

Assessment of Epidemiological Disease Surveillance system in

Mozambique, 13- Nov -4 Dec 2006



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Acronyms

AFP- Acute Flaccid Paralysis

ART- Anti Retroviral Therapy

BEM-PS- *Boletim Epidemiologico Mensal Dos Posto Sentinela*

BES- *Boletim Epidemiologico Semanal*

CDC- Centers for Disease Control

CSF- Cerebral spinal fluid

EPI- Extended Programme of Immunization

GHs- General hospitals

GNP- Gross National Product

HPs – Health Posts

AH5N1- Avian influenza virus type H5N1

IDSR- Integrated Disease Surveillance and Response

MOH- Ministry of Health

NGOs- Non Government Organization

MAL- Malaria

NHI- National Health Institsute

PARPA- Strategy for the reduction of poverty and promotion of economic growth (*as translated from Portuguese*)

RHs- Rural Health services

RHP-Rural Hospitals

RRTs- Rapid response Teams

QA- Quality assurance

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Executive summary

Ministry of Health, Mozambique requested WHO to provide technical support during the assessment of the epidemiological surveillance system that was conducted from 13 November to 4 December 2006.

The general objective was to assess the epidemiological surveillance system in Mozambique. The specific objectives were to:

- Assess the country's surveillance system with regard to detection, reporting, confirmation, analysis, preparedness, response and feedback on selected priority diseases;
- Review the status of functions essential for IDSR implementation in regard to human resources, training, supervision and coordination
- To review the quality of surveillance system in terms of completeness, timeliness and usefulness
- To identify key areas that need to be addressed during the preparation of the next disease surveillance strategic plan

The assessment team held teleconferences and briefing sessions with the WR Mozambique and with the senior MOH officials. Generic assessment questionnaire and the laboratory tools from WHO/AFRO were adapted to the local context and translated from English to Portuguese. There were two field teams, each with an epidemiologist, laboratory expert, data manager and a surveillance officer. A multistage sampling was used to select the study sites. Assessment was conducted in health facilities in four provinces and Maputo city.

The assessment found that, MOH gathers disease surveillance data from health facilities through BES (*Boletim Epidemiologico Semanal*) and BEM-PS (*Boletim Epidemiologico Mensal Dos Posto Sentinela*) reporting systems. BES is a weekly reporting system getting data for eleven diseases from all health facilities in the country since 1977. The priority diseases are measles, neonatal tetanus, acute flaccid paralysis (AFP), whooping cough, diarrhoea, cholera, dysentery, rabies, plague, meningococcal meningitis and malaria. The BEM-PS is a monthly sentinel reporting system-collating selected data from 3 central hospitals and 7 provincial hospitals since 1990. Selected non-communicable diseases were introduced in the BEM-PS in 2005. These were hypertension, cardiovascular accidents diabetes mellitus, trauma, asthma, and cancer.

Pathological specimen suspected cases of epidemic prone diseases are sent to provincial hospital laboratories or to the national reference laboratories for confirmation.

Epidemiological data is processed at the provincial and national level using the FOXPRO programme. This software was installed in the ministry of health disease surveillance unit in 1997 and was reviewed in 2004 to cater for the additional diseases.

Although the epidemiological surveillance system was functioning, the assessment indicated that the following areas required further strengthening: Case detection and reporting; data management and communication; epidemic preparedness and response; feedback and supervision; human resource and training; and coordination of laboratory services.

Based on the findings of the assessment, it is recommended that the following key activities should be a priority in the next plan of action:

- Revitalize Epidemic Management Committees at central, provincial and district levels
- Establish and Train Rapid Response Teams on preparedness and response at the central, and provincial and district levels
- Adapt and introduce the integrated case based and monthly reporting forms in the country's epidemiological surveillance system
- Revise and update the technical guidelines and the training manuals on epidemiological disease surveillance and response for district health workers.
- Conduct training for health personnel on disease surveillance, reporting, data management, supervision, feedback , preparedness and response
- Sensitize clinicians at hospitals on disease surveillance with emphasis on cases detection and reporting on priority diseases
- Develop a comprehensive national laboratory policy
- Train provincial labs in meningitis surveillance and provide adequate supplies
- Provide district laboratories with transport media and reagents

Epidemiological Surveillance System Assessment

Mozambique, 13 November –4 December 2006

I. Background

Mozambique 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. The country has a population of 19.7 million people (National Institute of statistics). The infant mortality rate is quite high at 124 per 1000 live births (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 government is addressing some of these inadequacies through “Plan of action for the reduction of poverty (PARPA) in Mozambique 2001-2005.

1. Health sector

The Ministry of health policy is “To provide and preserve the health of Mozambicans population, to promote the delivery of good quality and sustainable services that are accessible to all Mozambicans with equity and efficiency”

Consequently, the Health sector strategic plan (HSSP) 2001-2005 lays emphasis on health care provision, capacity building of individuals and communities and health advocacy.

During the destabilization war, the public systems and structures were consistently destroyed with health and educational institutions being affected most. The war ended in 1992 and reconstruction started in 1994 with funding from World Bank and Africa Development Bank among others partners.

