

## **Strategic Integrated Plan of Action for Laboratories (2008-2012)**

### **1. INTRODUCTION**

#### **1.1 Background**

Mozambique occupies a coastline of 2500 kilometres, covering a total area of 812,379 square kilometres, with a population of 19.7 million people (UN,2006). It lies in the southeastern part of Africa bordering the Indian Ocean and neighboring Tanzania in the north, South Africa in the south and Zimbabwe and Swaziland in the west.

Administratively the country divided into 11 provinces including the capital city Maputo.

They are namely :Maputo Rural, Maputo City, Gaza : with provincial capital Xaixai is 224 kilometres from Maputo. Inhambane: characterized by its extreme coconut palms and cashew nuts. Sofala: One of the richest provinces producing primarily shrimps and sugar, the provincial capital is Beira. Manica: Important for a wide range of fruits and vegetables. Zambezi: Is an agricultural region with magnificent tea plantation.

Tete: Known as the location of the colossal Cabora Bassa dam and rich in minerals such as coal, iron, fluorite and gold. Nampula: A paradise for rock climbers with city also called Nampula. Caba Delgado: The most northern province of the country known for its wood and Ivory artists. The capital city Pemba is located on the Pemba bay. Niassa: The largest province and most sparsely populated. Its largest town is characterized by extensive pine trees.

Fig: 1 MAP OF MOZAMBIQUE: Showing its boundaries and its major cities



At independence, Mozambique inherited a health system that was geared towards urban and curative services. Health status was extremely poor in the rural and isolated areas. In post independence, there was rapid expansion of the network of primary health care facilities, from 326 in 1975 to 1195 in 1985, and by the end of 2004, 46 hospitals, 730 health clinics and 473 health centers, giving a total of 1249 health institutions. Despite the conflict, there was a spectacular increase of external financing leading to the reconstruction and development of the health sector. Guided by a number of policy documents such as: 2001-2004 Government Program, The Plan of Action for the Reduction of Poverty (PARPA 2001-2005), and the health sector Strategic Plan. Emphasis was on primary health care, especially health promotion, and disease prevention, through programs of mother and child immunization and communicable disease control.

Despite all these, the infant mortality rate is quite high at 124 per 1000 live births (Demographic Health Survey, DHS, 2003). The country's GNP is estimated at USD 210. Subsistence agriculture continues to employ the vast majority of the country's work force with seventy percent of the population living in the rural areas. An equal proportion of the population lives below poverty line. The literacy rate is about 46% (National Institute of statistics). Communication by road is difficult in many parts of the country except along the coastal towns. Both fixed telephone line and mobile cellular service networks are available but concentrated in major towns and their immediate environs.

The major cause of morbidity and mortality in the country is malaria, with a prevalence rate amongst the age group zero to five, of an average of between 50% to 60%, higher in the Northern region of the country than the Southern region, and higher on the coast than the interior, and of about 35% amongst pregnant women. Malaria account's for 30% of hospitalizations (IPS 2007).

Mozambique is the 19<sup>th</sup> amongst the 22 high burden TB countries, with an incidence rate of 460 with an estimated 100 000 people. (US AID Infectious Diseases Sept 2006)

A Prevalence rate of 16% in HIV/AIDS classify's Mozambique as the 10<sup>th</sup> highest in prevalence. PLWHA are estimated at 1.400.000-2.200.000(US AID Infectious Diseases Sept 2006), while 53.414 by March 2007 were on ART (IPS 2007). Cases of TB and HIV co infection is 48% (US AID Infectious Diseases Sept 2006)

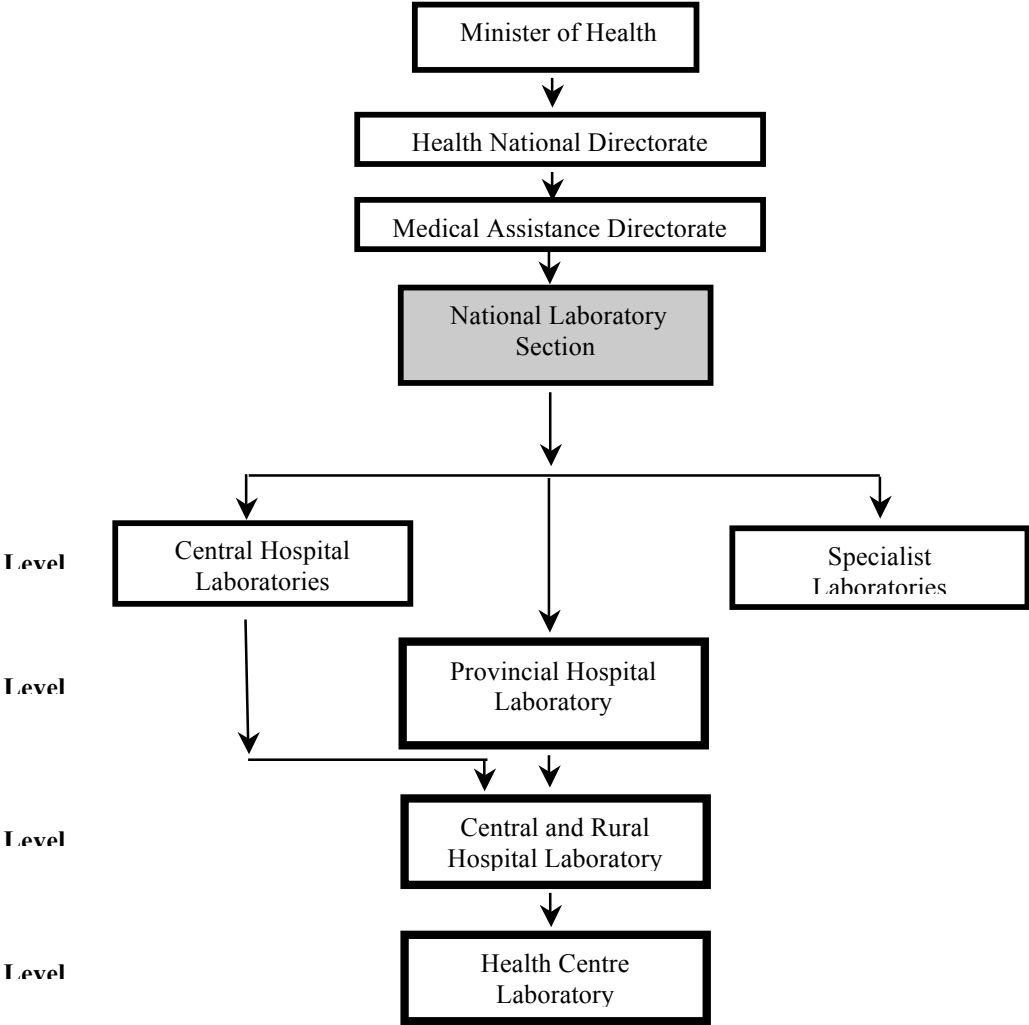
Other diseases of high prevalence rate are: diarrhea in the less than five years old of 55.5%, dysentery with prevalence rate of 10.5%, and meningitis most of which are HIV related. . Following the results of the epidemiological surveillance report (MOH, Jan – June 2007) 434 cases of meningitis , including 86 deaths were reported; 1375 cases of Cholera, including 22 deaths were reported in the provinces of Cabo Delgado, Niassa and Sofala, maybe as a result of frequent floods, outbreaks and drought.

Following The MOHs policy “ To provide and preserve the health of the Mozambican population to promote the delivery of good quality and sustainable services that are accessible to all Mozambicans with equity and efficiency”, an epidemiological surveillance assessment was carried out in November 2006. It reported weakness of laboratory coordination, insufficient training, poor system of distribution of consumables, poor specimen management, low level of preparedness for epidemic specimen management and weak reporting system. This was clear evidence that the elaboration of an integrated national strategic plan for laboratory networking is a top priority. This plan integrates clinical

diagnostics for individual patient care and public health diagnostics whose results address disease surveillance, and control decisions.

