occupational hygiene inspections, particularly inspection of dust control systems in mines.
- Focus of inspections on large industries.
- Artisanal mining segment is not covered with inspections, due to HR constraints and no clear concept on how to address the manifold safety and health challenges in the mining segment.

6.5 RECOMMENDATIONS

- Countries having not yet adopted ILO convention C155 as agreed upon in Article 12 of the Charter of Fundamental Rights in SADC proceed with the adaptation process and align their legislative frameworks to that Convention (Botswana, Malawi, Mozambique, Namibia, Swaziland, Tanzania and Zimbabwe)
- SADC promotes the implementation of the SADC Declaration on Mining and particularly "Harmonisation of Mining Policies, Standards, Legislative and Framework in Southern Africa" adopted in 2006 and in the field of safety, health and environment agree on a joint approach to the elimination of silicosis in the mining sector and provide common standards or a code of practice containing
- aligned occupational hazard exposure limits for airborne pollutants,
- aligned occupational hygiene protocols for the management and control of dust

  in the workplace, particularly personal dust monitoring approaches and the

  Systematic recording of lifetime exposure of mineworkers.

- All countries (apart from South Africa) develop regulations or introduce mandatory codes of practice geared towards the elimination of exposures to hazardous air pollutants.
- All countries (apart from South Africa) build the capacity of their labour and mine safety inspectorates (adequate human resources, equipment, skills and budgets) to effect meaningful controls and enforce set standards.

6.6 FINDINGS: INSPECTORATES

- The Occupational Health and Safety Inspectorates (MoH/MoH) are understaffed, lack the equipment and budgets to perform occupational health inspections.

- Focus of inspections on large industries.
- Artisanal mining segment not covered with inspections due to HR constraints and no clear concept on how to address the manifold safety and health challenges in this mining segment.

6.7 FINDINGS: OHS IN MINING SECTORS

- Zambia and Tanzania are the only countries where occupational health screening is performed by the public sector: OHSI in Kitwe, OSHA in Dar es Salaam and the contracted medical practitioners.

Other countries:

- Majority of transnational large and medium scale mines in other countries provide onsite OH screening and Oh as well as PHC services (BOHS III/IV), results are kept for a prescribed period. (e.g. 40 years SA, 10 year Namibia)
- Medium scale mines , depending on ownership , provide onsite OH and PHC services or outsource the service to private providers (BOHS II /III), some medium mines do not provide services as required , e.g. irregular or no OH screening and no health service coverage for workforce.
- Small scale mines: OH screening mostly not performed, health service coverage either through public system or paid by the mine owner.
- Artisanal mines : No OH screening , limited access to health services (geographical and financial)

6.8 Recommendations

- Lesotho and Malawi :Introduce OH surveillance into legislation based on ILO Recommendations 171 , 1985
- Botswana, Swaziland and Zimbabwe: Amend legislation to cater for exit medical examinations and regular OH screening of ex-mineworkers.
- All countries should develop the capacity of their occupational health inspectorates to enforce existing legislation (HR, competences, equipment, budgets for inspection, surveillance systems).
- Provide for a system of decentralised OH service delivery either through public or private providers that allow for OH screening in underserved mining segment(small –scale /artisanal)

7. Findings: Legislation

- All countries have elaborate protection schemes , tuberculosis without silicosis is only in SA and Zambia compensable
- Compensation systems cater theoretically for current and ex- miner workers, as well as their dependents.
- Compensation of claims from work-related injuries usually straight forward process.
- Compensation of occupational lung diseases evolving over time poses a great challenge and ex-mineworkers are underserved and neglected.
- All countries face challenge in compensation of ex-mineworkers , no systems in place to systemically track and trace ex-mineworkers and encourage medical benefit examinations
- Mineworkers in small –scale or artisanal mining not registered and do not contribute to the compensations fund and thus not eligible for compensation for work-related injuries or diseases.

7.1 Recommendations

- Tuberculosis contracted during mine work after significant exposure to silica dust (e.g. 200x8hr shift as in SA) to be integrated as a compensable disease.
- It is recommended that countries develop policies and approaches to track and trace ex-mineworkers offering medical benefit examination as required by law.
- Ideally medical benefit examinations be included into decentralised occupational health services, which would facilitate the access of ex-mineworkers and mineworkers in small scale or artisanal mines.
- In order to integrate artisanal mine work into social security systems mutual health insurance approaches should be considered in order to support mineworkers and families after loss of income through mine work.