Health care services in Mozambique are provided by **five** levels of health systems:

- 1) Traditional medicine and Community Health Workers: Though operating at the community level, is to some extent linked to formal service at peripheral level.
- 2) Health Post (HPs) and Health centre (HCs): This is a formal, but most peripheral level of the Health system in the country. This is a basic facility in often managed by one health worker who has elementary or basic health training. The facility offers curative and immunization services during normal official working hours.
- 3) Rural and General Hospital (RHs and GHs): This level provides essential preventive care, medical, surgical, maternity services and laboratory services. A medical officer manages the facility and an epidemiological surveillance (vigilante epidemiological) officer is usually located at the facility.
- 4) Provincial Hospital (PHs): This level receives referrals from the rural and general hospitals. The provincial hospitals are quite well equipped tertiary health care institutions. They provide comprehensive care just like district

hospitals but in addition provide learning facilities for medical training institutions.

- 5) Central and specialised Hospitals (CHs): These are located in Maputo, Beira and Nampula. They serve as referral centres for the population within their catchment areas.

1.1 Disease surveillance system

In 1979, the MOH created the epidemiological surveillance system with a long list of diseases to be reported by all health facilities. In 1985, the system was revised with the establishment of two sub-systems known as BES and BEM-PS.

The BES is the weekly epidemiological report by all health facilities. It includes epidemic prone diseases and diseases of national importance such as measles, neonatal tetanus, AFP, whooping cough, diarrhoea, cholera, dysentery, rabies, plague , Meningococcal meningitis and malaria.

The BEM-PS (Boletim Posto Sentinela) is a sentinel surveillance of a limited number of diseases by central (3) and provincial hospitals (7) reporting monthly. To reinforce the surveillance system the reporting of monthly summary of data on hospitalisations in rural hospitals and HCs was started in 1990. In 2001, the country conducted the first assessment of the surveillance system and in 2005 the non -communicable diseases (Hypertension, cardiovascular accidents diabetes mellitus, trauma, asthma, and cancer), were introduced in the sentinel reporting system or better known as the BEM-PS.

2. Major health problems

The major cause of morbidity and mortality in the country is malaria, HIV/Aids, tuberculosis, respiratory infections, diarrhoea, measles and meningitis. The country is vulnerable to disasters due to cyclones, floods and other times drought. There have been frequent outbreaks of cholera, dysentery, meningococcal and meningitis. Sporadic outbreaks of plague have occurred in the country. Surveillance reports indicate that non-communicable diseases, particularly cardiovascular diseases, diabetes and injuries are on the rise.

3. Justification for the assessment

In June 2001, an assessment of the epidemiological surveillance system was conducted in Mozambique and 5-year plan was developed. The generic technical guidelines on integrated disease surveillance were adapted to the national context. In 2003, IDSR core indicators were field-tested in the country. Currently, the Ministry of Health is in the process of restructuring. The Health Information System (HIS) that is under the Planning and Cooperation department will be placed at the National Health Institute. The Disease Surveillance Unit will be operating within the Health Information Department by March 2007. Relevant subsystems will be located in the division namely nutrition and epidemiological surveillance, information system related to performance of essential interventions, human resource finance and medicine. The assessment of the epidemiological surveillance system was to provide background information for the development of five-year plan on disease surveillance in the new context. Thereafter, the next missions will assist in updating the national disease surveillance guidelines to

include community participation and International Health Regulation(2005). The training manuals will be updated to help health personnel implement integrated disease surveillance.

4. Objectives

4.1 General objective

To assess the epidemiological surveillance system in Mozambique

4.2 Specific objectives

5.2.1 To assess the country's surveillance system (with regard to detection, reporting, confirmation, analysis, preparedness, response and feedback on selected priority diseases)

5.2.2 To review the status of functions essential for IDSR implementation. (Human Resources, Training, Supervision, coordination)

5.2.3 To review the quality of surveillance system (completeness, timeliness, usefulness)

5.2.4 To identify key areas that need to be addressed during the next disease surveillance strategic plan

5.0 Methodology

5.1 Site selection

Multistage sampling was used to select the study sites.

One province out of the 3 provinces that were assessed during the assessment of the epidemiological system in 2001 was selected. In this case, it was Zambezia province.

Three other provinces out of the remaining seven provinces picked through simple random sampling. Maputo city was included to take care of the urban complexities.

At the second stage, two districts were randomly selected in each province and thereafter four health facilities were randomly selected in each district. There were first stratified

for ownership NGOs vs. Govt and by type (Health Post, Health center, and Hospital) before the final selection. Only two private not for profit health facilities were in the sample and both were reporting to the ministry of health.

5.2 Preparations for the assessment

The team held briefing sessions with the WR and WCO team, the staff in the epidemiological surveillance department and senior MOH programme managers including the advisor to the Minister of Health.

The process, scope and content of the assessment were discussed. The WHO/AFRO generic assessment questionnaire and the laboratory tool were adapted and then translated from English to Portuguese. The tool was field tested in Maputo and revised accordingly.

5.3 Field assessment

Two teams made up of epidemiologists, laboratory experts, surveillance officers and data managers from WHO and MOH were dispatched. The teams assessed Gaza, Sofala, Zambezia, Maputo provinces and Maputo city.