**1.2 Current situation of the Laboratory Network of the National System of Health**

Coordination of laboratory services is vested in the Medical Assistance Directorate of MOH as shown in the diagram below:



The National Directorate of Medical Assistance oversees the Sector of Clinical Laboratories (SCL). This sector in turn coordinates the activities of clinical laboratories in general. The head of SCL coordinates and gives policy guidelines to clinical laboratories. Central laboratories providing for public health eg TB, Immunology/HIV, National Laboratories of Hygiene (Control of Waters and Food, National Control of Quality of Medicines, etc... are under the National Institute of Health Directorate..

Immunology, Tuberculosis, and Malaria laboratories were created to be the model in scientific research, training, EQC and QA.

The military laboratory which is under the jurisdiction of the Ministries of Defence operates independently. The University teaching laboratories are under the Ministry of Education. The case of the private laboratories is not clear, because there is no formal agreement with the government.

In the provinces, there is a provincial chief in charge of networking, supposed to coordinate activities in the province and to report to the central level. At the level of the district, the chief of laboratory networks, supervises activities in the health centres and is answerable to the provincial chiefs, however this is hardly functional, because of the lack of resources for supervision, and also because technically he may not be comfortable enough to take decisions and generally only implement's decisions coming from the central level.

The Public Health network of the Country is classified into four levels: Quaternary (Central and Specialized Hospitals), Tertiary (Provincial Hospitals) Secondary (District, General and Rural Hospitals) and Primary (Health Clinics). At the moment the service of clinical laboratory service follows the same organizational levels. There are 3 central laboratories, 7 provincial, 35 district/rural, and 209 health clinic laboratories in the country, making a total of 254 government owned health care laboratories. (MOH, 2004) There are 3 officially registered private laboratories. Full details will be available from HAM, 2007) In some Health units where there is no laboratory, there is a reference mechanism of the samples to the processing centres.

Table 1 The responsibilities of the Lab sector and Labs per level in the MOH/ Medical Assistance Directorate are outlined below:

<b>MOH Lab Sector in the Medical Assistance Department</b>
<ul style="list-style-type: none"> <li>To manage the laboratorial services at national level</li> <li>To develop and review the national laboratorial policies in collaboration with the LTC.</li> <li>To prepare national guidelines and operational in collaboration with the LTC</li> <li>To harmonize the plans and budget of the needs of the sector</li> <li>To identify and mobilise resources</li> <li>To assure the implementation of Bio safety in the Network</li> <li>To define the specifications for the search of relevant laboratory equipment, reagents and consumable and to monitor its distribution</li> <li>To facilitate the technical reference</li> <li>Inspect and to validate new analytic methods and equipments</li> <li>To coordinate the increase in capacity of the human resources (RH) of the sector</li> <li>To organize and to coordinate the System of Quality Assurance</li> <li>To create a standardized model of information system, manage it and to elaborate reports on the activities of the National Network of Laboratories</li> <li>To manage the maintenance of equipments and specific infrastructures.</li> </ul>
<b>Level IV: Central Hospital Laboratory</b>

<ul style="list-style-type: none"> <li>To offer reference services of diagnosis for specialized tests for each area</li> <li>To plan and budget the activities</li> <li>To accomplish the routine laboratory activities and specialized tests and for diagnoses and for Public Health purposes</li> <li>To support the implementation of the system of Quality Assurance in the region</li> <li>To participate in training programs</li> <li>To develop operational research</li> <li>To maintain the system of information</li> <li>To participate in the management of the reagents and consumables</li> <li>To manage the maintenance of the equipment and infrastructures.</li> </ul>
<b>Level III: Provincial Hospital Laboratory</b>
<ul style="list-style-type: none"> <li>To act as Laboratorial Reference in the province</li> <li>To forward reference samples to the central or designated reference lab</li> <li>To accomplish routine laboratory and specialized analysis</li> <li>To support the implementation of the system of Quality Assurance in the province</li> <li>To participate in the training programs</li> <li>To plan and budget their activities</li> <li>To maintain the system of information</li> <li>To participate in the management of the reagents and consumables</li> <li>To manage the maintenance of the equipment and infrastructures</li> <li>To manage and to coordinate the laboratorial services at provincial level</li> <li>To implement the national orientation lines in the province and operational protocols in collaboration with the national level</li> <li>To harmonize the plans and budgets of the needs of the sector</li> <li>To identify and to mobilize resources</li> <li>To assure the implementation of Bio safety in the Province</li> <li>To seek for laboratorial equipment, reagents and consumable and to monitor their distribution</li> <li>To supervise the laboratorial activities in the province</li> <li>To define and to monitor the referencing of the samples</li> <li>To coordinate the development of the Human Resources of the sector</li> <li>To organize and to coordinate the System of Quality Assurance</li> <li>To manage the system of laboratorial information and to elaborate reports on the activities of the Network of Laboratories at this level</li> <li>To manage the maintenance of the equipments and infrastructures.</li> </ul>
<b>Level II: District, Rural and General Hospital Laboratories</b>
<ul style="list-style-type: none"> <li>To act as Reference Laboratory in the district</li> <li>To refer the samples to the following level</li> <li>To accomplish routine laboratory basic analysis for diagnosis</li> <li>To support the implementation of the system of Quality Assurance in the district</li> <li>To supervise the laboratories of the health centres</li> <li>To participate in the training programs</li> <li>To plan and budget the activities</li> <li>To maintain the system of information</li> <li>To participate in the management of the reagents and consumables</li> <li>To manage the maintenance of the equipment and infrastructures.</li> </ul>
<b>Level I: Health Centres Laboratories</b>
<ul style="list-style-type: none"> <li>To accomplish routine laboratory basic tests for diagnosis and Public Health</li> </ul>

To refer samples to the next level  
 To provide the system of information of the health centre.  
 To participate in the management of the reagents and consumables  
 To implement activities of Quality assurance.

The shortage of human resource to work in diagnostic laboratories is serious. An assessment of numbers was made in 2006 and the distribution is shown in the table 1 below. Almost all the biologists are in Maputo Central Hospital or in Maputo City. Well trained biologists and technologists seek better paying jobs out of Mozambique. The country has no clinical pathologist; the first interested candidate for this training in that area has just been identified and is presently rotating in the various disciplines at Maputo Central Hospital laboratory.

Table 2 Picture of Distribution of the Personnel

Places	Superior technicians	Medium technicians	Basic technician	Microscopy technicians	Total
Niassa	0	15	17	10	42
Cable Delgado	0	16	23	5	44
Nampula	0	33	50	23	106
CH NAMPULA	1	8	12	0	21
Zambézia	0	26	48	13	87
Tete	0	16	24	17	57
Manica	0	9	23	10	42
CHBeira	2	12	11	3	28
Sofala	0	18	36	17	71
Inhambane	1*	13	18	20	52
Gaza	0	18	33	2	53
Maputo Province	0	10	9	7	26
Maputo City	3*	10	35	11	59
CH. MAPUTO	5	32	22	7	66
ICSM/ISCIS A	1	2	0	0	3
DNAM	2	4	0	0	6
INS	2*	13	0	3	18
Total	17	255	362	148	781

\* Biologists and Chemists

## 2. Situation Analysis:

The First part of this mission was dedicated to the situation analysis through a desk review of key reference documents in order to assess the current achievements and shortcomings.

Four Provinces were selected for our field visits. Selection of the sites was done by the MOH Laboratory sector. This included laboratories in the Northern region, Central region and Southern region. Secondly, we were made to visit laboratories of the central level, Intermediary level and Peripheral levels This assessment of the Laboratories was through a questionnaire, observation and interviewing, and through meetings with key individuals in the MOH, partners and private laboratories.

