Evaluation of the cholera surveillance system in Guinea Bissau

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Acknowledgements

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We declare that we have no conflict of interest.
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<thead>
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<th>Full Form</th>
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<tr>
<td>CHU</td>
<td>Community Health Units</td>
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<td>CHW</td>
<td>Community Health Worker</td>
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<td>DGPPS</td>
<td>General Direction of Prevention and Health Promotion</td>
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<td>ERR</td>
<td>Equipas de Resposta Rápida para as Emergencias em Saude (Rapid response teams for health emergencies)</td>
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<tr>
<td>HBU</td>
<td>Health Base Units</td>
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<tr>
<td>INASA</td>
<td>Instituto Nacional de Saúde Pública (National Institute of Public Health)</td>
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<td>LNNSP</td>
<td>National Public Health Laboratory</td>
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<td>MPH</td>
<td>Ministry of Public Health</td>
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<tr>
<td>SAB</td>
<td>Sector Autonómo de Bissau</td>
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<td>WHO-AFRO</td>
<td>World Health Organization-Regional Office for Africa</td>
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1 Summary

Background

Cholera is an endemic disease in Guinea Bissau and cholera outbreaks occur with interepidemic periods of different length. The national cholera surveillance system is crucial for a rapid detection of cholera cases and prompt detection of outbreaks that will enable a quick control of the epidemic. The purpose of evaluating the cholera surveillance system of Guinea Bissau is to ensure that this disease, of public health importance, is being monitored efficiently and effectively. Evaluation of a public health surveillance system focuses on how well the system operates to meet its purpose and objectives, and it may improve the information provided to ensure that cholera is being monitored efficiently and effectively.

We proposed to develop an evaluation of the cholera surveillance system in Guinea Bissau in order to make recommendation that may be used to improve the current system and the preparedness and response to cholera epidemics.

Objectives and Methods

The specific objectives of this evaluation were to (a) describe the importance of cholera in Guinea Bissau and the relevance of a surveillance system, (b) describe the purpose and procedures of the cholera surveillance system, and (c) detect items to be improved in the attributes of the cholera surveillance system.

With the aim of meeting these objectives, the following sources of information were used:

a. Administrative data: national guidelines, paper forms, electronic files and other documentation.
b. Primary data collection: information obtained through semi-structured interviews and focus groups.
c. Secondary data collection: previous reports, scientific articles, manuscripts, etc, regarding cholera surveillance in Guinea Bissau

Results

The cholera surveillance system of Guinea Bissau is a well organized decentralized structure, which resides within the National Health System: the identification of suspected cases is done at the health centres; the case investigation is done by the sanitary areas; the sanitary regions give technical and human resources support when needed; and the confirmation of cholera infection is done at central level, at the National Public Health Laboratory. All the information is combined at central level, at the recently created National Institute for Public Health. The system users know well the objectives of the surveillance, as well as the definition of cases. It is a useful system in detecting watery diarrhoea cases, although it is less useful in providing early detection of cholera cases and epidemical outbreaks.

Although the integrated surveillance system has as target population the whole country, several barriers have been identified in the detection of cholera cases:

- Over 60% of the population resides more than 5 Km from a health centre, which means a high risk of being missed by the surveillance activities. The CHUs are an excellent tool to minimize this, but almost 50% of the CHUs are not active due to lack of resources or lack of motivation from the staff.
- There is a turn to traditional medicine in the rural areas.
Cholera is still a stigmatizing disease in Guinea Bissau.

The users of the system have a good knowledge of the steps to follow to confirm cholera cases outside of an outbreak, although the confirmation of cases is limited by the access to patients, lack of trained staff, sporadic lack of Cary-Blair media, difficulties in ensuring the maintenance of the cold chain and problems in transport during the rainy season. During cholera epidemics, no samples are systematically collected in order to assess the role of *Vibrio cholerae* along the outbreak.

The structure for data reporting from lower to upper levels is well organized. The flux of information is done in a simple and in principle rapid manner, and roles and responsibilities are clearly defined. Nonetheless various obstacles in the flux of data were identified: lack of transport, gas, telephone, radios, etc. In addition, no individual data is reported, but only aggregated data. The quality of the data collected are generally high, with a good level of completeness and unusual missing information, but the data are not representative of the country. The information collected form the cases are not completely transferred to the databases, which only contains aggregated data on cases and deaths by region. This limits the analysis that can be done at central level to describe the outbreak.

The flux of information is clearly stated in the guidelines and the procedure is well known by the users. Nonetheless, the lack of a health information system makes difficult the transmission of the information between levels and all the information is exchanged through paper forms and phone calls.

**Conclusions**

The Integrated Surveillance System for Diseases and Responses, and specifically the cholera surveillance system, has accomplished many achievements:

- The network of community health workers is a very useful tool in the detection of cases where the health system faces difficulties.
- The users of the surveillance system are aware of the importance of high quality surveillance activities and of the prompt identification of cases.
- During 2009, The Ministry of Health, with the support of partners, called for the implementation of a study that analyzed the causes that determine the occurrence of cholera in Guinea-Bissau, with the main objective to establish a plan to control this disease in the country. The results were translated in the publication of the Strategic Plan for Prevention and Control of Cholera in Guinea Bissau that was published in May 2009.
- The MPH has also been recently involved in the preparation of its second National Health Development Plan (PNDS II), in order to adapt the previous version to the National Strategic Planning for Poverty Reduction. The reinforcement of the Surveillance System for Diseases and Responses is part of it.

The identified areas for improvement and recommendation were:

- To reinforce surveillance activities in areas repeatedly affected by cholera outbreaks (i.e. Biombo, Bissao and Bijagos) through the implementation of a sentinel surveillance system, the use of rapid cholera diagnosis tests, the correct transport of positive samples to the LNSP in order to verify the diagnosis, and the availability of reagents in the LNSP.
- To extend and/or increase the surveillance activities (improvement of case detection) in those geographic areas more isolated, especially those repeatedly affected by cholera epidemics, through the operation of all health facilities (including HBU) with allocation of staff and resources and the provision of training of the staff in case detection.
· To perform a health care seeking behaviour survey to identify areas less disposed to seek care at any health facility and provide health education to the population in identified areas.

· Identify the HBU, health centres, sanitary areas and sanitary regions that constantly do not report or do so but not on time and identify the reasons (lack of means, lack of motivations) in order to target them, i.e. through the installation and maintenance of the newly bought radios.

· Improve the control of the epidemics through inter-departmental collaboration, specifically with the newly created Direcção Geral da Prevenção e Promoção de Saúde, in order to implement timely control measures as the identification and closure of contaminated wells.

· To create a national standard database for cholera cases (individual and aggregated) to be implemented at regional and central level, promoting on the same time the data entry from each region at a Direcção Regional level.

· To continue with the epidemiological training (focusing on surveillance: data management and analysis, and outbreak response). Specific training in analytical tools would be desirable on a second step.
2 Background

Guinea Bissau

The republic of Guinea-Bissau is one of the smallest nations in continental Africa. The country is divided into 8 regions or regioes (Bafata, Biombo, Bolama, Cacheu, Gabu, Oio, Quinara, Tombali) and one autonomous sector (Sector Autônomo de Bissau).

![Figure 1 Map of Guinea Bissau (Source: United Nations)](image)

The population of Guinea Bissau was estimated to be 1,533,574 inhabitants in 2009 (based on projections from the 1991 census). Approximately 30% of the population lives in the city of Bissau (about 500,000 inhab). Although the country has experienced some years of stability and development since the end of the civil war in 1998, the life expectancy at birth is 47 years, and 203 children per 1000 births die before the age of five. The main causes of death are neonatal deaths, HIV/AIDS and diarrheal diseases.

Cholera epidemics

Cholera is an endemic disease in Guinea Bissau, besides epidemics are reported periodically in the country. Since 1986 the country has faced various cholera epidemics, being the most important in 1994 (15,719 cases, 290 deaths), 1996-97 (26,951 cases, 961 deaths) and 2005 (25,272 cases and 399 deaths). Between 1994 and 2008, 83,635 cases and 1,895 cholera deaths (case fatality rate of 2.3%) were reported in Guinea-Bissau. The last epidemic was declared in 2008-2009 and 14,222 cases and 225 deaths were reported.

Although in some outbreaks the first cases were reported from peripheral areas (1987 from Sao Domingos, 2004 from Bijagos, 2008 from Tombali) the outbreaks have constantly become critical once arriving to the Sector Autônomo de Bissau (SAB), the epicentre of the spreading. During the years of calm, cases of cholera have been registered in the city of Bissau (2002), in Bijagós (2004) and Tombali (2007), all coastal regions.

Evaluation of the cholera surveillance system in Guinea Bissau

Since 2004, Guinea-Bissau established a system of integrated disease surveillance to endorse the resolution AFR/RC48/R2 of the 48th Session of Regional Committee of WHO-AFRO (World Health

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Organization-Regional Office for Africa). This integrated surveillance system includes cholera among other diseases with epidemic potential.

A well working cholera surveillance system permits the ongoing systematic collection, analysis, interpretation, and dissemination of data regarding this disease in the country. These data can guide health personnel in the decision making needed to implement the proper strategies for disease control and for the prevention of future cases. The purpose of evaluating the cholera surveillance system is to ensure that cholera, which is a problem of public health in the country, is being monitored efficiently and effectively.

Since mid-2009 there have been structural changes in the Ministry of Public Health (MPH) in Guinea Bissau. At the moment of the evaluation, the newly created Instituto Nacional de Saúde Pública (INASA) and the General Direction of Prevention and Health Promotion (Direcção-Geral da Prevenção e Promoção da Saúde - DGPPS) had just started to function. Although it was a perfect moment to evaluate the flexibility of the system to adapt to changes, the current changes made difficult the assessment of specific aspects of the surveillance system.

3 Rationale of the study

- Cholera is an endemic disease in Guinea Bissau and cholera outbreaks occur with inter-epidemic periods of different length
- A national cholera surveillance system that monitors efficiently and effectively the disease countrywide is crucial in the rapidly detection of outbreaks
- An evaluation of the cholera surveillance system may improve the information provided to ensure that cholera is being monitored efficiently and effectively.

Therefore, we developed an evaluation of the cholera surveillance system in Guinea Bissau in order to make recommendation that may be used to improve the current system and the preparedness and response to cholera epidemics.

4 Objectives

General objective:

To evaluate the cholera surveillance system in Guinea Bissau.

Specific objectives:

- To describe the importance of cholera in Guinea Bissau and the relevance of a surveillance system.
- To describe the purpose and operation of the cholera surveillance system.
- To detect items to be improved in the attributes of the cholera surveillance system.
5 Methods

The evaluation was divided in **three main elements**: (a) description of the importance of cholera in Guinea Bissau and the relevance of a surveillance system; (b) description of the national cholera surveillance system; and (c) description of the performance of the cholera surveillance system.

The **sources of information** used were the following:

d. Administrative data: national guidelines, paper forms, electronic files and other documentation.

e. Primary data collection: information obtained through semi-structured interviews and focus groups (Annex 1-3).

f. Secondary data collection: previous reports, scientific articles, manuscripts, etc, regarding cholera surveillance in Guinea Bissau

A series of semi-structured interviews were conducted to personnel from the DGPPS, INASA, the national reference laboratory (**Laboratório Nacional de Saúde Pública** -LNSP), the Direcção Regional da Saúde da Distrito, and the sanitary areas. The interviews used are included in Annex 1.

A focal discussion session was also organized with participant from the above departments (except the sanitary areas). The methodology and results from this session are presented in Annex 2 and 3.

5.1 Description of the importance of cholera in Guinea Bissau and the relevance of a surveillance system

**Source of information:**

- Historical cholera data from the MPH, WHO, non-governmental organizations and Unicef.

- Previous published studies or available reports/documentation.