Table 1: Health facilities visited during the Assessment

Province	Districts	Health facilities
Zambézia	Ile	Palane; Socone; Mulevala; Ile;
	Mapeia	Lua-Lua; Gulamo; Chimuara; Mopeia
	Quelimane	Quelimane Provincial Hospital
Sofala	Machanga	Chinhuque; Divinhe; Machanga
	Buzi	Buzi rural hospital, Sofala; Grudja;
	Beira	Beira Central Hospital
Gaza	Mabalane	Mabalane; Combomune; Pfukwe; Mabomo
	Macia	Macia; Massano; Mazivila; Ulombe
	Xai-Xai	Xai-Xai Provincial Hospital
Maputo Province	Boane	Boane; Matola Rio; Capuene
	Maracuene	Marracuene; Matalane; Eduardo Mondlane; Momeno
Maputo city	Mavalane	Mavalane general hospital; Polana caniço; 1 st Maio; Albazine

6. Finding of the assessment

The findings were compiled from analysis of the data gathered by the assessment teams. This was through interviewing surveillance focal persons at various levels of the health system, including observations and discussions with key informants. Generally the current epidemiological surveillance system was found to be functioning at the district, provincial and central levels. However, in some areas the quality of information generated needs improvement. Laboratory confirmed epidemic pathogens were not timely reported. The epidemiological data was not being collected, analyzed or reported on time. Inadequate coordination and supervision of the surveillance activities could have contributed to some of these shortcomings. Below are some the major findings of the assessment.

7. Co-ordination of epidemiological surveillance

Epidemiological surveillance unit is in the Epidemiology department with other units (HIV/AIDS, Malaria, and Tuberculosis). It is headed by a Focal Point for Surveillance. Internally the unit participates in the quarterly meetings of the epidemiology department, as evidenced by minutes of a meeting of 23rd October 2006. Surveillance activities were reflected in the 5-Year National Health Strategic Plan (2001-2006) and in the MOH annual work plans. A new organisational structure of MOH places surveillance in the HIS, which is meant to collect, analyse, interpret and disseminate health related information. The response will be under the director in charge of disease prevention and control.

At present, surveillance advisory or epidemic management committee at MOH and lower levels are inactive. These committees plays an important role in formulating policies related to various aspects of IDS, advising top management on technical and organisational issues.

Of the 4 provinces surveyed, all had one officer dedicated to surveillance, but there were no provincial or district surveillance committee.

8. Assessment of core surveillance and response functions

8.1 Case detection

In order to detect cases of priority diseases, health workers require adequate training on clinical diagnosis and be equipped with appropriate case definitions. The MOH has distributed disease specific case definitions for use by the health facility staff. When asked to name the priority diseases in Mozambique, over 50% of the respondents mentioned malaria, measles, diarrhea, dysentery, and cholera. A few others mentioned rabies, HIV/AIDS, TB and leprosy . Surprisingly, none mentioned plague or meningococcal meningitis. The assessment found that only 34.8 % of the health facilities had national epidemiological disease surveillance guidelines. These guidelines contain case definitions for priority diseases. No health facility had a logbook to record reports of rumours of outbreaks. 77% of the districts said that they had a mechanism to capture information on outbreaks from the community. This is mainly through community health workers and volunteers.

Only four (8.7%) of the health facilities reported shortage of weekly and monthly reporting in the last 12 months.

8.2 Case confirmation

Except for plague, and leprosy, the surveyed provincial hospitals have capacity to confirm by culture, cases of selected priority diseases. District hospitals are unable to perform culture for cholera, dysentery, meningitis, typhoid, and other common bacteria, including TB. Rapid diagnostic kits for meningitis were not available. At the district level specimens could be collected and transported to provincial labs. In Quelimane provincial labs, 3 districts had submitted 8 stool specimens for cholera confirmation during the week of the survey. 3 were confirmed *Vibrio cholerae*. At the health facility level, lack of appropriate specimen containers, lack of transport media, and lack of skills to collect specimens such as CSF implies that higher levels must be called upon in case of suspected outbreaks. Although no outbreaks have been reported in the past 12 months, but by the case definition, the 3 isolates above confirm an outbreak of cholera.

8.3 Case registration and Reporting

Registration and reporting of priority diseases is important in surveillance. All the health facilities visited had an outpatient register and inpatient register (where appropriate) for recording cases. Data on selected diseases was then extracted and reported to the next level. Many cases reported to BES did not tally with those on the register putting in doubt the quality of reporting (see table 3). For example, the team counted the number of malaria cases in all the registers facility and compared the number to those found in the BES reports as an indicator of data quality. The reasons for these differences were varied, from clerical errors to the extreme of approximating that half of the out patient cases must be due to malaria (seen in Mavalane General Hospital). The largest difference,

proportionally, between registered cases and BES reported cases were in the hospitals rather than in health center and posts.

In one health facility (Xai Xai provincial hospital)) we found laboratory confirmed cases of meningococcal meningitis that were in the inpatients ward register but were not reported to the surveillance focal person in the district or province nor were the cases reported in the BES.

Table 2: Case registration (Malaria registration and reporting last one month)

Level	# Of cases Registered	# Of cases reported (BES)	Difference	Percentage
Central Hospital	648	860	212	32.7%
Provincial Hospital	910	2483	1573	172.8%
Rural/General Hospital	2610	7331	4721	180.2%
District Hospital	4769	5226	457	9.6%
Peripheral health facility	6878	5998	-880	-12.8%

Three types of reports are generated namely; Weekly epidemiological reports (BES), Monthly reports for selected non communicable diseases (Hypertension, diabetes, trauma , cardiovascular accidents etc..) and quarterly reporting for Tuberculosis, Leprosy and Malaria sentinel sites.

Weekly epidemiological report, (Bulletin epidemiological surveillance or BES), The BES contains information on eleven selected epidemic prone diseases such as measles, AFP, neonatal tetanus, malaria, plague, rabies, meningococcal meningitis, dysentery, cholera, diarrhea, and pneumonia.