**Table 3: Health facilities visited during the Assessment**

<b>Province</b>	<b>Districts</b>	<b>Health facilities laboratory</b>
Cabo Delgado	Pemba	Pemba Provincial Hospital
Nampula	Nampula	Nampula Central Hospital
	Monapo	Monapo Rural Hospital
Sofala	Beira	Beira Central Hospital
	Nhamtanda	Nhamtanda Rural Hospital
Maputo city	Mavalane	Mavalane general hospital; Maputo Central Hospital; University Hospital; Immunology Reference Laboratory; Sant' Egidio Reference Laboratory; CDC offices; Bill Clinton Foundation office;

## 3. Main findings

### 3.1 Laboratory policies, norms

Comprehensive policies governing clinical and public health laboratories were not found. Norms for staffing, equipment and test profiles for various levels of laboratories were not available.

### 3.2 Coordination mechanisms of the bodies involved.

The department of Medical Assistance coordinates operations of clinical laboratories. The laboratory interests of public health and disease surveillance are coordinated by NIH (Immunology/HIV Aids Lab, Central TB Lab, Central Malaria Lab, Food and water and Nutrition Hygiene Lab). Bacteriology interests of public health (eg, cholera, meningitis, typhoid etc..) are not represented in NIH in the current arrangement, because technically, the Central Hospital Lab in Maputo is supervised under Medical Assistance department. The University's laboratory departments are independent of MOH.

There is no formal agreement that explains expectations and obligations of NIH-based labs to Med-Assistance based labs and vice versa. Reporting mechanisms from clinical labs to epidemiology and epidemic response are not clear.



Almost all stakeholders visited voiced concern about poor coordination, non-involvement in laboratory strategic plan development.

### 3.3 Human resources

Lack of human resources is a major constraint in Mozambique. There is a huge gap both in number and level of training and is felt at all levels of laboratory services affecting the quality of results.

The Table 4 Distribution of the technicians in the laboratories visited.

Health Unit	Pathologists	Superior Technicians	Medium Technicians	Basic Technicians	Elementary Technicians
<b>Pemba Provincial Hospital Lab</b>			5	4	
<b>Nampula Central Hospital Lab</b>	1 Micro and 1 Histopath		9	11	
<b>Beira Central Hospital Lab</b>	1 Micro, 1 Hematol 2 Histopath ?		9	10	3
<b>Monapo Rural lab</b>			1	2	
<b>Nhamatanda Rural Lab</b>			1	2	1
<b>Mavalane Hospital Maputo Lab</b>	1 biologist		3		
<b>Maputo Central Hospital Microbiology</b>	1 MD microbiologist, 1 MD				
<b>NIH Immunology Lab</b>	19 (PHD, MD, Medical Vet, Biologist, Chemists,scientists)		6		
<b>TB Central Lab</b>	2 Biologists in training		4	2	
<b>Military hospital</b>	1 Biologist	1	2	4	
<b>Oceanpath private Lab</b>			4	1	
<b>University of Mondlane, Microbiology lab</b>	1MD , 2 biologists				

To relate the staff number to amount of work, the total number of tests for September in Beira was obtained. The table below shows the number of tests (22,899) performed by 22 technicians in Beira. Crude analysis shows that around 150 emergency specimens are received per day, to be processed by the technician on duty that day. This is clearly too high, causing mental fatigue and could lead to serious errors.

**Table 5**  
**Insight into the workload for these technicians can be seen from the month of September, 2007, in Beira:**

Test requested	Number	Method of test	Test requested	Number	Method of test
Hematology	5655	Mostly automated	Bacteriology, including TB	827	All manual
Chemistry	9385	Mostly automated	Parasitology, including malaria	1191	All manual
Immunology, including HIV	1344	Manual	Emergency Lab tests	4497	Manual and automated

The exact total of laboratory work force available this year will be available from the Health Services Accessibility Mapping project finalised mid-2007 and is under analysis. But according to MOH data of 2006, only 2% of the 781 laboratory workers were of university level training, including biologists and chemists. Technicians with medium education level constituted 32.6%, while those with basic and elementary training are 46.4% and 19%, respectively. Clearly therefore there is a shortage in laboratory workers. A career scheme for advancement was not available. It was reported that some of the basic/elementary technicians want to change jobs and become hospital cleaners because of the higher pay given to the latter.

Due to this critical shortage trained medical laboratory technicians, veterinary graduates and university qualified biologists are increasingly employed in hospital and research laboratories for example. They are trained on the job in automated CD4 counting, viral load and on Quality Assurance Management. The Immunology Lab under NIH employs currently 32 biologists who are trained to meet its needs. They are performing very well.

### **3.4 System of equipment and reagent procurement**

There exist a formal system of procurement of equipment, reagent, and consumables. On a yearly basis, the different district hospitals, general hospital labs, provincial laboratories, central laboratories evaluate their needs and send to the unit in charge of laboratories. They go through, finalise it, and forward to the unit in charge of supplies. (CMAM) This unit will contract MEDIMOC to procure through bidding. Once imported the products are stored at

MEDIMOC stores. The unit in charge of laboratories will plan distribution to the laboratories according to their needs. In our assessment it was found that, the basic reagents were available to perform essential tests (Pemba, Nampula, Monapo, Beira, Nhamatanda, Mavalane, Military hospital, Central hospital laboratory, immunology laboratory, and the national TB Lab.) The University use's reagents meant for research to perform public health investigations such as cholera. They diagnosed three cases last year.

Some reagents were not procured because of budgetary constraints: for example, we found out that, there was no confirmatory testing for syphilis nor electrophoresis of haemoglobin carried out. Some reagents expired due to uncoordinated supply and training: for example, hormonal testing kits supplied in Nampula expired before technicians were trained. We found that RDTs for malaria had been distributed to health units but were not used because technicians had not been trained (Nhamatanda). Again in Pemba provincial hospital laboratory, there was a risk of stock out of reagents used in the monitoring of PLWHA following ART (CD4, biochemistry, haematology, parasitological), because ART activities had suddenly been scaled up in the district without prior planning to scale up laboratory support as well.

All the health facilities we visited were provided with automated equipment to monitor PLWHA on ART (haematology and clinical chemistry); this same equipment is used for testing other patients. Some of the laboratories e.g. Mavalane was found with equipment meant for quaternary or tertiary laboratory, but with only one biologist who is not there on a permanent basis. The lab is run by medium term technicians.

The brand of equipment differed in different laboratories, meaning that it will be a challenge to standardize procedures and reagents.

Some equipment were not in use, because they were broken down. It was reported that technicians are not trained in preventive maintenance; engineers recruited in the maintenance department are mechanical engineers without adequate training/experience in electronic laboratory equipment. Some partners providing this equipment reported however, the presence of an after sales agreement to maintain equipment for two years including preventive training.

### **3.5 Lab Networking and Reference Laboratories**

Inter-laboratory networking (data sharing, specimen exchange, reporting etc....) is absent in general. This is true also for the central laboratories under NIH, performing functions for Disease Surveillance and Epidemic Response. Specimens for surveillance are not sent from the district/province to the central labs. Central labs also do not communicate or share information with the peripheral labs. Only TB organised refresher for microscopy in the rural areas. There exists one for HIV laboratories in the Sant' Egidio community, exchanging specimens and lab data.

Networking of all clinical laboratories is required. The district service should be linked to all the district hospital laboratory and should have data from all the rural labs and health posts, thus providing the data to the provincial chief, who should have the latter data plus data from the provincial and/central laboratories, which they should through linking have these data available to the Sector in charge of clinical laboratories. They in turn should have been linked to the laboratories at the central hospital. All reference laboratories should be linked

interlinked, linked to the NIH and also linked to the laboratories which carry out EQC. None of the above is available.