**Methodology:**

- Description of previous cholera outbreaks: number of cases, rates, socio-demographic characteristics of the cases, clinical outcomes (particularly, mortality) main geographical-areas affected, and changes in the trend over time

- Description of the potential tools to control a cholera outbreak and its degree of feasibility to be implemented in Guinea Bissau.

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2 A specific study in the context of this intervention was developed by Epicentre to cover this item
### 5.2 Description of the cholera surveillance system

The following items belonging to the cholera surveillance system have been described.

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<tr>
<th>Item</th>
<th>Objective</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Purpose and objectives of the surveillance system:</strong></td>
<td>To identify the intended goals of the cholera surveillance system in Guinea Bissau</td>
<td>- Listing of the objectives of the system as described in the national guidelines</td>
</tr>
<tr>
<td><strong>2. Case definition:</strong></td>
<td>To describe: - the case definition for cholera as specified in the national guidelines - the case definition for cholera used by the system users</td>
<td>- Description of the cholera case definition specified in the national surveillance guidelines - Description of the cholera case definition used in the reporting sites: health centres and hospitals (SPI)</td>
</tr>
<tr>
<td><strong>3. Residence of the cholera surveillance system within the national health system</strong></td>
<td>To describe the context in which the cholera surveillance system resides</td>
<td>- Description of the position of the cholera surveillance system within the national health system as explained in the national guidelines</td>
</tr>
<tr>
<td><strong>4. Level of integration with other systems in the national health system</strong></td>
<td>To describe the existence of other health care programmes, or parallel surveillance systems in the country and the ability of the system to combine them</td>
<td>- Description of existing parallel surveillance systems implemented - Description of existing health care programmes outside the national health care system</td>
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<tr>
<td><strong>5. Flow chart of the surveillance system</strong></td>
<td>To describe the participating agencies and the way in which the information is transmitted through the different levels of the system</td>
<td>- List of the participating agencies and its roles as explained in the national guidelines - Description of the flow of information within the surveillance system as explained in the national guidelines - Description of the characteristics of the information transmitted and the time needed to diffuse the information between the different levels of the system (FD and SPI)</td>
</tr>
<tr>
<td><strong>6. Components of the system</strong></td>
<td></td>
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<tr>
<td><strong>6.1 Population under surveillance:</strong></td>
<td>To describe the population in which cholera is expected to be detected in terms of demographic, socioeconomic and geographic characteristics, and the availability of health care</td>
<td>- Description of the population covered by the surveillance system - Description of the geographical distribution of the population covered - Description of population covered by the national health care system (provision of health care)</td>
</tr>
<tr>
<td><strong>6.2 Case identification</strong></td>
<td>To describe the methodology used for the identification of cholera cases in epidemic and non-epidemic periods</td>
<td>- Description of the sites where the cases are identified - Description of people in charge of case identification - Description of the criteria used for the identification of cases</td>
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<tr>
<td>Item</td>
<td>Objective</td>
<td>Activities</td>
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<tr>
<td><strong>6.3 Data collection</strong></td>
<td>To describe the methodology used for data collection and variables collected. To identify barriers and gaps in the correct data collection To identify the people in charge of data collection and its level of specific training</td>
<td>- Description of the type of data collected: in epidemic and non-epidemic periods - Description of the tools used for data collection - Description of the difficulty in collecting the data (SPI) - Description of the responsibility of the staff in charge of collecting the data and specific training received (SPI)</td>
</tr>
<tr>
<td><strong>6.4 Data reporting</strong></td>
<td>To describe how the data is reported to the next level of the surveillance system</td>
<td>- Description of the type of data reported: in epidemic and non-epidemic periods - Description of the tools used for data reporting - Description of the difficulty in reporting the data (SPI) - Description of the responsibility of the staff in charge of reporting the data and specific training received (SPI)</td>
</tr>
<tr>
<td><strong>6.5 Data management:</strong></td>
<td>To describe how are the system's data managed and to identify barriers in the correct data management</td>
<td>- Description of the format of the data and of the method used for data abstraction and coding (direct observation of data entering and SPI) - Description of the number of people implicated in data management and their level of training (SPI) - Description of the software used: level of difficulty to use, language, flexibility... (SPI) - Description of the method used to ensure accuracy of the records (SPI)</td>
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<tr>
<td><strong>6.6 Data analysis</strong></td>
<td>To describe how is the data analyzed and barriers in the correct data analysis</td>
<td>- Description of the number of people that analyze the data and its level of training (direct observation of data entering and SPI) - Description of: the statistical method used, the indicators obtained and the periodicity of the analysis (SPI)</td>
</tr>
<tr>
<td><strong>6.7 Results dissemination</strong></td>
<td>To assess the adequacy of the epidemiological information reported in terms of presentation, quantity and relevance</td>
<td>- Description of the information included in the cholera reports and cholera outbreaks reports - Description of the quality of the information reported - Identification of missing information in the reports - Description of the periodicity of the reports - Identification of the agencies/levels in the surveillance system to whom the results are disseminated</td>
</tr>
<tr>
<td><strong>6.8 Privacy, confidentiality and system security</strong></td>
<td>To assess the adherence of the cholera surveillance system to confidentiality and security standards</td>
<td>- Description of the method used to safeguard against the privacy of individuals, both soft and hard copies (SPI) - Description of the measures used to ensure the security of the surveillance system (SPI)</td>
</tr>
<tr>
<td>Item</td>
<td>Objective</td>
<td>Activities</td>
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<tr>
<td><strong>7 Specific reinforcements of cholera surveillance activities</strong></td>
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<td>- Description of planned and implemented means to reinforce the cholera surveillance system during cholera outbreaks</td>
</tr>
<tr>
<td><strong>8 Resources used to operate the surveillance system</strong></td>
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</tbody>
</table>
| **8.1 Funding sources** | To document the funding sources of the surveillance system | - Description of the partner agencies providing funds to the cholera surveillance system (national guidelines and SPI)  
- Detail the global budget to operate the cholera surveillance system |
| **8.2 Human resources requirements** | To document the human resources requirements to run the system | - Description of the staff involved in the cholera surveillance activities at each of the levels (SPI & guidelines) |
| **8.3 Other resources:** | To document other resources needed to operate the surveillance system | - Description of other resources needed to operate the system: computers, software, travel expenses, training expenses, internet connection, laboratory support,… (SPI) |

FD: Focal discussion; SPI: Semi-structured personal interview
### 5.3 Description of the performance and attributes of the surveillance system

<table>
<thead>
<tr>
<th>Item &amp; description</th>
<th>Indicators and Methods</th>
</tr>
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</table>
| **1. Usefulness:** How helpful the system is in meeting its objective as a result of interpreting and analyzing its data. | - Description of the actual use of the data as seen by the users (*FD and SPI*)  
- Description of how well the surveillance system meets its objectives (*FD and SPI*)  
- Description of the appropriateness of the cholera surveillance system (*FD and SPI*)  
- Description of additional utilities of the cholera surveillance system (*FD and SPI*) |
| **2. Simplicity:** Ease of use for the cholera surveillance system users | - Description of the level of easiness for the **detection of cases**: grade of complexity in the collection of data necessary for the identification of cholera cases (*guidelines and SPI*)  
- Description of the level of easiness for the **flux of data**: grade of complexity in the flux of information and main difficulties faced (*SPI*).  
- Description of the level of easiness for the **data management**:  
  - human resources necessary, time and difficulty on entering and editing the data (*SPI*)  
  - Time and difficulty on cross checking quality of data (*SPI*)  
- Description of the level of easiness for **analysis of data**: subjective difficulty in the calculation of the indicators (*SPI*)  
- Description of the level of easiness for **disseminating the data**: human resources requirements, time and difficulty on report writing and dissemination (*SPI*) |
| **3. Flexibility:** Capacity to adapt to changing information needs. | - Description of the level of difficulty in the development of the new VIDR (*SPI*)  
- Description of the level of difficulty in the implementation of the new VIDR (*SPI and FD*) |
| **4. Quality of the data:** Completeness and validity of the data recorded in paper form and in the databases. | - Comparison between recorded data (databases) and data in the paper forms  
- Review of the information recorded in the database, and the method used to create database backups and ensure quality of the data (*SPI*).  
  - Description of the proportion of missing data and aggregated variables and description of the coding used. |
| **5. Acceptability:** Satisfaction of the users with the different elements of the surveillance system. | - Description of the level of satisfaction of the users with:  
  - the case definition (*SPI & FD*)  
  - way of reporting to the upper level (*SPI & FD*)  
  - timeliness (*SPI & FD*)  
  - the information produced (*SPI & FD*)  
- Revision of the reports on the completeness and delay of reporting by sanitary area and region |
<table>
<thead>
<tr>
<th>Item &amp; description</th>
<th>Indicators and Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>6. Sensitivity:</strong></td>
<td>- Of the surveillance system to detect cholera cases: Proportion of cholera cases that are detected by the surveillance system - Description of the factors that affect the ability of the surveillance system in the detection of cholera cases outside the epidemic period - Description of the factors that affect the ability of the surveillance system in the detection of cholera cases outside the epidemic period</td>
</tr>
<tr>
<td>- Of the surveillance system to detect an outbreak:</td>
<td>Proportion of cholera outbreaks that are detected by the surveillance system - Description of the factors that affect the ability of the surveillance system in the detection of cholera outbreaks outside the epidemic period</td>
</tr>
<tr>
<td><strong>7. Predictive value positive:</strong></td>
<td>Proportion of reported cholera cases that are confirmed cases - Description of the factors that affect the probability that a case identified outside the epidemic period is a real cholera case - Description of the factors that affect the probability that a case identified during the epidemic period is a real cholera case</td>
</tr>
<tr>
<td><strong>8. Representativeness:</strong></td>
<td>Accurate description of the occurrence of cholera cases over time and its distribution in the population by place and person. - Description of the geographic origin of the samples sent to the lab in the inter-epidemic period - Number of health centres by region, number of people covered by each region - Characteristics of the cases by region: age, sex, socioeconomic status, geographic location - Description of the clinical course of the disease (latency period mode of transmission, outcome) by region (indicator of delay in seeking health care): - between reported cases and &quot;normal&quot; course - among regions - over time</td>
</tr>
<tr>
<td><strong>9. Timeliness:</strong></td>
<td>Speed between steps in the reporting within the surveillance system - Review of the dates of diagnosis and reporting - Review of the procedure for reporting the beginning of an outbreak - Delays in the transmission of the information and reasons for delay</td>
</tr>
<tr>
<td><strong>10. Stability:</strong></td>
<td>Reliability (ability to collect, manage and provide data properly) and availability (ability to be operational/effective/active when needed) of the surveillance system - Measure of dedicated resources - Review of alternative measures - Description of the technical support regarding information systems</td>
</tr>
</tbody>
</table>

FD: Focal discussion; SPI: Semi-structured personal interview
6.1 Meeting with stakeholders

Meeting with all actors partaking in cholera surveillance and outbreak control activities were held in order to identify the stakeholders that would receive the findings and recommendations of the evaluation and clarify roles and responsibilities.

The main organization participating in the surveillance system currently is the National Institute of Public Health (INASA); the evaluation of the system was done in collaboration with its epidemiologist.

6.2 Description of the importance of cholera in Guinea Bissau and the relevance of a surveillance system

- Description of previous cholera outbreaks

Cholera is endemic in Guinea Bissau and epidemics are reported periodically. Because of the poor water and sanitation structure, cyclical cholera outbreaks are expected to continue happening in the future.

Four high burden epidemics and three small outbreaks have been detected from 1996 to 2008 in Guinea Bissau. In all the four high burden outbreaks (1996, 1997, 2005 and 2008) more than 10,000 cases were notified with attack rates (ARs) of 1%, 1.4%, 1.8% and 0.9% respectively. The case fatality ratio (CFR) varied between 5.3% in 1997 to 1.6% in 2008. Figure 2 and 3 shows the most affected areas in the last epidemics.