There diseases that had case- based reporting forms were Acute Flaccid Paralysis (AFP), Neonatal Tetanus, and measles. There were no case based reporting forms for Cholera, meningococcal meningitis and plague.

Table 3: Weekly surveillance data (BES) completeness and timeliness of reporting to the next level

Type of facility	# Facilities	Completeness (%)	Timeliness (%)
Provincial Hospital	2	96.7	50.0
Rural/General Hospital	2	97.8	100.0
District Health facility	9	94.7	77.7
Peripheral Health facility	23	92.5	52.1
District Health directorate	9	94.2	89
Prov. Health directorate	4	99.2	50

The respondents (14) who did not report on time gave various reasons for their failure.

These were communication problems (28 %), multiple responsibilities (14.2%), shortage of budget (7.1%) and other reasons (50%).

The Government supported by European Commission is strengthening communication in areas without electricity, for example Gaza province, by introducing solar powered radios. These systems in turn require regular maintenance. We found one health facility without radio communication for the last 3 months due to a defective battery. The assessment team appreciated the innovativeness of some of the health personnel. For example, one health worker set up an antenna to boost the reception of his cellular telephone to enable him maintain communication with the referral hospital.

8.4 Data analysis and management

The integrated disease surveillance strategy recommends that data collected should be analyzed and used for action. The assessment found that very little analysis of epidemiological data is done at the health center (34.8%) or district health facility (22.2%). Those found were mainly for vaccine preventable diseases. The reasons given by health facility staff for not drawing graphs were: Lack of knowledge (6) lack time (1) and not important (10). Surprisingly, 26.3% of the health facilities that had national epidemiological surveillance guidelines did not display any graphs compared to 38.8% who did not have the guidelines. Of the 12 health facilities that had evidence of graphs, 36.7% had pre service training on epidemiology and disease surveillance compared to 14% who had no such training. 39.1% of these focal points who had graphs displayed had in service training on disease surveillance compared to 27.3% who did not have graphs.

Table 4: Presence of epidemic curves or line graphs (observed)

Health facilities	# Respondents	Evidence of graph	Percentage
Central Hospital	1	0	0%
Provincial Hospital	2	2	100%
Rural/General Hospital	2	0	0%
District Health facility	9	2	22.2%
Peripheral Health facility	23	8	34.8%
Total health facilities	37	12	37.8%
District h. directorate	9	6	66.7%
Provincial health directorate	4	4	100%

All the four Provincial health directorates had computers for data management but only three out of the nine (33.3%) visited district health directorates had computers. All the

peripheral health facilities were recording and processing (where this was done) their data manually

Knowledge of epidemic thresholds of priority diseases is essential for health personnel to recognize and respond to an epidemic. For example the country's threshold for polio (AFP) cholera, meningococcal meningitis, plague is one case and for measles it is 3 confirmed case or 5 suspected cases per month in a district with an estimated population of 100 000 people.

Table 5: Correct knowledge of epidemic threshold for selected priority diseases

Disease	Central Hospital Provincial/Rural/Geral (5)		District Health facility (9)		Peripheral Health facility (23)	
1. AFP	3	60%	7	77.8%	5	21.7%
2. Measles	1	20.0%	4	44.4%	2	8.7%
3. Cholera	3	60.0%	6	66.6%	7	30.4%
4. Meningitis	0	0.0%	0	0.0%	0	0.0%

All the provinces sampled had computers for data management but only 33% of districts had computers and software for use during the surveillance data analysis.

8.5. Epidemic preparedness and Response

Mozambique is a country that faces natural catastrophe from cyclones, floods and drought, this makes the population vulnerable from water borne and drought related disease outbreaks from cholera, dysentery, and meningococcal meningitis among others. It is therefore necessary for the health system to prepare for these regular occurrences. Case based reporting forms found in the health facilities were only for AFP, measles and neonatal tetanus. None of the facilities had a logbook for recording rumours of disease

epidemics or unusual events reports by the community 51.3% of health facilities had guidelines on epidemic management.

Epidemic management committees should provide guidance and mobilize resources during outbreaks. On the other hand the rapid response teams are the fire fighters during disease outbreaks. Therefore both should be part of an epidemic preparedness plan.

50 % of the provinces and 77.8 % of the districts said that they had epidemic management committees but only 22.2% of the provinces and 11.1 % of the districts could produce minutes of the committees meetings. Most of the meeting were said to be ad hoc. None of the districts and provinces had a structured Rapid Response Team (RRTs). None of the districts had reported a major diseases outbreak in the last 12 months.

8.6 Feedback

Giving feedback is one of the ways to motivate staff. This also serves as an assurance that what they are doing is appropriate and is being continuously monitored. It is recommended that feedback be provided at all levels. 50 % of the provinces provided written feedback in form of bulletin to the districts in the last 12 months. The feedback was in form of summaries of reports from BES. No districts provided written feedback epidemiological surveillance to the health facilities.

81% of the respondents were satisfied with the performance epidemiological surveillance.

Table 6: Satisfaction with the Performance of epidemiological surveillance

Type of facility	# Respondents	Satisfied	Not satisfied	Not applicable
Central Hospital	1	100%		
Provincial Hospital	2	100%		
Rural/General Hospital	2	100%		
District Health facility	9	66.7%	33.3%	
Peripheral Health facility	23	82.6%	8.7%	8.7%
Total	37	81.1%	13.5%	5.4%

When asked how the disease surveillance implementation could be improved 30 (40.5%) of the respondents mentioned training, four (5.4%) mentioned supervision and the same number proposed increasing the staff and providing manuals.