### **3.6 Documentation and data management**

At the MOH/NIS department, certain laboratory variables have been adopted and disseminated to the laboratories and the technicians made aware. In the statistics submitted back to HMIS, some districts regularly report on these variables while others do not. Analysis of this data at HMIS will therefore not be representative of the whole country.

Even the method of reporting was not uniform; all the 5 laboratories visited outside Maputo sent monthly paper reports to the hospital administration. Probed further, we were advised to request the Province or HMIS too who should have received the data. HMIS reported that some districts send this data directly to the MOH without transiting the province. When it is sent through the provincial health service, the Province may not forward it timely, despite link to the MOH through internet.

Laboratory data during disease outbreaks from (Hot Data) is reported through the same channels.

Laboratory registers were old, designed in the 1970s/80s, and did not contain the variables identified by the MOH as important. Some technicians termed their lab registers as obsolete.

Data was computerised in some laboratories. However the lab workers could not analyse it. At Mavalane and Beira, the cumulative data was not accessible because technicians were not trained to access the data or analyse it.

Since labs generate a lot of data, it is important to standardize data management for labs. It would be a priority for the central level to visit all the provinces in order to effectively put in place a standardized system of data collection.

### **3.7 Quality Assurance**

All the laboratories we visited at the district and provincial levels had internal quality controls for the automated equipment, but carried out no external quality control. There were no Quality Assurance guide lines in those laboratories.

The university laboratory participates in the WHO-AFRO/EQAS conducted from South Africa NHLS. The national TB laboratory participates in EQAS with a laboratory in Italy. The Immunology laboratory participates in proficiency testing with CDC. The Sant' Egidio laboratory participates in the Quazi program in South Africa. However these central laboratories did not provide proficiency testing specimens to the provincial or district laboratories for proficiency testing.

At the periphery, only slides for TB were sampled by the TB supervisors and referred to the central lab for re-checking. A system for quality control of malaria microscopy was not observed.

The private laboratory Oceanpath receives samples for proficiency from their mother laboratory Ampath in SOA. This to maintain the quality of all laboratories linked to Ampath.

Systematic QA needs to be introduced.

### **3.8 Availability of SOPs and laboratory manuals**

SOPs are available in some laboratories, such as the Sant' Egidio HIV training laboratory, The National Immunology Laboratory, The National TB laboratory ( though has to be up dated), the Mavalane general laboratory. The University of RIO in Brazil, FHI and CDC have helped in the elaboration of these SOPs and laboratory manuals. In the 3 provincial and 2 rural labs, SOPs were not available on the bench. Technicians run tests out of habit and knowledge.

Guidelines for use of RDTs (HIV and Malaria) to help standardise procedures for rapid testing were recently endorsed by MOH; but training of the end-users is not yet conducted nationwide and consequently, their algorithm was not mastered in the district laboratories that we visited.

### **3.9 Supervision, M and E**

A standard supervision format was not found at central, provincial nor rural levels. There is no budget voted and given to the provincial and district heads for supervision purposes.

There exist no clear indicators, and there is no computerized network to enable monitoring. Since regular supervision is not done, evaluation reports were not found at all levels.

### **3.10 Geographical and financial accessibility**

The geographical accessibility for diagnosis is limited in some Districts. According to the World Bank report on PHC in Mozambique (2004), on average only 20% to 50% of the population have access to basic preventive and curative health facilities. Accessibility is within 10km of health facility. MOH expects an update of this information soon from the Service Accessibility Mapping of 2007.

Laboratory tests are generally financially accessible here because they are mostly free in the government institutions. The challenge is the sustainability of the "free" nature given that, these reagents are expensive and the equipment used involve lots of running cost.

### **3.1 Infrastructure**

#### Central level (central, reference)

MOH is rehabilitating the Immunology laboratory. For now it will have enough space for CD4, haematology, chemistry, molecular biology, QC activities, research, training and administration. However more space will be required for virus culture.

The Central Hospital Maputo bacteriology laboratory has just been rehabilitated and there is no possibility of extension. The laboratories of the Faculty of Medicine are narrow and need rehabilitation. The national TB laboratory is very old and not well ventilated. Rehabilitation is needed in terms of repainting, change of doors, space redistribution and appropriate ventilation.

### Intermediary level (Provincial, District)

Laboratory rooms are small in area. Most of the structures at this level need rehabilitation; CDC is planning to rehabilitate the labs in the central hospitals of Beira and Nampula, with the aim of supporting them to be able to do TB cultures. It is important to note that TB processing shared the same room with other bacteriology specimens. The equipment required for TB culture would not fit in the existing structures; the manipulation of TB specimens in the existing space would endanger laboratory workers in Beira and Nampula from aerosols that will be created.

The Clinton Foundation reported intent to put up a prefabricated laboratory in Nampula for ELISA and Molecular biology.

If Beira and Nampula Central Hospital labs are rehabilitated and appropriately staffed and supplied, they will be effective as frontline referral points for many specimens currently brought to Maputo (TB cultures, TB quality assurance slides, hormonal tests, etc.....). They will however need close supervision and stringent EQA from the Maputo based central labs.

### Peripheral level (Health centres, health posts)

We did not visit any health centre.

## **3.12 Treatment and refuse disposal, infection prevention (Bio safety)**

Yellow boxes provided by EPI for safe disposal for sharps were found in all the laboratories that we visited. Guidelines on measures to take in case of accidental breakage of a sputum specimen container positive for TB, or if a worker comes into contact with HIV positive blood, were not available in all the labs visited except Mavalane. CDC reported that they are preparing a guide on Prevention of Accidental Contamination.

## **3.13 Funding**

Government finances the laboratory services and is supported by many partners (MOH to give list), supplying equipments and/or reagents; rehabilitating/constructing new laboratory infrastructure; training technicians, developing tools, and/or SOPs. Medical Assistance Department at MOH expressed need for better coordination with partners in order to monitor and evaluate impact of their contributions.

## **4. SWOT ANALYSIS**

Our assessment tool for laboratories at the different levels was the SWOT( Strengths, Weaknesses, Opportunities, Threats) analysis approach. Our aim was to come up with gaps to be filled and thus to propose solutions in terms of activities to fill the gaps.

### **Strengths:**

The main strengths were the following:

- Strong political commitment to strengthen laboratory services, both clinical and public health
- Existence of financial accessibility given that testing in the laboratories in all four levels is free.
- Hematology and chemical pathology equipment supplied to health facilities to monitor ART scale-up initiative; it is used for all patients.
- Presence of rehabilitated infrastructure in most of the provinces and on going renovation of others such as Pemba, as well as promises to put up pre-fabricated structures in Nampula as examples.
- Presence of technical and financial partners to contribute in the integrated scaling up of laboratory activities necessary for prevention, diagnosis and patient care.