Figure 2 Cholera attack rates by sanitary area in Guinea-Bissau. 1997-2005.
The duration of these epidemics has been constantly over 30 weeks. No changes in the trend have been identified in the last years and there is not a fix inter-epidemic period in the country. The last epidemic occurred with a shorter inter-epidemic period compared with the previous ones (Figure 4).

- Evaluation of the capacity of control of a cholera outbreak

It is well known that it is difficult to prevent the appearance of cholera outbreaks in setting were the water supply and sanitation are poor\(^3\). Improvement of the structure as well as hygiene education is needed in order to reduce the risk. But it is possible to reduce markedly the extension of the outbreak if timely control measures are implemented. So far, a two arms intervention has been usually proposed to limit an outbreak: case management and control measures\(^4\). The priority during outbreaks is to ensure an adequate treatment and management of cases in order to reduce the mortality, and subsequently implement prevention and control activities, mainly water and sanitation activities, in order to control the epidemic as soon as possible. The water and sanitation activities include: distribution of soap and bleach, chlorination, health education, disinfection of houses, control of markets and food hygiene. Moreover, cholera vaccines are available and have been used successfully in order to prevent or decrease the intensity of cholera outbreaks\(^5\). All these activities can

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be implemented in Guinea Bissau if outbreaks are timely detected and a specific preparedness plan is followed. The implementation of appropriate control measure could reduce highly the burden of future outbreaks in the country.

- Evaluation of the clinical course of cholera in the absence of an intervention

As commented above, cholera can produce high fatality rate in absence of adequate treatment. Moreover, the lack of control of the epidemic will lead to serious social impact. The health structure could become overwhelmed because of the high number of patients and absenteeism can collapse certain basic services. It has been proved elsewhere the high social, political and economical impact of cholera outbreaks in absence of suitable interventions.

6.3 Description of the cholera surveillance system

6.3.1 Purpose and objectives of the surveillance system:

The cholera surveillance system is included in the national "Integrated Surveillance System for Diseases and Responses ("Vigilancia Integrada das Doenças e Respostas na Guinea Bissau"-VIDR-). Since 2004, Guinea-Bissau counts with an integrated disease surveillance system to endorse the resolution AFR/RC48/R2 of the 48th Session of Regional Committee of WHO / AFRO. This system allows the monitoring of five diseases or conditions with epidemic potential (cholera, bloody diarrhoea, measles, meningitis and yellow fever), the surveillance of three diseases to eliminate and eradicate (polio, leprosy and neonatal tetanus) and nine diseases or conditions that are major public health problems in Guinea-Bissau (malaria, diarrhoea in children under 5 years old, acute respiratory infections, AIDS, STDs, tuberculosis, hepatitis, blindness, rabies). The VIDR are adapted from the WHO/AFRO second edition of the technical guide for Integrated Disease Surveillance and Response (VIDR) in the Africa Region.

The general objective of the VIDR is to provide timely rational basis for decision making and for the identification of effective public health interventions to fight against diseases. It pursues to improve the position of the districts in relation with the detection and response to diseases with high mortality, morbidity and disability rates.

The specific objectives of the VIDR are:

- To reinforce the capacity of the country to develop effective surveillance activities;
- To integrate different surveillance systems in order to gain efficiency in the use of resources;
- To improve the use of the information in the decision-making process;
- To facilitate the flow of the information among the different levels of the health system;
- To strengthen the capacity of the laboratories in the identification of pathogens and the monitoring drug susceptibility;
- To persuade the participation of doctors in the surveillance system;
- To promote the participation of the community in the detection and response to public health problems.

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• To reinforce the role of the laboratory staff in the epidemiological surveillance activities

The **objectives of the cholera surveillance**, as described in this guideline, are:

• To detect and provide quick response to watery diarrhoea cases and epidemiical outbreaks of watery diarrhoea.
• To report immediately cases and deaths when there is a suspect of an outbreak

### 6.3.2 Case definition:

The case definition for a cholera cases differs for suspected and confirmed cases

**Suspected case:**

This definition differs in epidemic and non-epidemic periods.

During non-epidemic periods, a suspected cholera case is defined as an individual five or more years old who develops *severe* dehydration or *dies* as a result of acute watery diarrhoea.

During a cholera epidemic, this definition changes to a person five years of age or older who has acute watery diarrhoea, with or without vomiting.

**Confirmed case:**

A suspected case with a positive stool sample to *Vibrio cholerae* O1 or O139.

There are no additional definitions in the guidelines in relation with the severity of the clinical presentation or the clinical outcomes of the patients.

### 6.3.3 Residence of the cholera surveillance system within the national health system

The health system in Guinea-Bissau is structured in a decentralized manner that includes three levels: central, intermediate and peripheral.

At the **central level** is the MPH, of which the following central organisms related with epidemiological surveillance depend (indirectly or directly): the National Hospital Simão Mendes, the National Institute of Public Health (INASA), and the General Direction of Prevention and Health Promotion (DGPPS). The role of the central level is to develop the standards, strategies and policies related with health.

The **intermediate level** is made up by 11 sanitary regions (*regiões sanitária*), where the regional hospitals are based. The role of the sanitary-region (intermediate level) is of technical support and coordination of sanitary-areas.

Each sanitary region is made up by sanitary-areas (*areas de Saúde*), which constitute the **peripheral level**. In each sanitary area there is at least one health centre and several Health Base Units.

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(Unidades de Saúde de Base). A nomenclature based on a one-letter code, distinguishes the health centres regarding its capacity of intervention. The Health Base Units are at the bottom of the structure, they are constituted by a Community Health Worker (Agentes de Saúde Comunitária), a midwife and a treasurer.

Regarding cholera surveillance, the national surveillance system resides within the health system in the sense that each level of the surveillance system corresponds to a different level of the health system. The identification of suspected cases is done at the health centres. The investigation of cases is done by the sanitary areas. The sanitary regions give technical and human resources support when needed. At central level the confirmation of cholera infection is done, specifically at the LNSP. Also at central level, the data coming from the regions is introduced in the electronic databases, merged, and analysed. For more detailed information see section 6.3.6.

6.3.4 Level of integration with other systems in the national health system:

The cholera surveillance system of Guinea Bissau resides within the national integrated surveillance system. There is no other surveillance system implemented in the country.

All the cholera cases detected in the National Health System are reported through the VIDR. Other cases could be identified in the private sector (mainly in Bissau), or the private non-profit sector that involves missionaries and Non-Governmental Organizations (NGOs), both national and international. Although the reporting of cholera cases is mandatory in the country, there is no control to ensure that the cases identified through these complementary services are registered. The general perception anyhow is that the number of cases identified in the private sector, excluding non-profit organizations, may be nil or minimum, and that the cases identified in the non-profit sector are all reported.

On the other side, recently new departments within the MPH have been created. One of these is the DGPPS, which includes two sub-departments related to cholera surveillance. These are: the Direção de Serviços de Doenças Transmissíveis e Não Transmissíveis (Infectious and non-Infectious diseases) and the Direcção de Serviços de Saúde Ambiental e Higiene Pública (Environmental Health and Public Hygiene). It is not clear yet how these departments will interact with INASA in the surveillance of cholera, although there has been already created a new structure in which the three departments are involved, the "Equipas de Resposta Rápida para as Emergencias em Saude" (ERR), with the aim of providing support to the regions in the control of outbreaks with an epidemic potential.

6.3.5 Flow chart of the surveillance system

Figure 5 represents the flux of information in the surveillance activities. Four main levels are defined: community, regional, central and international. Table 1 defines the surveillance functions and how they are achieved at each level of the health system (as defined in the national guidelines).
Figure 5 flux of information in the surveillance activities

Table 1 surveillance functions and how they are achieved at each level of the health system

<table>
<thead>
<tr>
<th>1.0 Identify</th>
<th>2.0 Report</th>
<th>3.0 Analyze and Interpret</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Community</strong></td>
<td>• Use simple case definitions to identify priority diseases or conditions in the community</td>
<td>• Know which health events to report to the health facility and when to report them</td>
</tr>
<tr>
<td><strong>Health Facility</strong></td>
<td>• Use standard case definitions to identify priority diseases or conditions that present in: - inpatient and outpatient services - community reports - private sector reports</td>
<td>• Report case-based information for immediately notifiable diseases - Report data gathered from inpatient and outpatient services and from community and private sector sources - Report summary data to next level</td>
</tr>
</tbody>
</table>
## Evaluation of the cholera surveillance system in Guinea Bissau

### Report version 4.4

<table>
<thead>
<tr>
<th>Level</th>
<th>1.0 Identify</th>
<th>2.0 Report</th>
<th>3.0 Analyze and Interpret</th>
</tr>
</thead>
</table>
| District, State, Province | • Maintain activities for collecting routine surveillance data in a timely way  
• Review records of suspected outbreaks  
• Collect and transport clinical specimens for laboratory evaluation | • Support health facilities in knowledge and use of standard case definitions for reporting priority diseases and conditions  
• Make sure health facility staff know when and how to report priority diseases and conditions  
• Promptly report immediately notifiable diseases to the next level  
• Report laboratory results to national and local officials | • Define denominators and obtain data for ensuring accurate denominators  
• Aggregate data from health facility reports  
• Analyze case-based data by person, place and time  
• Calculate rates and thresholds  
• Compare current data with previous periods  
• Prepare and periodically update graphs, tables and charts to describe time, person and place for reported diseases and conditions  
• Make conclusions about trends, thresholds, and analysis results  
• Describe risk factors for priority disease or conditions |
| National | • Establish steps for surveillance of sentinel populations  
• Conduct special surveys to gather information about reported cases, outbreaks or unusual events  
• Define and update surveillance needs and implement training for and other support to each level  
• Advocate for adequate resources to support the identification and reporting of cases  
• Set policies and procedures with national reference laboratory  
• Use national reference laboratory for maintaining quality control and standards | • Set policies and procedures for reporting priority diseases and conditions at each level  
• Include private sector laboratories in the reporting network  
• Support reporting activities throughout the system | • Set policies and procedures for analyzing and interpreting data  
• Aggregate data received from district reports  
• Make sure each level uses appropriate denominators for analysis  
• Interpret trends from national perspective  
• Adapt or define action thresholds  
• Provide training resources for analyzing and interpreting data  
• Analyze data for time, person and place  
• Analyze map and stratify by district and other factors  
• Make conclusions based on analysis results  
• Provide reports and share data with national authorities and WHO as required  
• Define public health analysis skills appropriate to each level of personnel in the system |
| National WHO Representative, WHO Regional Office | • Support policy setting at national and regional level for detecting priority diseases  
• Mobilize resources for training, logistics and supervision  
• Develop and distribute standard guidelines for surveillance “best practices”  
• Inform countries about problems that may cross | • Receive reports of outbreaks and international notifiable diseases | • Establish and disseminate standard guidelines for analysis of data for each priority disease |
Table 2  Surveillance functions and how they are achieved at each level of the health system (cont.)