7.2 Findings: Operational research

- Reporting of occupational injuries and diseases is prescribed in the legislation of all countries , however surveillance systems are weak ,underreporting is common

and reporting is not enforced particularly in countries where occupational health screening is left to the general public or private health system or not at all catered for in legislation(Malawi, Lesotho)

- Respectively baseline data on burden of TB or pneumoconiosis does not exist.
- Compensation mechanism hold databases, which are also incomplete since pneumoconiosis develops with long latency and ex-mineworker community is screened systematically.

7.3 Findings: Operational research

- Baseline data on types of dust emissions does not exist.
- Mining industry (particularly large) keep data on types of dust and dust emissions which are commonly not shared with authorities or within the industry.

7.4 Findings: Innovation

- Innovation approaches for the sharing of knowledge occupational hygiene and mine safety have been observed.
    - South Africa :CoM MOSH Learning Hub
    - Namibia :CoM joint benchmark visits to mines (mine health and safety managers , mining inspectors , union health and safety officers)
    - Zambia: Mining Sector Trust (ZAMSET) supports skills development in mining industry.

7.5 Recommendations

- Research on true burden of pneumoconiosis in study countries.
- Support to the development and rollout of systematic occupational health surveillance systems.
- Conduction of baseline studies on types of dust and dust emissions in the mining sectors.
- Adoption of models for industry –wide learning mechanisms as implemented in SA, Namibia and Zambia.

7.6 Key Intervention Recommendations

Conclusion 1: With exception to South Africa ; the laws , regulations and implementations guidelines in the study countries(targeting meaningful dust control and the prevention of occupational lung diseases in the mining sector)are imprecise, fragmented, out –dated and do not provide for hierarchy of controls to be established in mining operations. Baseline knowledge about silica dust emissions and high and low-risk areas for occupational lung diseases are not available and cannot guide the development of risk profiles and respective risk programs.

7.7 Key Intervention Recommendations

Intervention recommendations 1:

Provision of technical assistance to Ministries of Mines/ Mineral Resources for the development of national dust control programs:

- Technical assistance commissioned for baseline research on silica dust emissions and risk profiling in mining-intensive countries (Tanzania, Mozambique, Zimbabwe, Namibia and Botswana).
- Research commissioned on the true burden of pneumoconiosis amongst current and particularly ex-mineworkers in mining –intensive countries (Tanzania, Mozambique, Zimbabwe, Namibia and Botswana).
- Technical support for the introduction of a mandatory code of practice on personal exposure to airborne pollutants to be applied by the mining industries.
- Capacity development (knowledge, skills and equipment) of the relevant inspectorates to supervise and inspect the implementations of the CoP in the mining industry.
- Technical support of facilitation of a roll-out campaign for the introduction of the Cop in collaboration with the Chambers of Mines, other mining associations and the relevant Unions.

7.8 Key Intervention Recommendations

Conclusion II: Artisanal small-scale mining provides employment and income to thousands of mineworkers. Among these communities there is little or no awareness about the most basic safety and health protection. The relevant Ministries lack concepts and approaches on how to

address safety and concerns within this mining segment, which would enable them to push for better protection of the workers.

7.9 Key Intervention Recommendations

Intervention recommendations II:

Provision of technical assistance to Ministries of Mines/Mineral resources and/or Labour to develop and apply occupational safety and health concepts for artisanal small-scale mining operations, particular in Tanzania, Mozambique and Zimbabwe.

- Technical support to the relevant Ministries in developing risk awareness and risk protection concepts for artisanal small –small miners.
- Capacity building of inspectorates and small –scale mining associations to conduct risk awareness and risk protection training with artisanal small –scale miners and within peri-mining communities.

Roll-out of risk awareness and risk protection training with small-scale mineworkers in selected high- risk.

CLOSURE AND NEXT STEPS

After an intensive two days of presentations, panel and floor discussions on the four studies, the workshop came to an end with researching organizations being implored to take feedback and incorporate it into the studies so as to polish them. Final reports would then be submitted again to the TIMS Principal Recipient and will be made accessible via the TIMS' website.