Table 7: How can Disease surveillance implementation be improved?

Type of facility	# Respondents	Training	Supervision	Manuals	Increase staff (HR)	Not applicable
Central Hospital	1	1				
Provincial Hospital	2	1			1	
Rural/General Hospital	2					2
District Health facility	9	3	1			5
Peripheral Health facility	23	10	1	2	1	9
Total	37	15	2	2	2	16

9.0 Assessment of core support functions for the surveillance system

9.1 Supervision

Support supervisory visits are very crucial especially for the staff. It is an opportunity to orient health staff on new developments and reinforce good practices. The interaction motivates the staff and builds their capability. 55.5 % of the districts and 54.5 % of the peripheral health facilities had at least one supervisory visit from a surveillance supervisor in the last 12 months. Similarly, 88.9% of the districts and 82.6 % peripheral health facilities had received a supervisory visit from a higher level.

No checklists were available or used during the supervisory visits.

Various reasons were given for the inability to conduct supervision visits to the lower levels the main ones were that there were no vehicles dedicated for surveillance activities but pool transport is provided on request but the process takes a long time and depends on the availability of the vehicle.

9.2 Human resources

The following cadres of staff were focal persons or acting as focal persons for disease surveillance at the various levels. Most of the category health facilities were grossly understaffed some had only one trained staff conducting surveillance among other duties.

Respondents /surveillance focal person by level of training

Table 8: Respondents / surveillance focal persons by level of education and health facility

Level	#of respondents	Central Hospital	Provincial Hospital	Rural/General Hospital	District Hospital	Peripheral health facility
1. University	1	0	1	0	0	0
2. Medium	7	1	1	2	3	0
3. Basic	0	0	0	0	6	17
4. Elementar	0	0	0	0	0	6

9.3 Training

In order to perform efficiently surveillance focal person needs to have some basic epidemiological knowledge. Most of the health personnel providing services at the peripheral health facilities have basic or elementary training .Out of the # 23 respondents at the peripheral health centre, 56.5% had pre-service training on Epidemiology, and only 17.3% have had training on data management and on epidemic management.

Table 9: Previous training on disease surveillance, data management and epidemic

Type of facility	# Respondents	Epidemiology	Data management	Epidemic management
1	1	100%	100%	100%
2	2	50%	100%	0.0%
3	2	100%	50%	50%
4	9	66.7%	22.2%	22.2%
5	23	56.5%	17.3%	17.3%

¹Central Hospital, ²Provincial Hospital, ³Rural/ General Hospital, ⁴Distrital Hospital, ⁵ Peripheral health facility

Health directorates	# Respondents	Epidemiology	Data management	Epidemic management
District directorate	9	100%	44.4%	44.4%
Province. h. directorate	4	100%	50%	50%

* One questionnaire missed data (zambézia province)

9.4 Communication

Good communication is essential for the surveillance system to be effective.

However, the country is very vast and terrain is challenging, therefore communication is poor in some provinces. BES reports are sent from health facilities not only by post but also by telephone, radio call and even through cell phones by text messaging (SMS).

Table 9: Communication facilities

Level	Telephone service	Cell phone	Fax	Radio call	Internet/email
Province health directorate (4)	100%	100%	100%	100%	100%
District health directorate (9)	55.5%	22.9%	22.9%	33.3%	0%

9.5. Budget

100% of the respondents in provincial and 55.6% of the districts directorates said they had budget for disease surveillance. Their main concern is that the process of accessing the funds is rather long.

10. Laboratory

10.1 Structure of Laboratory Services in Mozambique

In Mozambique, over 90% of laboratory services are under the Ministry of Health and offer diagnostic services for patient management at four levels of the Health System - from lowest at Health Centre, rural and /or District hospitals, provincial hospital and the highest being four specialised Central laboratories.

10.2 Coordination of laboratory services

Laboratory services are coordinated from the Medical Assistance Department unit of the MOH. The unit deals with support issues, including laboratory matters. Commendable efforts have gone into supporting scaling up of ART in the country, and the provincial laboratories visited were equipped to perform haematological, renal and liver function tests for monitoring patients on ART. However, it was reported and observed that coordination of laboratory services for surveillance and epidemic response needs improvement. The Microbiology Reference Laboratory at Maputo Central Hospital acting as the focal point for bacterial pathogens of meningitis, the University Department of Microbiology which acts as a Reference lab for cholera dysentery, STDs (following MOU signed many years back), and the central lab unit had not met in the last 1 year. Respondents expressed need for clarity on source of resources to implement surveillance and epidemic lab investigations (training, reagents, referral of specimens, reporting, etc). The NHI also has TB and MAL labs that conduct specifically QA for these programs.

The lack of laboratory coordination for EPR is reflected also at lower levels. Of the 16 labs in the survey, 13 knew whom to inform in case of laboratory identification of epidemic pathogens; however in one provincial lab after confirmation of *Vibrio cholerae*, results had to wait for collection by the provincial surveillance officer in order to reach the requesting district and eventually to the health facility. In the central laboratory, more than 5 cases of *N. meningitidis* were isolated but not reported to the epidemiology department of MOH.