<table>
<thead>
<tr>
<th>4.0 Investigate</th>
<th>5.0 Respond</th>
<th>6.0 Provide Feedback</th>
<th>7.0 Evaluate and Improve the System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Support case investigation activities such as informing the community of the problem, case finding, collecting of specimens and other activities</td>
<td>• Assist health authorities in selecting response activities</td>
<td>• Give feedback to community members about reported cases and prevention activities</td>
<td>• Decide if public health action took place as planned</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health Facility</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Take part in investigation of reported outbreaks</td>
<td>• Treat cases and contacts according to standard case management guidelines</td>
<td>• Give feedback to community members about outcome of reported cases and prevention activities</td>
<td>• Monitor timeliness and completeness for reporting routine and case-based information to the district level</td>
</tr>
<tr>
<td></td>
<td>• Collect, package, store and transport specimens for laboratory testing</td>
<td>• Use appropriate infection control measures</td>
<td>• Evaluate preparedness for and timeliness of response activities</td>
</tr>
<tr>
<td></td>
<td>• Use investigation and laboratory results to confirm the outbreak</td>
<td>• Carry out public health response with the district level</td>
<td>• Evaluate appropriateness of case management</td>
</tr>
<tr>
<td></td>
<td>• Process and record laboratory results</td>
<td>• Mobilize community involvement in the Response</td>
<td>• Take action to improve reporting practices</td>
</tr>
<tr>
<td></td>
<td>• Provide the results to clinical staff and patients</td>
<td>• Advocate for resources</td>
<td>• Take action to improve readiness for timely response to outbreaks</td>
</tr>
<tr>
<td>District, State, Province</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Arrange and lead investigation of reported cases or outbreaks</td>
<td>• Select and implement appropriate public health response (for example, depending on the disease, plan to strengthen case management, conduct immunization activity, improve control and prevention activities)</td>
<td>• Alert nearby areas and districts about outbreaks</td>
<td>• Monitor and evaluate program targets and indicators for measuring quality of the surveillance system</td>
</tr>
<tr>
<td>• Assist health facility in safe collection, packaging, storage and transport of laboratory specimens for confirmatory testing</td>
<td>• Convene epidemic response committee and plan response</td>
<td>• Give health facilities regular, periodic feedback about routine control and prevention activities</td>
<td>• Monitor and evaluate timeliness and completeness of reporting from health facilities in the district</td>
</tr>
<tr>
<td>• Receive and interpret laboratory results</td>
<td>• Conduct training for emergency activities</td>
<td>• Monitor routine prevention activities and modify them as needed</td>
<td></td>
</tr>
<tr>
<td>• Decide if the reported outbreak is confirmed</td>
<td>• Plan timely community information and education activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Report the confirmed outbreak to the next level</td>
<td>• Alert nearby areas and districts about outbreaks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Distribute specimen collection kits for special surveillance activities</td>
<td>• Give health facilities regular, periodic feedback about routine control and prevention activities</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 4.0 Investigate
- Alert laboratory and support its confirmation activities: supplies, transport media, logistics, transport of specimens
- Support activities for investigating reported outbreaks: supplies, logistics, equipment, budget
- Collaborate with international authorities as needed during investigations
- Notify regional, international networks about confirmed outbreak
- Process specimens from investigation and send timely results as required to each level
- Request additional specimens as needed
- Take part in epidemic response team

### 5.0 Respond
- Set policies and procedures for responding to cases and outbreaks of priority diseases and conditions
- Support epidemic response and preparedness activities
- Report and disseminate results of outbreak response in bulletins, media, press releases and briefings

### 6.0 Provide Feedback
- Give feedback about response activities to each level
- Give districts regular, periodic feedback about routine control and prevention activities
- Develop and periodically distribute regional bulletin for epidemiology and public health

### 7.0 Evaluate and Improve the System
- Establish and disseminate policies and procedures for monitoring surveillance and outbreak response activities
- Establish policies and practices for supervising surveillance and outbreak response activities
- Evaluate detection and reporting activities, and make improvements as needed:
  - Monitor and evaluate program targets and indicators for measuring quality of the surveillance system
  - Monitor and evaluate timeliness and completeness of reporting from intermediate levels
  - Monitor and evaluate timeliness of national support for outbreak response
  - Monitor and evaluate effectiveness of district level outbreak response activities
  - Monitor routine prevention activities and modify as needed
  - Monitor quality assurance for laboratories at lower levels

### National WHO Representative, WHO Regional Office
- Communicate recommendations for case investigation and laboratory confirmation
- Mobilize resources for improving laboratory capacity and skills
- Mobilize resources for investigation and confirmation as required, based on national level need and request
- Provide laboratory training and equipment
- Establish guidelines for preparedness and outbreak investigations
- Participate in investigations as requested

### National WHO Representative, WHO Regional Office
- Support response activities (technical experts, guidelines)
- Report to and inform international authorities about outbreak response
- Calculate response indicators and report status to next level
- Assist national level with epidemiological response and development of public health action

### National WHO Representative, WHO Regional Office
- Provide feedback for collaboration with national and regional levels
- Inform countries about problems that may cross borders or have impact on regional levels
- Report analysis results in regional and international bulletins for disease trends and patterns
- Develop and distribute regional bulletin for epidemiology and public health

### National WHO Representative, WHO Regional Office
- Use reports from countries to measure their systems and advocate for improvements

### 6.3.6 Components of the system

#### a. Population under surveillance

The VIDR has as target population for the surveillance activities the whole country. The population per year and sanitary area is obtained from the 1991 national census to which a specific annual growth rate is applied. There has been a new census done during 2008 but the results are not available yet.

For the year 2009, the estimated population for Guinea Bissau was 1,533,574, of which 204,617 (13.3%) were below five years old. Most of the population (27.5%) is estimated to live in SAB. The second most inhabited areas are Bafata, Gabu, Oio, with around 13.5% of the population each.
Regarding the provision of care, at the central level there is one national hospital (Hospital Nacional Simão Mendes). There are also two specialized national centres: the National Reference Centre for Pneumology and the Cumura Hospital for Leprosy. In terms of care at a lower level, at the regional level there are five regional hospitals: Bafatá, Catío, Canchungo, Gabú and Mansoa. In the peripheral level, currently there are 110 primary health care centres, including 25 health posts 10.

In spite of this, over 60% of the population does not have easy access to health services (this is they reside further than 5km from a primary health care structure), and less than 30% have access to a health facility 11. The access to health care is very different between the geographical regions and even within regions, varying from 100% for the population in urban areas to 45% for the rural population.

### Table 3 Population by sanitary region and group of age. Guinea Bissau, 2009.

<table>
<thead>
<tr>
<th>Sanitary region</th>
<th>Pop 2009</th>
<th>0-14 years</th>
<th>&gt;15 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bafata</td>
<td>205,699</td>
<td>96,678</td>
<td>109,020</td>
</tr>
<tr>
<td>Bijagos</td>
<td>24,406</td>
<td>11,471</td>
<td>12,935</td>
</tr>
<tr>
<td>Biombo</td>
<td>66,377</td>
<td>31,197</td>
<td>35,180</td>
</tr>
<tr>
<td>Bolama</td>
<td>9,876</td>
<td>4,642</td>
<td>5,234</td>
</tr>
<tr>
<td>Cacheu</td>
<td>113,069</td>
<td>53,142</td>
<td>59,927</td>
</tr>
<tr>
<td>Gabu</td>
<td>210,896</td>
<td>99,121</td>
<td>111,775</td>
</tr>
<tr>
<td>Oio</td>
<td>213,596</td>
<td>100,390</td>
<td>113,206</td>
</tr>
<tr>
<td>Quinara</td>
<td>71,261</td>
<td>33,493</td>
<td>37,768</td>
</tr>
<tr>
<td>S Dom</td>
<td>89,389</td>
<td>42,013</td>
<td>47,376</td>
</tr>
<tr>
<td>SAB</td>
<td>421,939</td>
<td>198,311</td>
<td>223,628</td>
</tr>
<tr>
<td>Tombali</td>
<td>111,968</td>
<td>52,625</td>
<td>59,343</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,533,574</strong></td>
<td><strong>723,083</strong></td>
<td><strong>815,391</strong></td>
</tr>
</tbody>
</table>

### Table 4 Health facilities by sanitary region. Guinea Bissau, 2009.

<table>
<thead>
<tr>
<th>Região Sanitária</th>
<th>Biombo</th>
<th>Oio</th>
<th>Cacheu</th>
<th>Bafata</th>
<th>Gabu</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Regional Hospital</strong></td>
<td><strong>1</strong></td>
<td><strong>1</strong></td>
<td><strong>1</strong></td>
<td><strong>1</strong></td>
<td><strong>1</strong></td>
</tr>
<tr>
<td>Centro de Saúde A</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Centro de Saúde B</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Centro de Saúde C</td>
<td>6</td>
<td>13</td>
<td>10</td>
<td>13</td>
<td>19</td>
</tr>
<tr>
<td>Posto de Saúde</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Number of health care centres per 100,000 inhab</strong></td>
<td><strong>15.1</strong></td>
<td><strong>8.0</strong></td>
<td><strong>10.7</strong></td>
<td><strong>7.4</strong></td>
<td><strong>9.5</strong></td>
</tr>
<tr>
<td><strong>Estruturas privadas</strong></td>
<td><strong>3</strong></td>
<td><strong>3</strong></td>
<td><strong>0</strong></td>
<td><strong>1</strong></td>
<td><strong>1</strong></td>
</tr>
</tbody>
</table>

### Table 5 Health facilities by sanitary region. Guinea Bissau, 2009 (cont.).

<table>
<thead>
<tr>
<th>Região Sanitária</th>
<th>Quinara</th>
<th>Tombali</th>
<th><strong>TOTAL</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Regional Hospital</strong></td>
<td>0</td>
<td>1</td>
<td><strong>6</strong></td>
</tr>
<tr>
<td>Centro de Saúde A</td>
<td>1</td>
<td>0</td>
<td><strong>2</strong></td>
</tr>
<tr>
<td>Centro de Saúde B</td>
<td>2</td>
<td>2</td>
<td><strong>12</strong></td>
</tr>
<tr>
<td>Centro de Saúde C</td>
<td>3</td>
<td>7</td>
<td><strong>71</strong></td>
</tr>
<tr>
<td>Posto de Saúde</td>
<td>7</td>
<td>14</td>
<td><strong>25</strong></td>
</tr>
<tr>
<td><strong>Number of health care centres per 100,000 inhab</strong></td>
<td><strong>18.5</strong></td>
<td><strong>21.0</strong></td>
<td><strong>11.2</strong></td>
</tr>
<tr>
<td><strong>Estruturas privadas</strong></td>
<td>0</td>
<td>2</td>
<td><strong>10</strong></td>
</tr>
</tbody>
</table>

Theoretically, at each sanitary area there is one primary health care centre and several Community Health Units (CHUs). To have a CHU, the village should have more than 300 inhabitants and should be

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more than 5 km from the nearest health centre. There are 701 USC in the country, but approximately 420 are active. Most of them lack basic equipment (chair, table, medical utensils, telephone).

In general, the number of health staff is insufficient: there is one doctor for 24,558 inhabitants, and one nurse per 3,000 inhabitants. Again, there are wide disparities between the sanitary regions. This lack of qualified staff affects both the identification of patients and the collection of samples and data.

b. Case identification

The identification of suspected cases of cholera is done at two different levels: community and regional. At regional level the cases may be identified in the hospitals. At community level, cases can be detected at the health centres, by the nurses and/or doctors. In the community cases may be identified by the Community Health Worker (CHW, Agente Comunitário de Saúde). The CHWs work as nursing assistants, although they have not been trained for this. They are elected people from the community who, in addition to their job, are in charge of providing basic health care in the community (treatment for headaches, diarrhoeas, not complicated wounds, etc). They are not additionally remunerated.

The CHWs report weekly to their respective health technician at the sanitary area the number of treatments provided the previous week. A cluster of diarrhoea cases, deaths due to diarrhoea among adults, or the observation of cholera-like faeces in a case, constitute an emergency and must be reported on the same day.

Therefore, the identification of suspected cases is based on clinical symptoms, both in the community and in the health facilities. For the confirmation of a cholera case corroboration from the laboratory is needed; a stool sample is sent to the respective regional direction of health, and from there to the LNSP. The regional laboratories do not have the capacity to do cholera culture.

For the shipment of samples, the national guideline recommends:

- That the samples arrive to the LNSP no longer than two hours after collection
- If this time is preview to be longer, that the samples are placed in a tube that contains Cary-Blair media
- If Cary-Blair media is not available at the health facilities, that the sample is kept between 4-8ºC.

The results from culture are available 2-4 days after the sample reaches the laboratory.