- THE END -

24 St Andrews,
Parktown,
Gauteng, 2193
Tel: +27 11 274 9200
www.timssa.co.za

Annex 1: Workshop Agenda

TIMS

TB in the Mining Sector in Southern Africa

TIMS Dissemination Workshop
10 -11 May 2017

INTRODUCTION

As part of the Global Fund Regional Grant for TB in the Mining Sector in Southern Africa programme (TIMS), four studies were conducted to address knowledge gaps about the TB epidemic in this sector. The four studies are:

1. Epidemiological Baseline study	Baseline Epidemiological Study on TB, MDR-TB, Silicosis and HIV amongst Mine workers and Ex-Mine workers in Southern Africa
2. Geospatial Mapping study	Regional Mapping Study of Key Populations (mine workers and mining communities), health services and mines in Southern Africa (Geospatial Mapping of mineworkers, ex- mineworkers and health services)
3. Knowledge Attitude and Practice study	Knowledge Attitudes and Practice (KAP) Survey related to TB, HIV and Silicosis
4. Legislative Review	Review of the existing industry standards, legislation and regulations for mine health and safety.

The results of these studies are now available, and a dissemination workshop has been planned. The workshop will provide a platform to the share results, validate results as well as discuss utilization of the said results.

OBJECTIVES

The objectives of the Dissemination workshop are to:

- Share results of the knowledge generation studies conducted for the TIMS Grant;
- Validate results of the studies by technical participants from the 10 countries studied
- Engage stakeholders on ways in which the knowledge generated through the TIMS Grant can be utilized.

EXPECTED OUTPUTS

The expected outputs are:

- Wider knowledge of results of the studies commissioned through the TIMS Grant

- Consensus of the accuracy and robustness of the findings and recommendations of the studies
- Indications of possible ways in which the results of studies commissioned through the TIMS Grant will be put to use

WORKSHOP AGENDA

TIME	ITEM	FACILITATOR
9 May 2017	Arrival	ALL
	Day 1: 10 May 2017	
08:00	Registration	ALL
09:00 to 09:30	Welcome Remarks	Regional Coordinating Mechanism (RCM)
09:30 to 09:45	Overview of the workshop and objectives	Principal Recipient (PR)
09:45 to 10:00	Video clip highlighting TB efforts in the region	
10:00 to 10:30	***Comfort Break***	
10:30 to 12:00	Presentation of Epidemiological Study Results	PHRU
12:00 to 12:30	Panel feedback on results of Epidemiological Study	Panel 1
12:30 to 13:30	Facilitated discussion on Epidemiological Study results (additional inputs, corrections, and revisions)	ALL
13:30 to 14:30	***Lunch***	
14:30 to 14:45	Sputum Collection Video Clip	IRD
14:45 to 15:45	Presentation of results of Mapping Study	TomTom Consortium
15:45 to 16:00	***Comfort Break***	
16:00 to 16:45	Live demonstration of Mapping Tool	TomTom Consortium

TIME	ITEM	FACILITATOR
16:30 to 17:00	Facilitated discussion on Mapping Study results (additional inputs, corrections, and revisions)	ALL
17:00	Wrap up and closure of day 1	PR

	Day 2: 10 May 2017	
08:30 to 09:00	Recap of Day 1	PR
09:00 to 10:30	Presentation of KAP Study	Select Research
10:30 to 11:00	***Comfort Break***	
11:00 to 11:30	Panel feedback on results of KAP Study	Panel 2
11:30 to 12:30	Facilitated discussion on results of KAP Study (additional inputs, corrections, and revisions)	ALL
12:30 to 13:30	***Lunch***	
13:30 to 15:00	Presentation of Legislative Review	TomTom
15:00 to 15:30	***Comfort Break***	
15:30 to 16:30	Facilitated discussion on results of Legislative Review (additional inputs, corrections, and revisions)	ALL
16:30	Wrap up and closing remarks	PR

GUIDELINES FOR PRESENTERS

Approximately 90 minutes has been allocated for presentation of results for each study

The chair for the session will assist in time keeping

The time allocation should be distributed as follows:

- Introduction, scope of work, methodology, limitations 10 min
- Country specific results (for 10 countries) 60 min
- Key recommendations and conclusion 20 min