### **Weaknesses:**

The following weaknesses were considered important :

- Institutions for higher training of medical lab technologists in the country lacking until a year ago when this began; the first batch is expected in three years (2009/10).
- Human resources is inadequate both in number and in level of training,
- Technicians, especially basic, feel undervalued because cleaners even earn better than them
- No defined career profile/scheme of service – promotional avenues for self advancement.
- Those trained are found for the most part only in Maputo Province.
- Policies and guidelines governing laboratories are not elaborated.
- Weak coordination and collaboration between different laboratories and hospitals with MOH - among clinical laboratory units at Maputo (SCL, central hospital labs, university, which could offer better quality bacteriology services for referral)
- Poorly defined clinical and/or public health and disease surveillance roles of laboratories at all levels
- Lack of formal MOU between central labs for TB, Malaria, Immunology/HIV, and clinical SCL
- Poor coordination between SCL and HMIS for purposes of management and surveillance information
- Absence of laboratory networking – no contact, not enough information sharing, feedback and specimen referral etc..... (eg Pemba, Nampula, Beira, Monapo, Nhamantanda)
- Insufficient QC, QA, and where available like in Mavalane it is not standardized.
- Absence of SOPs except in Mavalane where the RIO university in Brazil assisted in its elaboration.
- Operational research carried out but results are not documented or shared.
- No standardized system of monitoring and evaluation in place.
- No system of supervision in place
- Procedure of equipment and reagents procurement and supply is inadequate. (In terms of Quality, timing, quantity and also in terms of appropriateness and capacity to provide a buffer in times of increased need.) Pemba running out of stock because new centres were opened (10) for ART
- Algorithm for rapid testing is available but not adopted officially. --Training was not provided on the Guidelines and on the use of RDTs in the rural hospital lab that was visited (Nhamatanda)

- Available support for laboratories from the different partners is not coordinated.( St Egidio, CDC, FHI, PEPFAR, International Union against TB, USAID, GTZ, MSF,WHO..... For example, USAID is funding TB lab activities through FHI, CDC is also acting through FHI to sponsor the TB lab; WHO/HQ is also supporting TB lab to complete the drug resistance study. This situation could lead to double funding and is proof of a lack of coordination.
- Laboratory data is not always available and when it is available and computerized in as Mavalane , Beira and Nampula, it is not in a form that permit's statistical analysis.
- Registers used in the laboratories are obsolete.
- Insufficient infrastructure in 3 provincial bs to permit establishment of capacity for TB cultures (Nampula, Beira and Xaixai)
- Central reference TB laboratory is not strengthened enough to support activities in the three proposed labs.
- Absence of a designated reference laboratory for epidemic investigations. Although specimens for cholera for example are sent from the affected health unit to the university, they are not clearly designated as the reference. More so, they consume reagents that they acquire privately through research implying that, they could run out of stock at any given time.
- No laboratory engineers for the curative maintenance of equipment after they would have outlived the period observed by the contract
- Poor reagent management, (expired hormonal reagents in Nampula, because reagents were brought without equipment and when the equipment were brought, people were not yet trained to use them).
- Lack of standardization of reagents for equipment which themselves are not standardized as a result the SOPs for the use of equipment and reagents cannot be standardized if available.
- Lack of inter laboratory networking.

## **Opportunities**

The following opportunities exist:

- The presence of many technical and financial partners ready to provide funding and technical assistance.
- Graduate biologists available to be recruited and trained in automated testing for ART and scientific research; they are good material to implement QA
- Fifteen laboratory technicians are sent by CDC every year for four months to Brazil and other countries to attend refresher courses.
- Brazil is working with CDC to design a curriculum for the upgrade of technicians.
- Technical assistance on the way for lab diagnosis of Cryptococcus meningitis – could be expanded to other meningitis pathogens.
- Partners, eg Sant Egidio, have training program which could be integrated with TB, Mal etc.....
- International attention on XDR-TB, Revised IHR, scaling up ART,

## **Threats**

We identified the threats below and they should be taken in to consideration.

- Better paying jobs (even across boundaries) will take away lab technicians as they may feel undervalued by the current (MOH) employers; tactics to motivate retain employees are needed, otherwise only the least qualified will remain in the service.



- Budget not adequate for the functioning of laboratories which may result in unreliable results, such as in the case in Napula, Beira, Xiaxia and other health units where only VDRL was carried without TPHA because of a lack of funds.
- The ability for the Nation to sustain the labs after most of the partners would have left.
- Frequent power cuts coupled with the inability to provide fuel for generators where available lead to damaged equipment and/fear of use of the equipment.

## 5.0 Major problems

After the SWOT analysis we identified the major problems with Laboratories in Mozambique. Level IV laboratories fall in the central level (Reference laboratories, Central Laboratories), level II is in the intermediary level (Provincial, District laboratories and laboratories of general hospitals) while Level I laboratories are at the Periphery/Operational level (Health posts).

The table 6 summary of problems and shortcomings to be addressed in the next 5 years.

<p>Central level: Central laboratories, Reference laboratories, University laboratory</p>	<ul style="list-style-type: none"> <li>• Policies not available or not updated, where they exist</li> <li>• Documents on norms not available documents on norms are not yet disseminated</li> <li>• Procurement of wrong items sometimes</li> <li>• Poor maintenance system for laboratory equipment.</li> <li>• Shortage of well trained laboratory staff</li> <li>• Lack of a national system on Quality Control/Assurance</li> <li>• Insufficient follow up, supervision and coordination of laboratory activities</li> <li>• Insufficient financial resources for analysis at the central laboratory and for the TB National laboratory.</li> <li>• No financial resources allocated for the university Laboratory, yet it receives emergency samples for suspicion of meningitis and cholera.</li> <li>• SOPs still to be elaborated and standardised</li> <li>• Algorithms on RDT's have to be clarified, adopted and distributed Nation wide</li> </ul>
<p>Intermediary Level : Provincial, District,Rural</p>	<ul style="list-style-type: none"> <li>• Infrastructure inadequate</li> <li>• Insufficient trained personnel</li> <li>• Absence of a provincial or district system of Quality Control</li> <li>• Frequent stock rupture of reagents and consumables</li> <li>• No organized system for refuse disposal nor for the prevention of accidental contamination</li> <li>• Insufficient follow up, supervision and coordination of laboratory activities</li> <li>• Insufficient financial resources</li> <li>• No system of QA in place</li> <li>• Lack of maintenance system for laboratory equipment</li> <li>• System of specimen transport to be to central level to be improved</li> </ul>

Operational Level :Health posts	<ul style="list-style-type: none"> <li>• Absence of RDT's at this level</li> <li>• Lack of a system of refuse disposal and for the prevention of accidental contamination</li> <li>• Insufficient financial resources</li> <li>• Insufficient supervision and coordination of VCT activities</li> </ul>
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## 6. Priority actions and needs

Priority actions and needs below were identified as the most appropriate solutions to the existing problems

Central level	<ul style="list-style-type: none"> <li>• Establish a Lab Technical Committee, with subcommittees to advise MOH on development and coordination of laboratory services in the country</li> <li>• Elaborate SOPs (spelt out, standardized, endorsed and disseminated)</li> <li>• Recruit biologists and train and deploy to conduct specialised testing required in TB and Malaria central laboratories</li> <li>• Identify international laboratory specialists (1 TB and 1 malaria) and recruit for one year to provide technical assistance in setting up reference facilities</li> <li>• Standardise laboratory forms and Lab Information System Tools in collaboration with HMIS and Epidemiology Surveillance Unit</li> <li>• Put in to place a system statistics collection and inter laboratory networking through internet.</li> <li>• Strengthen specimen referral system</li> <li>• Improve the procurement system for reagents and equipment by creation of a technical committee whose validation is required for procurement.</li> <li>• Establish a cost effective maintenance system of equipment, involving first line management.</li> <li>• Training of medical engineers on equipment management.</li> <li>• Put into place a national system of QA</li> <li>• Carry out operational research</li> <li>• Train/refresh personnel</li> <li>• Put in place a national system of QC</li> <li>• Organize follow up activities, supervision and coordination</li> <li>• Advocate for resources mobilisation</li> <li>• Strengthen collaboration and coordination between partners</li> <li>• Coordination and collaboration of the MOH with all the heads of the laboratories at the central level.</li> <li>• dissemination of National algorithm for rapid testing</li> </ul>
	<ul style="list-style-type: none"> <li>• Rehabilitate the laboratories in need</li> <li>• Put in place QC activities at the level of the provinces and districts</li> <li>• Assure regular procurement of laboratory reagents and equipment</li> <li>• Put into place a system of refuse elimination and of prevention of</li> </ul>

Intermediate level	accidental contamination <ul style="list-style-type: none"> <li>• Organize follow up activities, supervisory and coordination activities of the operational level</li> <li>• Implement specimen referral systems</li> </ul>
Operational level	<ul style="list-style-type: none"> <li>• RDT's made available in the health centres.</li> <li>• Assure regular procurement of laboratory reagents</li> <li>• Put into place a system of refuse disposal and another for the prevention of accidental contamination</li> <li>• Organize a system for statistics collection</li> </ul>

## 7.0 KEY RECOMMENDATIONS

### 1. Laboratory policies, norms

MOH should develop laboratory policies and norms to be followed at all levels. Where guidelines exist for specific issues, they should be revised and upgraded.