Confirmation of cases is done solely for the first five-ten suspected cases residing in the same geographical area. Once an outbreak is declared, laboratory confirmation is sought only once the number of cases is starting to decline, with the aim of confirming the end of the outbreak.

c. Data collection

The data collected at health care centre for all suspected cholera cases outside of an epidemic period are:

- Date of registration
- Name of the health centre, sector and region
- Name of the patient
- Sex
- Age
- Occupation
- Address
- Date of initiation of symptoms
- Date of death
- Information on possible risk factors (trips, contact with possible cholera cases, source of consumed water, history of food consumption, etc).
The data are collected on specific paper forms for the registration of cholera cases (Ficha individual de registro dos casos de cólera). No distinction is made between suspected and confirmed cases.

As well a paper form for the LNSP is filled in and sent with the sample (Ficha de colheita de amostra). This form contains information regarding the patient (name, sex, age, address) and the sample (type of sample, collection date, collection time). Afterwards, the result form culture is filled out in the same paper form at the LNSP.

According to the users, the completion of both forms is not considered to be a complex procedure, although no specific training is given on how to do it.

During epidemic periods, there are not particular paper forms, but the information is recorded in the register book of the facility. The sole information collected from the cases is name, age, sex, date of symptoms onset, registration date, clinical outcome and date of death. No samples are normally collected, unless is specifically required from the Direcção Regional.

The number of cases and deaths are synthesized daily at the structure of health in the specific paper form (Ficha de Alerta). At the regions, the number of cases and deaths from the different sanitary areas is merged.

d. Data reporting

Outside of epidemic periods, if the doctor/nurse/CHW suspects a cholera case, he should immediately notify to the person named at the healthcare facilities, this is usually done on person. At the healthcare facility, they should in turn notify to the health technician of the sanitary area. This is done preferably by phone, otherwise by radio. At the same time, the paper forms with the epidemiological and clinical information from the suspected cholera cases are sent to the respective sanitary area from the health centres. It is the role of the health technician to report directly to the region, where consecutively the case is reported to INASA. From the data collected on the paper forms, only the numbers of cases (and deaths) are reported so far to the region. The reporting from the sanitary regions to INASA is done weekly, even if there are no cases. In addition to the number of cases identified that week, the sanitary regions also report the number of sanitary areas that have reported and the number that have not yet reported. During cholera epidemics, this reporting is done daily. Simultaneously, the health structure must take measures in response to limit the potential outbreak, and the region shall make arrangements to investigate and confirm the epidemic.

During cholera outbreaks, the health technician is responsible for making a synthesis of the cholera cases identified that week in his area and reporting daily by phone to the next superior level (regional level) the number of cases detected and the number of deaths reported. As said above, from 2010 on, this information will be disaggregated by sex and group of age.

As part of the integrated surveillance activities, and regardless of the epidemic situation, at regional level the number of cases (and deaths) from each sanitary area is computed and reported weekly to INASA by phone (in addition to the daily verbal communication). The number of sanitary areas that have reported that week is also recorded. Until now, only the number of cases and deaths where reported, except on the last cholera outbreak (2008) when also information regarding group of age (below or over five years), and sex was notified. From January 2010 on, new groups of age (<12 months; 1-4 years; 5-14 years; > 14 years) will be as well stated. Additionally, this information is sent weekly by paper form to the epidemiologist in INASA.

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12 The community health worker may notify to the closest health centre.
**e. Data management**

INASA is responsible for entering the number of cholera cases and deaths in a common database. Although the regions are encouraged to do so, and procedures are specified in the surveillance guidelines, currently there are no resources available for entering, editing or analysing the data. INASA is planning to transfer the responsibility of data management to different epidemiologist. Each epidemiologist will be responsible of the data from specific regions, not only for cholera but also for all the other reporting diseases. So far, a single person is in charge of the data management (data entry and data-cleaning). During cholera epidemics there is no additional human resources support.

Not all the epidemiologists have received specific training on data management, although it is planned that they do so.

So far, only an aggregated data base in Excel® format is available for cholera data at central level. The person in charge of data management has skills both in data management and analysis, nonetheless specific training would be necessary if the complexity of the database or the analysis is increased. The database contains the daily number of cases and deaths by sanitary area. There is not an individual data base of cholera cases at central level; thus, information regarding age, sex or residence is limited, nonetheless it is planned to create an individualized database where demographic and clinical information from the cases will be introduced.

No specific procedures are used to ensure data confidentiality when individual data collection is performed.

Since the data is already collected in an aggregated format, the data management is very limited. The checks are done by phone and corrections are directly applied in the aggregated data base. When the reporting is not completed for a specific region, the data manager tries to update this information in contacting the regions. Checks of repeated registers or missing data are limited, and the system relies in the information reported at regional level. All the regions reported cases in last epidemic, but the completeness of this information is difficult to evaluate.

Regarding the availability of historical data, there are missed data from the civil-war period and also form the 2002-2003 outbreak. Historical data are available in different Excel® files and in paper, but an historical data base has not been created so far. No specific management plan of the historical records is available.

All the regions are encouraged to enter their cholera cases in an electronic database; nonetheless it is not clear how many of the regions are currently doing so. It seems that at least SAB, Biombo and Quinhara managed their own data base, but this information is not used to report to the central level, and only in few regions like Biombo it is used to give retro-feedback to the sanitary areas with periodically reports. Currently all the Direcção Regional have at their disposal one computer, but there are energy supply problems to ensure their use.

In the LNSP, there is no formal database where the data collected in the paper forms may be introduced. This does not allow to subsequent quality checking of the data or later analysis (proportion of positive cholera cases, trends, sanitary areas with confirmed cholera cases by week...).

**f. Data analysis**

The aggregated collection of data limits itself the analysis, and the variety of analysis performed regarding cholera in Guinea Bissau are limited. The responsibility of the data analysis is shared by the tree levels; nonetheless, the information is mainly analyzed at central level. The regions which run their own data bases perform different analysis to complete the information provided a central level, which includes, in most of the cases, a description of the cases by age, sex and sanitary areas. At central level most of the analyses are performed by the same person who performs the data management.
The analyses at central level consist in a description of the epidemic by time and place (sanitary areas). The statistics that are computed are: total number of cases by week, total number of deaths, weekly incidence, attack rate and case fatality ratio. Graphs that represent the evolution of these statistics are automatically produce by the Excel© file. The information by sub-region is available but the summary statistics are not computed. As commented before, no individual information of cases is analyzed at central level.

g. Results dissemination

No systematic report is written and shared so far, although there are plans to create a national epidemiological bulletin. The Excel© contains a sheet with summary statistics (on number of cases and deaths) by region that is sent to the MPH. This information is also shared with other partners (WHO, UNICEF, NGOs) in a weekly base during the meetings of the Cholera Tasks Force. INASA also produces internally tables with the weekly number of regions and sanitary areas that have reported, but this information is not normally shared unless required (i.e. daily to the MPH during outbreaks).

Retro-feedback to the regions is not systematically provided; nonetheless information is shared when demanded by the regions. Few regions provide feedback to the sanitary areas regarding the progress of the cholera outbreak.

During cholera outbreaks there are monthly meeting organized between health technicians and the regions in order to update the health technicians with the activities being implemented.

h. Privacy, confidentiality and system security

The national technical guidelines state that as part of the management of public health data, the staff working on surveillance activities should watch that the surveillance system safeguards against the privacy of individuals. Nonetheless, there is no specific systems set up in order to ensure the privacy of the patients and the confidentiality; neither a security system is implemented to control the access to the databases. In the notification forms it is specified the patient’s name, family name, age and sex, but this information is not entered in the data base.

6.3.7 Period of time of data collection

The surveillance activities run during all the year. No specific activities are reinforced during cholera outbreaks, but daily visits to the facilities that register higher amount of cases to collect the data. The WHO reinforced the human capacity of the national staff with a consultant during the last epidemic.

6.3.8 Resources used to operate the surveillance system

Due to the recent changes in the administration of the MPH, it was not possible to find accurate information on the funding sources and human resources requirements for the surveillance system.

Normally the funding for cholera surveillance comes directly from the MPH as part of the national budget for the integrated surveillance of diseases, but it seems that there is no specific budget for cholera surveillance. There is also some funding coming from the Action Plan for West Africa.

The WHO collaborates with technical support as providing training or communication means (radios, mobiles...).
6.4 Description of the performance and attributes of the surveillance system

6.4.1 Usefulness

In terms of utility, differences should be made between geographical areas, objectives and case definition.

a. Detecting watery diarrhoea cases:

The cholera surveillance system of Guinea Bissau is well organized to detect watery diarrhoea cases. Its decentralized structured theoretically permits the detection of cases even in the more isolated geographic areas. In reality, it is useful in detecting watery diarrhoea cases among urban and less rural areas. In the more isolated geographical regions, it is frequent that the first cases are missed and following cases are not detected until a number have accumulated or deaths have occurred. This affects mainly those areas that do not have a health centre and are supported only by the CHU.

Furthermore, it is frequent that the patients do not seek care due to cultural problems as stigmatization, embarrassment (patients seek care at night, or prefer to go to Simão Mendes Hospital), search of care at the traditional healer, funeral customs (if a cholera death is reported it is mandatory to bury it rapidly, but the family prefer to wait for the relatives to arrive), etc. Also, in the more isolated areas there are accessibility problems specially during the rainy season: around 25% of the sanitary areas are not accessible during an average of three months a year.

b. Detecting the first cholera cases:

Regarding the detection of the first cholera cases, there are also disparities among more and less remote areas. During the rainy season, several rural areas become inaccessible and samples cannot be sent to the LNSP for confirmation. Furthermore, in those areas covered only by a CHU, the community health worker cannot take samples by himself and must wait for the person in charge from the health centre to come and take the sample which delays further the detection of cholera cases.

Other factors identified as barriers by the system users in the detection of the first cholera cases are:

- lack of expertise in collecting the sample (specially among the ex-combatants)
- workload
- lack of motivation of the staff
- the self-medication with antibiotics before the sample is collected
- lack of resources
- shortness of tubes with Cary-Blair media
- lack of fridge or stable electricity supply to keep the cold chain

The quality of the sample and the shipment cannot be subsequently assured. Additionally, the LNSP had been short of reagents in the months previous to the evaluation, not being able to process the samples that arrived.

c. Timeliness in the identification of cases:

Timeliness in detecting cholera cases or deaths cannot be as well ensured. Different causes were identified:

- At local level, delay in the identification of cases due to the factors explained above.

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- At regional level there is a delay in notification (which, in principle, should be daily), mainly due to lack of resources (telephone, radio), although this differs among the sanitary areas.

d. Providing appropriate and quick response to cases and epidemic outbreaks

Once a suspected cholera case is detected, a nurse from the health centre travels to the place affected in order to confirm the patient meets the case definition, take samples to be sent to the LNSP, do contact tracing and dismiss that previous cases have occurred in the same community or that there are more concurrent cases not identified so far. In case it is necessary, a team from the region travels to give technical support. The response to outbreaks is not considered to be rapid enough by the system users mainly due to problems in the notification (late, not appropriate in all structures).

In April 2009, the ERR were created to support the regions when needed. Its main objective is to contribute in the reduction of morbidity and mortality related to outbreaks capable of creating epidemics or health-related alerts of international relevance. As part of their activities, the ERR should deploy urgently, within a maximum of 48 hours, the gaps at regional and local level regarding (a) surveillance, (b) management of epidemic and (c) case management. They are constituted by an epidemiologist, a clinician, a laboratory person, a communication expert and a representative from the Hygiene and Sanitary department. At the moment of the evaluation, the ERR were still not active due to lack of resources.

The users identified the transport of patients to the health facilities as a barrier to ensure the rapid management of cases: taxis deny carrying sick people, there are not enough ambulances, and boats sometimes are not available. On the other hand, the management of cases is not appropriated in some areas as several centres had to close due to lack of staff.