10.3 Resources

The mission was impressed that financial resources are available, both from national coffers and from development partners. This is evident from the number of new and state of the art equipment found in the districts and provinces for the support of ART.

10.4 Human Resource, Training and Skills

At lower levels, labs were staffed with 1 to 2 lab workers. Most of these workers had basic education, with very few having completed intermediate level of education. The provincial lab staff have intermediate, and with one a university graduate. Thus, while laboratory equipment for support of ART, there remains a serious shortage of adequately educated and skilled human resource to use the infrastructure.

10.5 Laboratory Involvement in Epidemic Surveillance and Response to Outbreaks

10 out of the 16 surveyed labs were part of rapid response teams, but they did not have list of referral labs or clear mechanisms/guidelines to rapidly refer specimens. There were no guidelines on procedures (technical or reporting) to follow in case of outbreaks.

10.6 Reporting, Dissemination of Information, and Feedback within the System

Laboratory registers and data were available in all the labs. However, it is not reported regularly to the next level. Consequently, there is even no feedback from the higher levels.

Positive cultures of potentially epidemic pathogens are not promptly reported. For example in one province, 2 cultures of *Vibrio cholerae* were confirmed in Zambezia provincial lab, with another 5 pending confirmation, all originating from 3 different districts, during the morning of assessment team visit to this lab. The lab director reported that the recognised routine is to report such results to surveillance officer of the hospital (who is supposed to visit the lab every day). The results are then reported to the district/provincial epidemiology unit, which will in turn report to the epidemiology units of the concerned districtsuntil the information reaches the clinic/requesting clinician/health care worker. There is a lot of delay for the health facility to receive important information. At Central Hospital laboratory, more than five cases of *N. meningitidis* were isolated in 2006 but they do not appear in BES. Going by the MOH thresholds, there was an outbreak of meningitis. These examples show that there is therefore a gap between lab and epidemiology units. This gap needs to be closed.

10.7 Quality Control

Internal QC during performance of tests was conducted by --- out of the labs surveyed. Only TB program conducts nationwide QA scheme, in this case proficiency testing by re-examination of ZN smears. Results for one province showed that for 1st Q of 2006, out of 17 districts, and a total of 357 slides reviewed, 6 districts false positive slides and only 1

had false negative slide. Discordance ranged from 8% - 45%, indicating need for close supervision and retraining of technicians. The needs for these interventions are generally even more regarding cultures and identification of epidemic pathogens.

10.8 Availability of Essential Equipment and utilities

The surveyed labs had basic equipment sputum, blood and stool for microscopy.

Provincial labs and some district labs were recently equipped to be able to perform tests for monitoring ART. Basic bacteriology culture equipment is also available in these laboratories. However, standardisation of equipment is advisable. A national committee could be formed to address this issue.

II. Discussions and recommendations

Based on the on the findings of the assessment and taking into consideration the need to strengthen epidemiological surveillance and response in the country, the following is recommended:

1. Surveillance and response

1.1 Case detection and reporting

The national technical guidelines on epidemiological surveillance were finalized and disseminated in 2004, but since then new local and global health issues have arisen that need to be addressed.

1.1.1 Recommendation

Revise and update National Guideline and the training materials taking into consideration new and re emerging diseases. Include avian influenza H5N1 and all public health emergencies of international concern as outlined in the International health regulations (2005).

Currently only measles, neonatal tetanus and acute flaccid paralysis have case based reporting forms used for immediate notification. Other diseases of epidemic potential such as cholera, meningococcal meningitis, plague, viral Haemorrhagic fevers and possibly avian influenza H5N1 do not have case based reporting forms. There is a generic reporting form developed by WHO/AFRO that can be adapted and used by the country. This form should be completed and sent immediately by the quickest means to the next level in case of a suspected cases of epidemic prone diseases. The

advantage in using this form is that it can be used for all the above-mentioned diseases rather than stockpiling separate forms for each condition. The dispatch of the forms should be preceded by a telephoning call, radio call, text message or whatever medium of immediate communication is available in the locality.

All health workers especially clinicians should be trained (or sensitized to minimize the cost) on how to detect and report on selected priority diseases.

1.1.2 Recommendation

- Adapt and introduce the integrated disease case based reporting form for epidemic prone diseases to health facilities.*
- Conduct training/sensitization of clinicians on case detection and reporting on priority diseases*

Collection, analysis and reporting of surveillance data for action is very important. Some information should be acted upon immediately therefore sent using the case based reporting form as recommended above. The current weekly BES reporting system is very important and should be retained but the quality of the data should be verified through regular supportive supervision and training of the staff. The remaining diseases of national importance should be reported by all health facilities using a monthly reporting form.

1.1.3 Recommendation

Adapt and introduce the WHO/AFRO-recommended integrated surveillance monthly form for diseases of public health importance nationwide in Mozambique. This includes <5 year old outpatient and in-patient malaria,

diarrhoea, and pneumonia cases. Other selected diseases of national public health importance such hypertension, diabetes, trauma etc. could be included in this form.

1.2 Data analysis, management and communication

The assessment showed epidemiological data is hardly analyzed at the peripheral health facility level. The peripheral staff should be able to manually organize, summarize and display data in tables and graphs as appropriate. Those in the district and provincial directorates should be able to manually and electronically (using computers) manage surveillance data.