### 2. Coordination mechanisms

Coordination of laboratory network should be reinforced. A Lab Technical Committee should be established to advise MOH on technical issues and coordination of all laboratories in the country. The national coordinator of laboratories should be secretary to this committee and should ensure implementation of all recommendations of the committee. The committee should form its subcommittees to address relevant problems identified by the committee.

A Technical Advisor should be hired on permanent basis for 2 years to support the head of SCL in the day-to-day implementation of the recommendations of the Lab Technical Committee.

### 3. Human resources

MOH should scale-up employing biologists and deploying them at provincial and district laboratories. Apart from training them on specific technical tasks related to ART, special emphasis should be placed on training them in QA.

MOH should develop an integrated refresher training module containing priority tests. This module should be used by all stakeholders in future refresher training sessions. This will minimise repetitive absence of lab workers from duty stations attending to multiples of refresher courses.

#### 4. Procurement

A laboratory technician should be attached to CMAM to provide technical support during procurement of laboratory needs. The person should undergo some training in procurement.

#### 5. Lab Networking and Reference Laboratories

National Reference Laboratories for the following diseases should be designated (HIV/Aids, TB, Malaria, Cholera, Meningitis, and Plague) and should plan and conduct their activities of training, specimen collection and transportation, and feedback, with the clinical laboratories unit under Medical Assistance department.

#### 6. Quality Assurance

Laboratories already involved in international EQA schemes should establish EQA links and conduct EQA with provincial and district laboratories, piecemeal. The EQA subcommittee of LTC should work out mechanisms of establishing this linkage.

LTC should develop supervision guidelines with simple performance indicators.

#### 7. Documentation and data management

LTC, working with HMIS should ensure standardisation of laboratory forms and data management tools, including computerisation and enhancing data utilisation at source. A subcommittee should be tasked to follow up the matter.

## 8. STRATEGIC INTEGRATED PLAN OF ACTION FOR LABORATORIES (2008-2012)

The previous analytical steps gave us a clear insight of the situation of the network of laboratories in Mozambique. Knowing that this is an era of expansion of activities, we identified the shortcomings, which lead us to the priority needs, which we used to formulate our objectives. These objectives and their strategies are the basis for the development of the strategic plan of action.

### **8.1 General Objective**

**To strengthen the capacity of laboratories, to support diagnosis, patient care, and prevention of disease.**

### **8.2 Specific Objectives**

There are 12 specific objectives

#### **8.2.1 Specific objective 1**

**To develop/update within a year, policies, norms and organisation with respect to laboratories.**

#### **8.2.2 Specific Objective 2**

**To reinforce coordination and collaboration between the laboratories, and stakeholders.**

#### **8.2.3 Specific Objective 3**

**To improve within 5 years the technical competence and number of laboratory technicians, technologists in the laboratories.**

#### **8.2.4 Specific Objective 4**

**To strengthen capacity for laboratory testing , and reporting of epidemic pathogens.**

#### **8.2.5 Specific Objective 5**

**Set up designated reference laboratories for Malaria, HIV, Tuberculosis and support expertise in laboratories with existing potential in a particular area**

**8.2.6 Specific Objective 6**

To improve the procurement, distribution and stock-keeping of reagents ensuring uninterrupted laboratory testing service

**8.2.7 Specific Objective 7**

To improve procurement, distribution, and maintenance system of equipment to ensure implementation of test profiles determined by MOH for each level of health care

**8.2.8 Specific Objective 8**

To construct and/or rehabilitate infrastructure while maintaining others

**8.2.9 Specific Objective 9**

To establish and maintain QA scheme that ensure provision of quality health care within 5 years.

**8.2.10 Specific Objective 10**

To promote documentation, data analysis for management, and operational research

**8.2.11 Specific Objective 11**

To ameliorate bio safety in all laboratories within 5 years.

**8.2.12 Specific objective 12**

To establish a system to monitor the implementation of this plan as well as the measurement of all input, output, process and outcomes of the plan.

## 8.3 STRATEGIES

### **8.3.1 Strategy 1**

Elaboration/updating of policies and guidelines governing laboratories.

### **8.3.2 Strategy 2**

Elaboration of the process of co ordination of reinforcement of coordination and collaboration between stakeholders and laboratories

### **8.3.3 Strategy 3**

Procedure for the increase of human capacity in quantity and in quality put in place

### **8.3.4 Strategy 4**

System of deployment of trained staff established

### **8.3.5 Strategy 5**

Elaboration of a scheme to develop the capacity of Provincial and District laboratory Technicians to enable them deliver high quality information hence creating a high sense of awareness.

### **8.3.6 Strategy 6**

Establishment of a formal and regular system of supervision

### **8.3.7 Strategy7**

Progressive designation of Reference laboratories for HIV, Malaria and TB

### **8.3.8 Strategy 8**

Procedure for official declaration of laboratories with potential expertise in certain areas determined

### **8.3.9 Strategy 9**

Procedure for the standardization of reagents, their procurement, and for their distribution established.

### **8.3.10 Strategy 10**

Standardized system of equipment procurement and distribution put in place

### **8.3.11 Strategy 11**

Procedure for signing of contract between the MOH and suppliers determined.

### **8.3.12 Strategy 12**

Procedure for Infrastructure construction/rehabilitation and their maintenance put in place

### **8.3.13 Strategy 13**

Procedure of QA put in place

### **8.3.14 Strategy 14**

System of Standardization of both paper and electronic based laboratory registers in place

### **8.3.15 Strategy 15**

A system of telephone and electronic reporting of emergency data from the rural to the department in the MOH established

### **8.2.16 Strategy 16**

Establishment of improved system of bio safety

### **8.3.17 Strategy 17**

A procedure of monitoring and evaluation of the strategic plan put in place

MOH will engage operations specialists with knowledge of the realities in the local setting to design monitoring and evaluation indicators. Reports from the QA and supervision tasks will be used for these purposes.

## **8.4 EXPECTED RESULTS**

When strategies have been clearly defined, expected results are clear.

### **8.4.1 Result 1**

Policies, norms and organisation governing laboratories developed/updated in Mozambique.

### **8.4.2 Result 2**

Activities of the different stake holders involved in laboratory activities coordinated

### **8.4.3 Result 3**

The capacity of human resources increased in quantity and in quality.

### **8.4.4 Result 4**

Trained staff deployed according to the agreement of the MOH.

### **8.4.5 Result 5**



Capacity of the Provincial and District technicians developed to deliver high quality information and to create a high sense of awareness.

**8.4.6 Result 6**

Formal and regular system of supervision instituted.

**8.4.7 Result 7**

Reference National laboratories officially designated progressively

**8.4.8 Result**

Laboratories with areas of potential expertise declared.

**8.4.9 Result 9**

Reagents standardized, their procurement and their distribution, also standardized

**8.4.10 Result 10**

Standardized system of equipment procurement and distribution

**8.4.11 Result 11**

Contract signed between suppliers of equipment and the MOH

**8.4.13 Result 12**

Infrastructure rehabilitated/constructed and maintained.

**8.4.13 Result 13**

QA in place

**8.4.15 Result 15**

Paper and electronic registers available with analysable data

**8.4.16 Result 16**

Telephone and electronic reporting of emergency data to MOH

**8.4.17 Result 17**

Bio safety improved

**8.4.18 Result 18**

Strategic plan monitored and evaluated.