The system is also limited in the identification of associated factors with an outbreak. There is no information regarding causative factors for cholera in the database and therefore there are not further analysis done in order to identify potential etiological factors.

e. To immediately report cases and deaths

As a result of the delay in detecting the cases, the reporting of cholera cases is not done on a timely manner. In addition, in the rural areas, there is a delay in the reporting due mainly to lack of resources: some of the health centres lack of mobile phones or radio to enable to report promptly.

6.4.2 Simplicity

a. In the detection of cases:

According to the users, the information required to identify a suspected cholera case (number of stools in 24 hours, age, and level of dehydration) is easy to obtain; the number of variables included is considered appropriate and the users do not find it a complex procedure.

On the other hand, the identification of a confirmed case is not considered easy since it requires the collection of a stool sample that has to be sent promptly to the laboratory in Bissau ensuring the maintenance of cold chain and the resources are not always available. The users identified some barriers on this respect: sometimes they don’t arrive on time to collect the sample, they do not have tubes with Cary-Blair transport media or they do not have fridges in the health centres. In addition, in more remote areas, as in the islands, or in regions that become inaccessible during the rainy season, it cannot be ensured that the samples arrive at the laboratory in the recommended time.
b. In the flux of data:

The flux of data is clearly stated and explained in the national guidelines. Although the structure of the surveillance system has changed recently, the reporting sources and the person in charge are clear. The users classify as easy the way the information flows from the different levels of the surveillance system. The papers forms used to collect information from the cases are simple to use.

The main inconvenient that the users face is the lack of means in some sanitary areas to report the cases to the region: motorcycle, or motorcycle but not gas, public transport available, in the area, telephone, radio, and internet. Also the lack of motivation among the staff was recognized as an obstacle in the flux of data: the wage cut forces that some of the staff go to work on the fields.

Regarding the flux of data from the regions to INASA, the users agreed that it is an easy procedure, helped by the fact that there is a free number to call ( linea amarilla) (although not available from all the regions) and that the epidemiologists call the regions when they haven’t received the weekly call. Nonetheless, there is not intranet or internet in most of the regions which limits the possibility to transfer electronic files. Indeed, all the information is transferred between the different levels in paper support or telephone calls. This fact limits the timeliness and the amount of information that can shared between levels, but it remains the system simple.

Several obstacles on the reporting, affecting mainly the rural areas, where identified during the evaluation. Some of these were the lack of transport to report from the CHU to the sanitary areas, or the lack of telephone, radio, or internet in the areas to report to the sanitary regions.

c. In the data management:

As explained before, the data entry is still done at central level (INASA) and the information that is entered in the database is limited. Thus, the data management is simple; nonetheless, the use of an aggregated database limits the data check and makes difficult the correction of the information, which is mainly collected by phone during epidemics.

d. In the analysis and dissemination of data:

The analyses are performed mainly at central level, and are simple. It consist in a description of the epidemic by time and place (sanitary areas). A table containing the number of cases and deaths by region is generated automatically in the Excel® file and it is distributed to the MPH and the other partners involved in cholera control activities during the epidemics.

6.4.3 Flexibility

The national guidelines for the integrated surveillance system have been recently reviewed to adapt them to the new WHO guidelines for integrated disease surveillance. The simplicity of its structure has allowed the cholera surveillance system easily adapting to other public health needs. Indeed, the recently revision of the national guidelines and epidemiological surveillance indicators have been defined by the users as an easy procedure.

Regarding the level of difficultness in the change of any existing procedure within the surveillance system (i.e. implementation of a sentinel surveillance system, utilization of rapid diagnosis test), most of the users were keen to introduce changes that would improve the detection of cases and an earlier control of an outbreak. On the other hand they showed some concerns, mainly related to the necessity of training, prior to the implementation of any new practice, and to the availability of resources.

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14 Segunda edição do guia técnico para a Vigilância Integrada das Doenças e Resposta (VIDR) na Região de África
6.4.4 Quality of the data

The quality of the data collected on the paper forms and on the cholera database is generally high regarding the level of completeness; also the missing information is unusual. The epidemiologists from INASA ensure that the information reported by phone from the regions match the information received on the paper forms.

Nonetheless, the weekly data cannot be representative of the country since some sanitary areas recurrently do not report or do so but not on time. Thus, there is usually a delay that has to be considered in the interpretation of the data during the outbreaks. Moreover, many of the information collected on the paper is not transferred to the database, which only includes number of cases and deaths aggregated by sanitary region and epidemiological week. Missing information is unusual in this aggregated data base.

There are none periodical crosschecking done with the regions and/or the sanitary areas to ensure the quality of the data. Some times the information contrasted, but it is done in an informal and not standardized way, which does not allow its assessment. There are no backups done and the modifications and additions to the database are always done over the same version.

6.4.5 Acceptability

Generally the users are satisfied with the cholera surveillance. They agreed that the case definition outside of an epidemic period is appropriate. However, the definition during epidemic period was considered too sensitive as each diarrhoea case is classified as cholera. Regarding its use, the majority of health care workers declared not to apply the case definition accurately and, for example, children under five where systematically included. In general, outside and inside epidemic periods, reported cholera cases are not considered to be representative of the real cholera cases.

The users were also satisfied with the time required to confirm the cases at the LNSP (from two to four days) although they expressed interest in a quicker method, as the rapid diagnosis test for cholera. In general, all the users agreed that this would be a very useful tool that would improve the promptness of the case detection at the beginning of an outbreak, and would improve the specificity of the case definition during epidemics.

The method used for reporting the cases is considered clear and easy. However, a number of users agreed that it would be more interesting to report additional information as age and sex. Deadlines for reporting to the higher level are generally considered appropriate, except between the most remote sanitary areas and the regions where deadliness are difficult to achieve, mainly because of communication difficulties. However, in average, 34.5% of the sanitary areas do not send the weekly reporting form (although it is unknown how many of this shared this information through a different mean, i.e. verbal communication) and 54.5% send it after the deadline is met.

Regarding the information produced with the data gathered through the cholera surveillance system, the health technicians from the sanitary areas complained that they did not receive periodically feedback from the sanitary regions on the situation of cholera in their area or in the country. They all agreed this would be useful information to improve prevention and control measures.
6.4.6 Sensitivity

- Of the surveillance system to detect cholera cases:

During epidemic periods, this may be affected by the proportion of patients that are captured by the health care system, the sensitivity of the case definition and the stability of the reporting.

- A high health care seeking behaviour among the citizens is crucial in order to ensure that the surveillance system detects a high proportion of the cholera cases occurring in the community, but there are disparities on this respect among the population as commented below in the representativeness section.

- The number of cases reported might be reduced during the outbreaks when the burden of work is especially high. Specific problems identified by the users were the shift turns, during which if patients were admitted it is likely that they will not be registered properly, and the motivation of the staff, mainly related with the cut in salaries.

- During cholera outbreaks, the case definition is based solely on the clinical symptoms of the patients, which makes it highly sensitive. This high sensitivity could be reduced by the exclusion of patients under five years of age.

During inter-epidemic periods, only patients that test positive to culture are considered cases. The sensitivity of the case definition is influenced by the factors explained above as well as by factors related with the laboratory confirmation: the proportion of cholera patients that are tested for cholera and the sensitivity of the culture.

- As said before, the isolation of some rural areas was identified by the users as a difficulty for the detection of cases, and therefore for collecting and shipping samples to the LNSP.

- The culture of cholera is a high sensitive technique, although this sensitivity is influence by the quality of the transport (errors in the handling of the sample, media, cold-chain) and the laboratory technique, increasing the number of false negative results.

- In addition, the fact that only patients five years of age or older are tested reduces the sensitivity of this definition.

- Of the surveillance system to detect an outbreak:

The capacity of the surveillance system to detect an outbreak is influenced by the definition of outbreak. If defined as the existence of two or more cases of cholera in the same geographical region, the cholera surveillance system of Guinea Bissau is likely to have a low sensitivity in detecting outbreaks. The sensitivity of the system increases once the numbers of cases raises or deaths start to occur. On the other hand, it is likely that the surveillance system is quite sensitive to detect large epidemics.

6.4.7 Predictive Value Positive (PVP)

It was not possible to accurately assess the PVP of the surveillance system.

Regarding the PVP in the detection of the first cases of an outbreak, since all the cases reported as cholera cases have been positive in culture, the expected PVP is 100%. On the contrary, during epidemic periods it is highly likely that none cholera cases are included in the registers due to the low specificity of the case definition, and therefore a high proportion of non-cholera cases (diarrhoea cases of different aetiologies) are expected to be classified as cholera cases. Indeed in the 2008-09
outbreak, 116 samples were sent to the LNSP for cholera culture, of this 27 were positive, which means a PVP of 23%. However, since samples are not systematically collected from patients during outbreaks we could not calculate a real PVP for the system during epidemics.

6.4.8 Representativeness

The data coming from the surveillance system could not be representative of the whole country both during inter-epidemic and epidemic periods. It was not possible to collect some of the information needed to evaluate the representativeness of the data (i.e. geographic origin of the sample during inter-epidemic periods); nonetheless, there are indicators like the coverage of the health system, the delay or the percentage of missing information from the regions that shows disparities in the data collection. Indeed, as commented above, there are disparities among regions in the detection of the first cases of the epidemic and the reporting of subsequent cases. There was an agreement among the user of the system to classify the urban areas better represented than the rural areas.

According to the Plan Estratégico there are significant regional disparities in health care access among the population. Although the number of health facilities is inadequate but meets the standards of WHO 1/10000 inhabitants (there are about 1/9000 inhab), most of the structures of health care in rural areas are closed for lack of nursing staff. The use of existing services is weak, mainly due to the long distance the patients need to travel to reach a facility. Thus, the population is turning back to traditional medicine.

6.4.9 Timeliness

It was not possible to evaluate the delay in the health care seeking since it the onset date is not introduced in the electronic database. Nonetheless, due to the stigmatization of the disease, the sought of care outside the health care system (traditional medicine), the lack of expertise of particular health staff (i.e. ex-combatant), and the difficultness faced in collecting and shipping the samples from some of the more isolated areas may affect the timely detection of the first cases and therefore the outbreak detection. Indeed, in the 2008 cholera outbreak, the first cholera case was detected on May 5th, 2008, but was not reported to the MPH until May 15th. There is also a delay in the notification of an outbreak. As an example, the 2008 cholera outbreak was not officially declared until July 2008.

6.4.10 Stability

Due to the changes in the structure in the Ministry of Public Health, this section could not be completed. Nonetheless, the new building and the new structure of INASA should help to improve the stability of the system.

A specific assessment should be done in the future once the new structure is fully operative.

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7 Discussion

7.1 Main results

- A well functioning cholera surveillance system in Guinea Bissau is relevant since:
  
  - Cholera is endemic in Guinea Bissau and high burden epidemics, with high social, political and economical impact, are reported periodically.

  - These epidemics are expected to happen in the future due to the poor water and sanitation structure in the country.

  - A timely detection of the first cases of an outbreak allows the implementation of timely control measures, useful to reduce the extension of the outbreak (geographically) and its burden (reducing both, the number of cases and deaths).

- The overall surveillance system is going through a review process as a result of the structural changes that have undergone in the Ministry of Public Health.

- The cholera surveillance system of Guinea Bissau is a well organized decentralized structure, which resides within the National Health System, with well defined objectives. The identification of suspected cases is done at the health centres. The case investigation is done by the sanitary areas. The sanitary regions give technical and human resources support when needed. The confirmation of cholera infection is done at central level, at the National Public Health Laboratory. All the information is combined at central level, at the recently created National Institute for Public Health. The system users know well the objectives of the surveillance, as well as the definition of cases.

- The cholera surveillance system from Guinea Bissau is useful in detecting watery diarrhoea cases, although it is less useful in providing early detection of cholera cases and epidemical outbreaks.