1.2.1 Recommendation

- Conduct training on disease surveillance and response at the provincial district and health facility levels.*
- Strengthen supervision at all levels to ensure that health workers acquire and retain the necessary skills*

The MOH is buying more than one hundred and forty computers, one for every district in the country. These are essential tools for data management. Therefore, all the relevant staff should know how to maintain and use computers effectively. Should the MOH decide to use an adapted integrated disease surveillance monthly form, WHO/AFRO and CDC can provide a computer module, adapted to the Mozambique version of the monthly reporting form to be used at district, provincial or national level. They also will provide

training for three HMIS persons to be able to trouble-shoot and make changes to the system

1.2.2 Recommendation

-Train health personnel on data management at the provincial and district directorates using the appropriate software.

-Install user-friendly soft ware e.g. EPI INFO for data management at the central, provincial and district level

The assessment team saw much innovativeness by health workers who were trying to send the epidemiological data urgently from the periphery level to district and provincial levels. A more detailed analysis should be made to maximize and strengthen the use of any locally available communication media such as solar powered radios, short text messages (SMS) and internet facilities where possible.

1.2.3 Recommendation

- Identify and strengthen the various media (telephone, radio, SMS, internet) available for timely transmission of data in order to ensure early intervention

- Refund of limited amount of money spent to buy airtime to enable those sending urgent reports through text messages personal cell phones. This should be included in the district plans.

1.3 Epidemic preparedness and response

Epidemic management committees where available were only meeting during epidemics i.e. ad hoc and in most case there were no records of their meetings. There are no obvious selection criteria for membership or how frequent the meetings should be held.

1.3.1 Recommendation

- Revitalize these committees at central, provincial and district levels by providing guidelines for their operations.*
- Provide guidance on membership and the regularity of the meetings.*

Rapid Response Teams (RRTs) are the technical arm of the Epidemic management committees. These were not operational at all levels and therefore need to be reactivated. WHO/AFRO has generic training materials that has proposed membership, roles and responsibilities , Preparedness and response to epidemics and can be adapted to train the RRT teams.

1.3.2 Recommendation

- Establish and make operational RRTs at central, provincial and district levels.*
- Conduct training for national, provincial and district Rapid Response Teams*

1.4 Feedback

There is no feedback from the districts directorates to peripheral health facilities. Now this is possible when the computers are installed and health personnel are trained at the district level.

1.4.1 Recommendation

-The surveillance focal persons at the province and district directorates should ensure regular transmission of feedback bulletins to the health facilities

1.5 Supervision

Supervisory visits by surveillance focal persons to all levels were found to be irregular and few. This should be reviewed to ensure that whoever goes to the facility can also assess the performance of the staff and advise accordingly.

1.5.1 Recommendation

- Initiate regular supportive supervision using a checklist for the supervisors at the district and provincial levels.*
- A Supervisor should visit each health facility at the least twice every year.*
- The district and provincial supervisors should be informed of any new disease specific or programmatic guidelines to make them effective in their roles (for example case definitions, reporting formats, disease control guidelines etc)*

1.6 Human resource and training

The assessment team noted an acute shortage of health workers at all levels of the health system, but the Government is addressing this issue through pre service and in service training.

1.6.1 Recommendation

- Conduct in- service training of health workers on disease surveillance and response using appropriate training materials should be conducted*

1.7 Co-ordination

The assessment team learnt that disease surveillance would be under Health Information System directorate and response aspect in diseases prevention and control directorate. It is important to ensure that data collected is used for action.

1.6.1 Recommendation

-Establish a forum with regular scheduled meetings between the directorates (HIS, laboratory, disease prevention and control) to discuss disease surveillance and response issues.

1.8 laboratory

Coordination of laboratory services was found to be weak at all levels.

1.8.1 Recommendation

-Conduct a needs assessment of equipment, infrastructure, human resources, tasks and laboratory tests, within the context of Mozambique disease burden in order to strengthen the operations and linkages between health facility and national reference laboratories.

-Develop a national laboratory policy, including public health aspects.

There were no standard reporting formats, delays in reporting of results, no compilation or data analysis of laboratory data for surveillance purposes.

1.8.2 Recommendation

The head of laboratory services in the MOH, with support of epidemiology surveillance unit colleagues, should initiate and coordinate adaptation of

laboratory technical procedures in the context of Mozambique. These should include procedures for reporting analysis and dissemination of relevant laboratory data that are useful for surveillance of priority pathogens.

Meningitis outbreaks occur in Mozambique. Isolates of *Neisseria meningitidis* are frequently seen at the central hospital, Maputo. *Hemophilus influenza* type B is not well documented in Mozambique although EPI is conducting surveillance for paediatric Hib meningitis at the central hospital and laboratory. Hib is preventable.