## 8.5 REQUIREMENTS ALREADY IN PLACE TO ASSURE THE EXPECTED RESULTS

- Existence of a Directorate of Medical Assistance, Sector in charge of laboratories and the Directorate of National Institute of Health in the MOH, the National Immunology Laboratory and other Laboratories with expertise for TB, cholera, malaria, and meningitis.

- Existence of some competence in terms of training as well as training guides and equipment. ( MOH, National Immunology laboratory,). CDC is setting up 3 regional centres at Mavalane, XiaXia and Kilimani to train on microscopy and curative treatment of equipment. TB program runs refresher courses in three chosen provinces where 20 technicians are trained yearly. The choice of province is based on insufficiencies discovered during previous supervision.
- Presence of division in charge of equipment and reagent procurement, as well as distribution.
- Presence of a Directorate in charge of NIS
- Creation of a Directorate in charge of maintenance of medical equipment at the MOH.
- Experience of an institutions in place on QC ( National immunology laboratory, National TB laboratory)
- Experience of other institutions abroad on Quality Control (NICD, Italia, CDC,) and their collaboration with TB National laboratory, Microbiology laboratory at the University, microbiology laboratory at the central hospital, National immunology laboratory, Oceanpath private laboratory and Sant'Egidio
- Experience of some people, and institutions carrying out operational research on HIV diagnosis in children, and on viral load (National immunology Laboratory, and , resistance to anti TB treatment (CDC)
- Existence of resources for training on bio safety, laboratory management, (APHL).
- Available resources to support lab. for the monitoring of resistances (APHL through CDC)
- Intent to look for fund to train the first clinical pathologist in Mozambique ( CDC)
- Existence of some elaborated SOPs to serve as a model for the elaboration of the others ( SOPs at Mavalane laboratory, developed by CDC in collaboration with Rio university in Brazil)
- Existence of software for stock calculation in TB program that could be shared to help other programs and/or those in charge of calculating supplies in their yearly budgeting.

## 8.6 PLANNED ACTIVITIES

Implementation of a Plan is through action. Theoretical planning is transformed into activity. By carrying out the activities listed below, we get closer and closer to our expected results.

### **Strategy 1**

Procedure for the elaboration/updating of policies and norms governing laboratories put in place

**Activities:**

- Nomination of work group to elaborate norms and policies
- Workshop to elaborate and to validate norms and policies
- Production and dissemination

**Strategy 2**

Elaboration of process of reinforcement of coordination and collaboration between stakeholders and laboratories.

**Activities:**

- Establishment of committee, appointment of chair man and TOR elaborated
- Mapping of all the stake holders/partners
- Regular meeting between stakeholder/partner and technical committee to assess ongoing interventions by the former and to plan for the next steps

**Strategic orientation 3:**

Procedure for the increase of human capacity in quantity and in quality put in place

**Activities:****Pre service training:**

- Assessment of laboratory technicians, technologists, scientists and clinical pathologists in Mozambique.
- Training of at least 300 medium term technicians and of at least 200 basic technicians to be carried out in six different provinces By MOH by 2009
- Biologists trained at the university in Maputo absorbed
- Training of biologists and medical scientists abroad
- Training of first clinical pathologist in view
- Elaboration of an up to date scheme for subsequent training of lab. technologists and technologists.

**In service training:**

- TB program train's 20 technicians per year and per Province in 3 different Provinces

**Strategy 4**

System of deployment of trained staff established

**Activity:**

- Deployment of trained personnel based on the need of the laboratory and type of equipment

**Strategy 5**

Elaboration of a scheme to develop the capacity of Provincial and District laboratory technicians to deliver high quality information, hence creating a high sense of awareness.

**Activity:**

- -Training of trainers carried out . laboratory technicians trained on epidemics investigations, with emphasis on specimen handling, transport and on reporting channels t

### **Strategy 6**

Establishment of a formal and regular system of supervision

#### **Activities:**

- Workshop to develop supervision standardized tools reflecting the four levels of laboratories
- Workshop to develop epidemic-specific supervision tools
- Training on the use of supervision tools
- Production and dissemination of tools
- Institution of regular supervision

### **Strategy 7**

Progressive designation of reference laboratories for HIV, Malaria and TB

#### **Activities;**

##### **HIV**

- Official designation of national Immunology Laboratory as Reference Laboratory for HIV

##### **MALARIA**

- Assessment of national malaria laboratory and gap determined in terms of human resources, infrastructure, equipment and quality
- Budgeting
- Upgrade of human resources especially microcopist
- Training on research methodology, QA, microscopy, GLP
- Research on drug resistances
- Rehabilitation of infrastructure
- Availability of reagents and equipment
- Electronic linkage to provincial service and to the MOH
- Used as training site for Masters program

##### **TB**

- Budgeting
- Rehabilitation of laboratory following gap of previous assessment
- Extend quality assurance activities to proficiency testing and EQAS
- Recruitment of biologist, scientist and high level technologist
- Extension of electronic network within the laboratories to province and to MOH
- Analysable computerisation of all data
- Used as venue for training Masters students

### **Strategy 8**

Procedure for Official declaration of laboratories with potential expertise in place

#### **Activities:**

- Official designation as laboratory with potential expertise
- Advocacy by MOH to different stakeholders on the need to support these laboratories to enable them maintain their expertise
- Yearly evaluation by external accredited laboratory to support and to reconfirm their status

### **Strategy 9:**

Procedure for reagent standardization, procurement and distribution established.

#### **Activities:**

- Needs assessment at the different levels by laboratory heads, with backing statistics.
- Mapping of possible epidemics
- Needs at the different levels censored by heads of laboratories with backing statistics and sent to MOH
- Budgeting for all levels including emergency laboratory supplies
- Procurement committee appointed
- Appointment of senior lab technician to lab. stores
- Senior technician to crosscheck reagent specifications, including emergency laboratory supplies for each level of laboratory before the tendering process.
- Training in supply management
- Distribution overseen by personnel in lab sector of MOH with adequate knowledge.

### **Strategy 10**

Standardized system of equipment procurement and distribution in place

#### **Activities:**

- Inventory of existing equipment in present network and gap found
- Standardization of equipment brands by equipment sub committee
- Procurement of standardized equipment
- Distribution of equipment according to need and level of laboratory

### **Strategy 11**

Procedure for signing of contract between the MOH and suppliers determined.

#### **Activity:**

- Signing of documents in which all equipment follow up requirements are clearly stated..

Follow up requirements:

Present in the contract of a guarantee of at least 2 years during which the company will carry out curative treatment, and provide spare parts if necessary. Also MOH will recruit from the existing pool of technicians, a cadre of staff to be trained as preventive maintenance professionals. This training will be carried out by the supplier of equipment which should have a Representation in Mozambique.