- Although the integrated surveillance system has as target population the whole country, several barriers have been identified in the detection of cholera cases:

  - Over 60% of the population resides more than 5 Km from a health centre, which means a high risk of being missed by the surveillance activities. The CHUs are an excellent tool to minimize this, but almost 50% of the CHUs are not active due to lack of resources or lack of motivation from the staff.

  - There is a turn to traditional medicine in the rural areas

  - Cholera is still a stigmatizing disease in Guinea Bissau

- The users of the system have a good knowledge of the steps to follow to confirm cholera cases outside of an outbreak, although the confirmation of cases is limited by the access to patients, lack of trained staff, sporadic lack of Cary-Blair media, difficultness in ensuring the maintenance of the cold chain and problems in transport during the rainy season.

  During cholera epidemics, no samples are systematically collected in order to measure the role of *vibrio cholerae* along the outbreak.

- The structure for data reporting from lower to upper levels is well organized. The flux of information is done in a simple and in principle rapid manner and roles and responsibilities are clearly defined. Nonetheless obstacles in the flux of data were identified: lack of transport, gas telephone, radios. In addition, no individual data is reported, only aggregated data.

- The quality of the data collected is generally high, with a good level of completeness and unusual missing information, but the data are not representative of the country. The information collected
from the cases are not completely transferred to the databases, which only contains aggregated data on cases and deaths by region. This limits the analysis that can be done at central level to describe the outbreak. Data is not introduced in databases until it reaches the central level.

- The decentralized structure permits in theory the detection of cases even in the more isolated areas, but several difficulties were identified as the access to health care, to a confirmed diagnosis, the sought of care, lack of expertise and lack of motivation in the staff.

- The flux of information is clearly stated in the guidelines and the procedure is well known by the users. Nonetheless, the lack of a health information system makes difficult the transmission of the information between levels and all the information is exchanged through paper forms and phone calls.

### 7.2 Limitations of the study

There are several limitations in the evaluation, mainly related with the moment in time for the performing of the evaluation and its duration, which should be taken into consideration.

The field visit of the epidemiologists coincided with two national holidays, which limited the collection of data and could introduce an information bias since the basic health structure was not enough explored during the interviews. Only few sanitary areas were visited, more extensive studies in rural areas are needed; nonetheless, all the regional directors were interviewed and participated in the focal discussion. Also, the community was not well assessed; information coming from discussions with community leaders, associations, or the general population would had provided valuable information to assess their role and opinions regarding cholera surveillance, but it was not possible because of time constrains.

The recent modifications in the administration made more complex the evaluation of the surveillance system, since some of the describe structures and changes will be set up in the coming months. Nonetheless, the usefulness of this report can be higher because of this fact, since the result of this evaluation can be used to orient some of the changes that will take place.

The evaluation was done outside of epidemic period, therefore the data regarding the performance of the system (timeliness; completeness) relied on the information provided by the system users.

In addition, because of the limited duration of the mission, there was no time to carry out a specific data entry to assess some additional indicators of interest. These additional analyses could be done locally if the users consider this information important to improve the system, since the protocol used to carry out the evaluation will be provided to the health authorities.

Finally, it is important to point out that this document is not a guideline to control cholera in the country or to organize the preparedness plan. This report is oriented to identify barriers and to provide recommendation in order to improve the epidemiological surveillance of cholera in Guinea-Bissau.


8 Conclusion and Recommendations

8.1 Main achievements accomplished

The Integrated Surveillance System for Diseases and Responses, and specifically the cholera surveillance system, has accomplished many achievements:

- The network of community health workers is a very useful tool in the detection of cases there where the health system faces difficulties. In addition, some of the sanitary areas work with the so called "colaboradores de salud" who do syndromic surveillance during outbreaks and report to the health technicians the diarrhoea cases in the community who are not willing to go to the health centre.

- The users of the surveillance system are aware of the importance of high quality surveillance activities and of the prompt identification of cases.

- During 2009, The Ministry of Health, with the support of partners (OMS, UNICEF, PNUD), called for the implementation of a study that analyzed the causes that determine the occurrence of cholera in Guinea-Bissau. Its main objective was to establish a plan to control this disease in the country. The results were translated in the publication of the Strategic Plan for Prevention and Control of Cholera in Guinea Bissau that was published in May 2009. It makes recommendations to contribute to reduce morbidity and mortality from cholera in the country through the:
  - strengthening of the coordination, both inter-ministerial and within the Ministry of Health
  - strengthening of the surveillance activities
  - meiorating the outbreak response
  - strengthening the health system in order to make available to 80% of the population access to primary health care (5km of a health-care structure)
  - promoting research
  - Implementing specific interventions in sanitation, hygiene and access to drinking water.
  - strengthening communication activities to change behaviours

- The MPH has also been recently involved in the preparation of its second National Health Development Plan (PNDS II), in order to adapt the previous version to the National Strategic Planning for Poverty Reduction. The reinforcement of the Surveillance System for Diseases and Responses is part of the PNDSII, which proposes as part of its recommendations the following strategies:
  - Strengthening the epidemiological surveillance system
  - Development of an early warning system for diseases of epidemic potential
  - Creation of a rapid intervention team
  - Strengthening the operational capacity of the LNSP
8.2 Main recommendations:

1. To reinforce surveillance activities in areas repeatedly affected by cholera outbreaks (i.e. Biombo, Bissao and Bijagos) in order to detect timely the first cases of the epidemic:
   a. Implement a sentinel surveillance system in these areas
   b. Implement the use of rapid cholera diagnosis tests, ensuring that correct training has been provided to the staff before the introduction of the tests
   c. Ensure the correct transport of positive samples to the LNSP in order to verify the diagnosis
   d. Ensure the availability of reactives in the LNSP and enhance its role in the confirmation of cases

2. To extend and/or increase surveillance activities (improvement of case detection) in those geographic areas more isolated, especially those repeatedly affected by cholera epidemics, through:
   a. Operation of all health facilities (including HBU) with allocation of staff and resources
   b. Provide periodical training of staff in case detection. This could be reinforced through calls/visits to the regions historically affected at the beginning of the epidemics and on the weeks preceding the expected first cases.

3. To perform a health care seeking behaviour survey to identify areas less disposed to seek care at any health facility and provide health education to the population in identified areas

4. To identify the HBU, health centres, sanitary areas and sanitary regions that constantly do not report or do but not on time and identify the reasons (lack of means, lack of motivations) in order to target them, i.e. through the installation and maintenance of the newly bought radios

5. To improve the control of the epidemics through inter-departmental collaboration, specifically with the newly created Direcção Geral da Prevenção e Promoção de Saúde, in order to implement timely control measures as the identification and closure of contaminated wells.

6. To create a national standard database for cholera cases (individual and aggregated) to be implemented at regional and central level, promoting on the same time the data entry from each region at a Direcção Regional level.

7. To continue with the epidemiological training (focusing on surveillance: data management and analysis, and outbreak response). Specific training in analytical tools would be desirable on a second step
## 8.3 Specific recommendations to identified barriers:

<table>
<thead>
<tr>
<th>1. Promptly identification of cases</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main barriers identified</strong></td>
<td><strong>Recommendations</strong></td>
</tr>
<tr>
<td><strong>a. Access to care</strong></td>
<td><strong>a. Access to care</strong></td>
</tr>
<tr>
<td>- More than 60% of the population reside further than 5km from a primary health care structure</td>
<td>- Operate all health facilities (centres and PS) with allocation of staff and resources</td>
</tr>
<tr>
<td>- 40% of the USCs are not active</td>
<td>- Perform a health-care seeking behaviour survey</td>
</tr>
<tr>
<td>- Turn to traditional medicine in search of care</td>
<td>- Provide health education in identified areas</td>
</tr>
<tr>
<td>- Stigmatization</td>
<td></td>
</tr>
<tr>
<td><strong>b. Case definition</strong></td>
<td><strong>b. Case definition</strong></td>
</tr>
<tr>
<td>- During epidemic periods, the case definition excludes patients under five years old, although they are also treated in the cholera treatment centres</td>
<td>- To adapt the cholera case definition during outbreaks in order to include all the groups of age.</td>
</tr>
<tr>
<td>- The low PVP of the case definition during epidemics allows the registration of a high proportion of diarrhoea cases that do not meet the clinical criteria for cholera</td>
<td>- To improve the clinical identification of cholera through the training of the staff at the cholera treatment centres</td>
</tr>
<tr>
<td><strong>c. Detection of suspected cases</strong></td>
<td><strong>c. Detection of suspected cases</strong></td>
</tr>
<tr>
<td>- Some of the CHW are not familiar with the cholera case definition</td>
<td>- Provide periodical training to the CHW</td>
</tr>
<tr>
<td>- Lack of motivation among the staff in the HBU and the health centres</td>
<td>- Reinforce cholera surveillance at the beginning of the epidemic periods through the call/visit to the CHW</td>
</tr>
<tr>
<td><strong>d. Case confirmation</strong></td>
<td><strong>d. Case confirmation</strong></td>
</tr>
<tr>
<td>- Lack of trained staff to collect the samples</td>
<td>- Reward the staff in the HBU providing material for the HBU, training,…</td>
</tr>
<tr>
<td>- Around 25% of sanitary areas are not accessible an average of 3 months per year</td>
<td>- Increase the supervision activities from the sanitary regions to the sanitary areas, and from the sanitary areas to the health centres and health units.</td>
</tr>
<tr>
<td>- Lack of resources to ensure shipment to the LNSP: transport, tubes with media, cold chain</td>
<td>- Enhance the role of the LNSP in the confirmation of cases</td>
</tr>
<tr>
<td>- Occasional lack of reactive in the LNSP</td>
<td></td>
</tr>
</tbody>
</table>
### 2. Reporting of cases

<table>
<thead>
<tr>
<th>Main barriers identified</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a. Lack of means to report:</strong>&lt;br&gt;• Some HBUs become inaccessible during the rainy season&lt;br&gt;• Some HBUs lack of radios, mobile, telephone coverage,...&lt;br&gt;• Some at the sanitary areas lack of means to report: radios, mobile, telephone coverage</td>
<td><strong>a. Lack of means to report:</strong>&lt;br&gt;• Improve the communication with the HBU, sanitary areas, and regions.&lt;br&gt;• Ensure the installation and maintenance of the newly bought radios, especially in those areas repeatedly isolated during the rainy season&lt;br&gt;• It would be desirable to develop an intranet system to facilitate the exchange of information between regional and central level</td>
</tr>
<tr>
<td><strong>b. Cases not reported during epidemics:</strong>&lt;br&gt;• This is facilitated by the high burden of work, together with the lack of motivation of the staff.</td>
<td><strong>b. Cases not reported during epidemics:</strong>&lt;br&gt;• To reduce the number of cases not registered through:&lt;br&gt;  · Training the staff working on the CTC on the importance of data collection&lt;br&gt;  · Providing periodical feedbacks with the ongoing of the outbreak to the staff&lt;br&gt;  · Ensuring periodical visits from the cholera reference person from the Direcção Regional to the CTC</td>
</tr>
</tbody>
</table>

### 3. Promptly detection and control of outbreaks

<table>
<thead>
<tr>
<th>Main barriers identified</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a. Detection of the outbreak</strong>&lt;br&gt;• Mainly related with the delay in the identification/collection/shipment of samples&lt;br&gt;• Results from the lab take 2-4 days to be available</td>
<td><strong>a. Detection of the outbreak</strong>&lt;br&gt;• Recommendations above&lt;br&gt;• Use of rapid test for cholera detection at the health centres and hospitals</td>
</tr>
<tr>
<td><strong>b. Control of the outbreaks</strong>&lt;br&gt;• No information regarding risk factors is introduced in an electronic database and analysed&lt;br&gt;• No analysis regarding risk factor identification are systematically done</td>
<td><strong>b. Control of the outbreaks</strong>&lt;br&gt;• Ensure all the information regarding risk factors is entered in a database&lt;br&gt;• To develop a plan of analysis to implement during outbreak situations to identify sources and provide promptly targeted control measures&lt;br&gt;• Reinforce the technical capacity of the epidemiological team with experienced staff in surveillance and outbreak investigation to follow up the activities at central and regional level&lt;br&gt;• Ensure rapid intervention from the ERR when the regions needed in order to control an outbreak</td>
</tr>
</tbody>
</table>
## 4. Data management and analysis