1.8.3 Recommendation

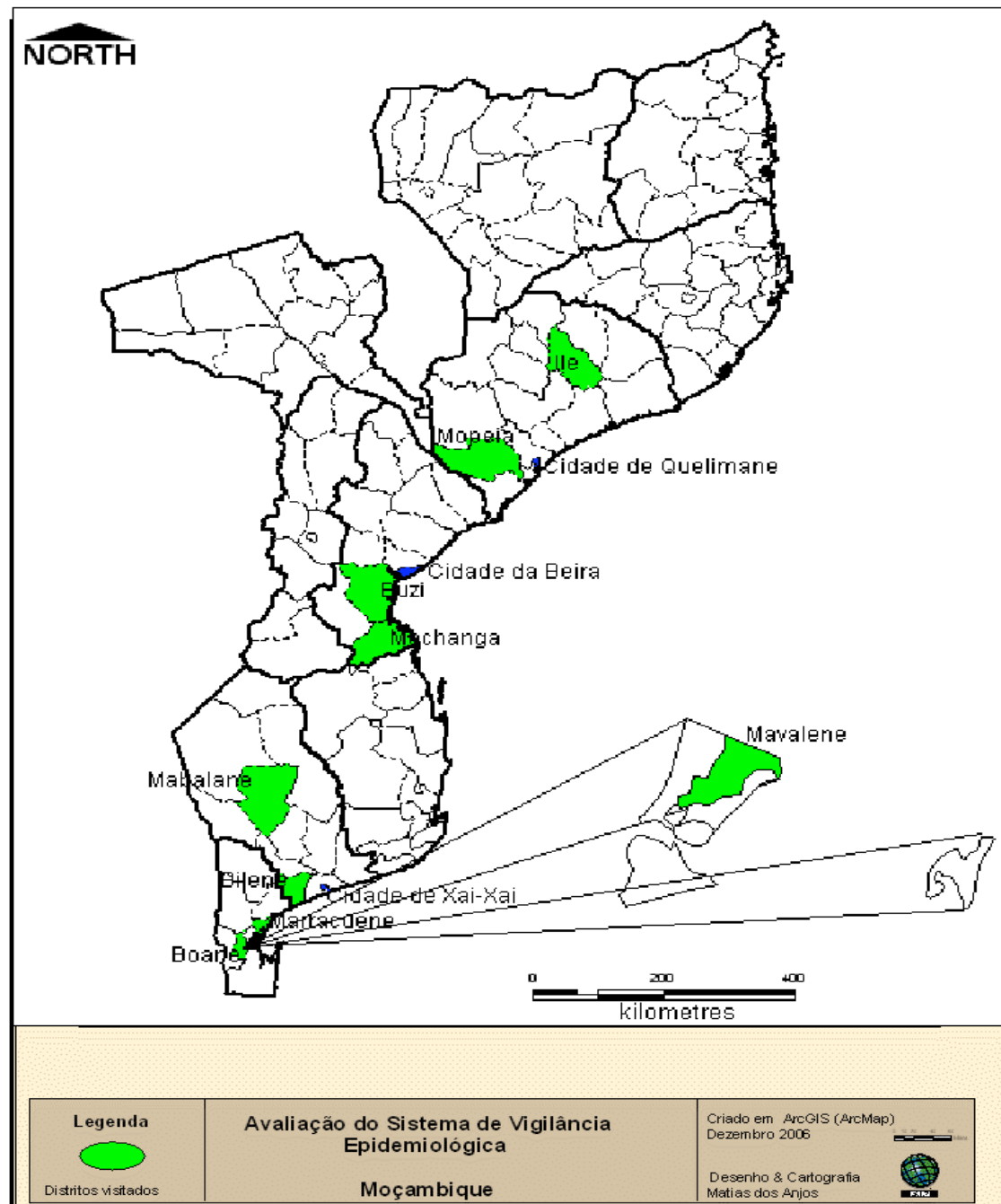
-1 or 2 Provincial hospital laboratories that are within the epidemic prone area should be trained and supplied with necessary tools by EPI and MOH for setting up enhanced surveillance of meningitis, including paediatric Hib meningitis.

III. Next Steps

Based on the findings of the assessment, it is recommended that the following key activities should be a priority in the next plan of action

- Revitalize Epidemic management committees at central, provincial and district levels
- Establish and Train Rapid Response Teams on preparedness and response at central, provincial and district levels
- Adapt and introduce the case based and monthly reporting forms in the countries health surveillance system
- Revise and update the technical guidelines and the training manuals for district health workers.
- Conduct training for health personnel on disease surveillance, reporting, data management, preparedness and response
- Sensitize clinicians at hospitals on disease surveillance with emphasis on cases detection and reporting on priority diseases
- Develop a comprehensive national laboratory policy
- Train provincial labs in meningitis surveillance and provide adequate supplies
- Provide district laboratories with transport media and reagents

Annex 1: Sites visited during the epidemiological assessment



Annex 2:

List of Participants to the Debriefing by the Epidemiological Assessment Team, 4 December 2006

MOH conference room

9. Prof Helder Martins (Advisor to the Minister for Health)
10. Dr Alfredo Mac Arthur (Head Epidemiology dept)
11. Dra Ercilia Almeida (Head Health information system)
12. Dra Lidia Mendez (Epidemiologist)
13. Mr Jose Chivale (Epidemiological Surveillance)
14. Dra Alzira Mabote (Bilogist-Data manager)
15. Dr Machone (Head of laboratory unit)
16. Dra Elena Folgosa (Head Department microbiology , Eduardo Mondlane University Medical school)
17. Dra Elizabeth Coelho (Head laboratory Central hospital Maputo)
18. Dra Daisy Trovoadá (Acting Disease Prevention and Control officer, WHO)
19. Dra Lucia Linares (EPI WHO)
20. Mr Matias dos Anjos (Data manager WHO)
21. Dra Eva Carvoella (WHO malaria)
22. Dr Mac Otten (CDC)
23. Dr Thomas Aisu (WHO/CSR- Inter-county Support Team, Eastern and Southern Africa)
24. Dr Peter Gaturuku (WHO/ AFRO -CSR/ Training and Research unit)

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3. Dra Lucia Linares (EPI WHO)
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