In addition 20% of the cost of equipment shall be allocated to procurement of spare parts at time of sale. After sale contracts will be the modus operandi

### **Strategy 12**

Procedure for Infrastructure construction/rehabilitation and their maintenance put in place

#### **Activities:**

- Completion of ongoing service availability mapping and gap found
- Assessment of designated infrastructure at central and provincial level by team of engineers, MOH and infrastructure sub committee
- Assessment of designated infrastructure at district level by team of engineers, MOH, infrastructure sub committee
- Budgeting
- Meeting to select company/companies to rehabilitate/construct and agree on the terms of the contract.
- Construction/rehabilitation of designated laboratories
- Maintenance of infrastructure
- Handing over/commissioning of rehabilitated/constructed infrastructure

### **Strategy 13**

Procedure of QA put in place

#### **Activities:**

- Establishment of a multi-disciplinary QA committee including laboratory specialists will be formed by the MOH to steer the process.
- MOH will request and provide financial resources for each of the designated laboratories to identify and affiliate with internationally recognised EQAS Schemes
- MOH will form working groups of Senior Technicians and laboratory specialists to develop SOPs appropriate to each level of laboratory, To develop training guides on Proficiency testing, on the importance of in built IQC for automated procedures, on split analysis in smear microscopy.
- TOT of laboratory technicians per province
- Each area of work will be required to develop a programme for establishing EQAS, initially for simple tests, to be implemented from year 4 – 5.
- Printing and dissemination of adopted SOPs
- Pasting of SOPs in each laboratory

### **Strategy 14**

System of Standardization of both paper and electronic based laboratory registers in place

#### **Activities:**

- Workshop to develop general standardized variables per level of laboratory meant for register and also those meant for electronic input
- Standardization for variables input for diseases such as malaria, TB, HIV, and priority diseases of epidemic potential needing weekly surveillance
- Use of software such as EPI 2000 recommended in public health organizations which is free of charge and user friendly

### **Strategy 15**

A system of telephone and electronic reporting of emergency data from the rural to the designated department of the MOH established

#### **Activity**

- Telephone line linking designated department in the MOH for data management and for disease surveillance

### **Strategy 16**

Establishment of improved system of bio safety

#### **Activities:**

- Assessment on the extent of bio safety knowledge and practice in the laboratories
- Dissemination of bio safety SOPs to all laboratories
- Pasting in each laboratory.
- Measures accompanying SOPs made available (incinerator, Na hypochlorite, gloves).

### **Strategy 17**

A procedure of monitoring and evaluation of the strategic plan put in place

MOH will engage operations specialists with knowledge of the realities in the local setting to design monitoring and evaluation indicators. Reports from the QA and supervision tasks will be used for these purposes.

#### **Activities:**

Monitoring of the implementation of activities through:

- Through supervision reports
- Through quality assurance reports
- Through national information system report
- Through the epidemic reports
- Through reports on laboratory activities
- Through reports on bio safety
- Interviews with main stakeholders

Mid term evaluation, and then the final evaluation will be carried out by the MOH and by partners supporting the plan.

Evaluation will be quantitative and qualitative.

Quantitative analysis will give us insight on the extent of the implementation of programmed activities, while, qualitative analysis will give us an idea on the appreciation of laboratories by clients/patients.

## 8.7 STRUCTURES IN PLACE

The implementation of the integrated strategic plan for laboratories 2008-2012 in Mozambique will be under the MOH.

The MOH and all its directorates will work in collaboration with various committees and sub committees whose members would be determined by the Honourable Minister of health. Several committees will be set up by the Honourable Minister of health

## 8.8 FUNDING

The MOH with the support of the Stakeholders will finance the plan. Stakeholders will be advised to finance activities in the plan that are not already financed by others.

Resources should be decentralised to the different levels leading to responsibility and accountability. Financial reports will be sent to the MOH and to the Technical committee on a monthly basis.

## 8.9 MANAGEMENT AND FINANCE

National coordination will be by the MOH with all its directorates in collaboration with the committees put in place.

Reports on finance management will be sent to the MOH with a copy to the Technical committee on a monthly basis from all the laboratories. The technical committee will remain the link between the Stakeholders and the MOH, and must receive reports.

## 8.10 ROLE OF STAKEHOLDERS

They would intervene in the mobilization of resources, and in providing technical aid.



## Annexes

## KEY PEOPLE MET

Nº	NAMES	POSITION
1	EL HADI BENZERROUG	WR/MOZAMBIQUE
2	Dr. AISU THOMAS	WHO/IST/HARARE
3	Dr. NKUNKU SEBATIÃO	DPC/MOZAMBIQUE
4	Dr SANDRA MUCHANGA	NFP/HIV/MOZAMBIQUE
5	Dr EVA DE CARVALHO	NFP/MALARIA/MOZAMBIQUE
6	Dr. LUCIA LINARIS	NFP/EPI/MOZAMBIQUE
7	Dr. AMERICO ASSAN	DIRECTOR OF MEDICAL ASSISTANCE/MOH
8	Dr. FOUMANE	DIRECTOR OF NATIONAL HEALTH INSTITUTE/MOH
9	Dr. ERCILIA ALMEIDA	DIRECTOR OF NATIONAL INFORMATION SYSTEM
10	Dr. LIDIA MENDES	INCHARGE OF EPIDEMIOLOGICAL SURVEILLANCE
11	Dr. MACHONE	INCHARGE/CLINICAL LABORATORY SECTOR
12	Dr. NOEMIA MUISSA	INCHARGE/PROCUREMENT/SUPPLY/CMAM
13	Dr. MARTINHO DO CARMO DGEDGE	INCHARGE OF TRAINING/HUMAN RESOURCES/MOH
14	Dr. ALESSANDRO CAMPIONE	ADVISER/MOH
15	Dr. HELIO COSSA	STATISTICS/EPIDEMIOLOGICAL SURVEILLANCE/MOH
16	Dr. ILESH JANI	HEAD NATIONAL IMMUNOLOGY REFERENCE LAB/NHI/MOH
17	Ms. DULCE BILA	MSC MOLECULAR PATHOLOGY/NATIONAL REFERENCE IMMUNOLOGY LABORATORY
18	Dr. ELENA FOLGOSA	HEAD OF DEPT. OF BACTRIOLOGY/MODLANE FACULTY OF MEDICINE
19	Ms JOSEFA MEDO	RESEARCHER
20	Dr. ELISABETH COELHE	HEAD OF THE LABORATORY/CENTRAL HOSPITAL MAPUTO
21	Dr. PAULA SAMAUGIDO	TB/FOCAL POINT/MOH
22	Dr.MABUNDA	MALARIA/FOCAL POINT/MOH
23	Dr. ELASABETH STREAT	LSDI/REGIONAL TECH ADVISER/MALARIA INITIATIVE
24	Mr.RAMILIO MANHIQUE	LAB. TECHNICIAN/MAVALANE GEN. HOSPITAL LABORATORY
25	Dr. LISA NELSON	COUNTRY ADVISOR/CDC/MOZAMBIQUE
26	Dr. ALFREDO	SENIOR TREATMENT ADVISOR/CDC

27	Ms. JESSINA MASAMBA	LAB SPECIALIST/CDC
28	Ms SUSANA DUCRUZ	BILOGIST/MAVALANE GENERAL HOSP. LABORATORY
29	Dr. SUSANNA CEFFA	DREAM PROGRAM (SANT'EGIDIO)
30	Mr. CARLOS MACHERLERZ	DIRECTOR MILITARY HOSPITAL LAB
31	Dr. ANNA Mr CRAIG VINCE	BIOLOGISTE MILITARY HOSPITAL MANAGER OCEANPATH LABORATORY
32	Ms. ILANA KIRSZTAN	BILL CLINTON FONDATION
33	Ms. FABIANA ARIKI	BILL CLINTON FOUNDATION
34	Mr. SALAMAO JAIME MAUGATE	MEDICAL TECHNICIAN/INCHARGE/NATIONAL TB LABORATORY
35		PEMBA
36		NAMPULA
37		BEIRA
38		NAMATANDA
39	Mr FLATIEL VILANCULOS	INCHARGE/DOCUMENTATION/WHO/MOZAMBIQUE
40	Ms STELLA CAMPOS	AA/FINANCE/WHO
41	Ms PAULA NOGUEIRA	SECRETARY/WR/WHO
42	Ms LAXMIBEN PATEL	LOGISTICS OFFICER/WHO
43	Mr. ANSELMO NHACA	SECRETARY/DPC
44	Ms ANTONIADE CONCEIÇÃO	SECRETARY/EPI/WHO
45	Mr. ARLINDO AVELINO	LABORATORY TECHNICIAN MILITARY HOSPITAL
46		MONAPO
47		
48		



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Technical Group for the development of the Integrated Strategic Plan for Laboratories ( 2008-2012)

**List of members**

1	Dr Doris Forlemu	<b>Consultante/WHO</b>
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7		
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