<table>
<thead>
<tr>
<th>Main barriers identified</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>• There is not a standard database at national level for individual cases</td>
<td>• Create a national standard database for cholera cases (individual and aggregated)</td>
</tr>
<tr>
<td>• No data entry is systematically done below the central level</td>
<td>• Implement the standard database homogenously at regional and central level</td>
</tr>
<tr>
<td>• Lack of historical database</td>
<td>• Promote the data entry from each region at a Direcção Regional level</td>
</tr>
<tr>
<td>• There are no database backups done</td>
<td>• Create a system to back up the database periodically</td>
</tr>
<tr>
<td>• The modifications and additions are always done over the same version of the database.</td>
<td>• To continue with the epidemiological training (focusing on surveillance: data management and analysis, and outbreak response). Specific training in analytical tools would be desirable on a second step</td>
</tr>
<tr>
<td>• There are none periodical crosschecking done with the regions to ensure the quality of the data</td>
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</table>
9 Annexes

9.1 Annex 1. Semi-structured interview
HEALTH FACILITIES:

1. Is it mandatory to declare cholera cases in Guinea Bissau?  
   Yes □  No □  Unknown □

2. Is there a national technical document for cholera surveillance in Guinea Bissau?  
   Yes □  No □  Unknown □

3. If yes, describe: Do you have a hard copy here?  
   Yes □  No □  Unknown □

4. What is the cholera case definition that you use (type & number of variables)?
   __________________________________________________________
   a. Does it differ in non-epidemic and epidemic periods?  
      Yes □  No □
   b. If yes, describe each:  
      - Non-epidemic period:  
        __________________________________________________________
      - During outbreaks:  
        __________________________________________________________

5. Do you agree with the definition the for a cholera case from the “Technical guidelines”:  
   i. For non-epidemic periods?  
      Yes □  No □
   ii. For epidemic periods?  
      Yes □  No □

6. Is it difficult to detect a cholera case when there is not an epidemic?  
   Yes □  No □

7. Is it difficult to detect a cholera case when there is an epidemic?  
   Yes □  No □

8. When there is not an epidemic, based on what do you test a patient for cholera?
   __________________________________________________________

9. How do you do to collect the sample?
   __________________________________________________________

10. How do you prepare the sample?
    __________________________________________________________

11. How do you ship the sample?
    __________________________________________________________

12. During a cholera outbreak, when would do you take a sample from a patient to be tested?
    __________________________________________________________

13. Have you lacked appropriate resources to obtain, prepare and ship the samples at any time during the last 6 months?  
    - Containers:  
      Yes □  No □
    - Medium:  
      Yes □  No □
    - Boxes:  
      Yes □  No □
    - Stamps:  
      Yes □  No □
    - Gloves:  
      Yes □  No □
    - Other: ______________________________

14. How long does it take to receive the results from the lab?  
    ______________________________
15. May I see the forms where you collect information from the cases?

16. Have you lacked appropriate resources for filling in the forms at any time during the last 6 months?
   - Paper forms: Yes ☐ No ☐
   - Pens: Yes ☐ No ☐
   - Other: ____________________________

17. Do you collect the information through directly interviewing with the cases, or copied from the clinical forms?

18. Do you find it difficult to collect all the information? Yes ☐ No ☐

19. If yes, what aspect is the most difficult/complex?

20. How long does it take to collect all the information from the case? ____________

21. Did you receive specific training for this activity (detecting a case & filling the form, collect the sample)? Yes ☐ No ☐

22. If yes,
   a. When? ____________________________
   b. Where? ____________________________
   c. By whom? ____________________________
   d. For how long? ____________________________

23. Do you have any type of supervision on the work you do? Yes ☐ No ☐

24. If yes, who provides this supervision? ____________

25. How is the supervision done? ____________________________

26. How would you improve the way a cholera case is detected:
   i. During non-epidemic periods?
   ii. During epidemic periods?

27. Is it you who reports the data to the Direção Regional de Saude? Yes ☐ No ☐

28. If no, who is it? ____________________________

29. How do you report the cases to the region?
   Telephone ☐ Mail ☐ Email ☐ Fax ☐

30. If in paper form, may I see it? Yes ☐ No ☐
   - Check variables included: ____________________________

31. Do you find it hard to send the forms before the deadline? Yes ☐ No ☐
   - If yes, why? What is the deadline?

32. Have you lacked appropriate forms at any time during the last 6 months have enough resources for filling and sending the forms?
   - Paper forms: Yes ☐ No ☐
   - Pens: Yes ☐ No ☐
   - Envelopes: Yes ☐ No ☐
   - Stamps: Yes ☐ No ☐
   - Other: ____________________________

33. How would you improve the way the reporting of a cholera case is done:
i. During non-epidemic periods?
ii. During epidemic periods?

35. Do you know what the reporting is for (objective of reporting a cholera case)? Yes □ No □

36. If yes, what is its objective?

(If no, please explain)

37. Do you think this is useful for the detection and control of a cholera outbreak? Yes □ No □

38. Do you receive reports with the cholera cases detected in your health facility? Yes □ No □

39. If yes, with what periodicity? ___________________

40. If you don’t receive them, would you like to receive it? Yes □ No □

41. If yes, what would you use it for?

42. Could you tell me how many meeting per year do you have with the Region?

43. What are the objectives of these meetings?

44. If the new “Technical guidelines” made changes, how difficult would you find the following changes?
   a. To diagnose cholera during non-epidemics in the health facility through a diagnosis rapid test?

Very difficult □ Difficult □ Easy □ Very easy □

b. To diagnose cholera during epidemics in the health facility through a diagnosis rapid test?

Very difficult □ Difficult □ Easy □ Very easy □

c. To change the paper forms from the patient?

Very difficult □ Difficult □ Easy □ Very easy □

45. If the new “Technical guidelines” made changes, how difficult would you find the following changes?

46. Are you satisfied with the way you report to the region? Yes □ No □

47. If not, why? ___________________

48. Are you familiar with the population covered by your health facility (age, sex, population by village, total population...)? Yes □ No □

49. If yes, who provided this information?

50. Do you think there are patients that might not seek care in case of severe diarrhoea or cholera? Yes □ No □

51. Do you think this might change during a cholera outbreak? Yes □ No □

52. Do you think there might be patients that should be tested for cholera during non-epidemic periods and are not for any of this reasons?
   i. No resources (container, medium,...)? Yes □ No □
   ii. No human resources? Yes □ No □
   iii. Work load? Yes □ No □
53. Do you think that during an outbreak there are patients who receive treatment but are not included in the registration books for any of these reasons?
   i. Workload (very busy!)? Yes ☐ No ☐
   ii. No resources (pen,...)? Yes ☐ No ☐
   iii. No book (completed and there is not a new one)? Yes ☐ No ☐
   iv. Other: ____________________________________________

54. What do you normally do when a ASC reports a suspected cholera case?

55. How many USC are under your “area sanitaria”? ____

56. How do you communicate with them?
SANITARY REGIONS:

1. What are the roles of your position?
   _____________________________________________________

2. Does it change during cholera outbreaks? How?
   _____________________________________________________

3. Did you receive specific training for this activity (detecting a case & filling the form, collect the sample)? Yes ☐ No ☐

4. If yes,
   a. When? _______________________________
   b. Where? _______________________________
   c. By whom? ____________________________
   d. For how long? _______________________

5. Could you tell me what is the structure of the Direcções Regionais de Saúde?

6. What is the cholera case definition used in Guinea Bissau (type & number of variables)?

7. Does it differ in non-epidemic and epidemic periods? Yes ☐ No ☐

8. If yes, describe each:
   a. Non-epidemic period: __________________________
   b. During outbreaks: ____________________________

9. When should a cholera case be reported?
   _____________________________________________________

10. How is a cholera outbreak defined?
    _____________________________________________________

11. Who reports to you the cholera cases?
    _____________________________________________________

12. How is the report done (type of forms, periodicity: a. During outbreaks: ____________________________
   b. During inter-epidemic periods: ____________________________

13. Are you satisfied with the way you are reported (method, quality)? Yes ☐ No ☐

14. If not, why & how would you improve it? Any difference between non-epidemic and epidemic periods?
    _____________________________________________________

15. When there is not an epidemic, based on what is a patient tested for cholera?
    _____________________________________________________

16. Who and how collects, prepares and ships the sample?
    _____________________________________________________

17. How long does it take to receive the results from the lab? ___________

18. Who receives the results from the lab? ___________

19. Do you think it would be feasible to use a cholera diagnosis test that the nurses could use by themselves? Yes ☐ No ☐

20. Have the health centres of your region lacked any of the following resources at any time during the last 6 months?
   - Paper forms: Yes ☐ No ☐
   - Pens: Yes ☐ No ☐
   - Containers: Yes ☐ No ☐
   - Medium: Yes ☐ No ☐
   - Boxes: Yes ☐ No ☐
   - Stamps: Yes ☐ No ☐
21. How do you process the paper forms that you receive? (If saved on a database, ask for software, variables included, who does data entry, …)

22. Where and how do you keep the forms received (historical records)?

23. Is there any cholera case that you do not report to the central level?

24. How do you report to the central level (type of forms, telephone, email, fax, periodicity, …):
   a. During outbreaks: ____________________________
   b. During inter-epidemic periods: ____________________________

25. Are you satisfied with the way you report to the central level?  Yes ☐  No ☐
   a. If not, why & how would you improve it?

26. Have you lacked appropriate forms at any time during the last 6 months for filling and sending the forms?
   - Paper forms:  Yes ☐  No ☐
   - Pens:  Yes ☐  No ☐
   - Envelopes:  Yes ☐  No ☐
   - Stamps:  Yes ☐  No ☐

27. Do you know what the reporting is for (objective of reporting a cholera case)?  Yes ☐  No ☐

28. If yes, what is its objective?

29. Do you find the cholera surveillance system in Guinea Bissau useful to detect cholera cases in inter-epidemic periods (outbreaks)?  Yes ☐  No ☐
   a. If no, what do you think the reasons are? And, how could it be improved? (no health-care seeking, no information regarding cholera, stigma, … no lab test done)
   b. Do you think some outbreaks are being missed, or declared late? (How could this be improved?)

30. Do you think that during an outbreak there are patients who receive treatment but are not included in the registration books for any of these reasons?
   - No resources (container, medium, …)? ☐
   - No human resources? ☐
   - They have cholera but they don’t meet the definition to be tested? ☐

- Other: ____________________________
31. What are the procedures to detect the first cholera cases (active surveillance)?

32. In general,:
   a. How would you improve the way a cholera case is detected during non-epidemic periods?
   b. What measures would you implement to improve the control of a cholera outbreak?

33. In general, what measures would you implement to improve the control of a cholera outbreak?

34. Do you have any type of supervision on the work you do? Yes ☐ No ☐
   a. If yes, who provides this supervision?
   b. How is the supervision done?

35. Do you receive reports from an upper level with the cholera cases detected in your region? Yes ☐ No ☐
   a. If yes, with what periodicity?
   b. If yes, are you satisfied with them? Yes ☐ No ☐
   c. If not, why?

36. If you don’t receive them, would you like to receive it? Yes ☐ No ☐

37. If yes, what would you use it for?

38. How many meeting per year do you have with the Region?

39. How many meeting per year do you have with the “técnico de salud” from the health facilities? Yes ☐ No ☐
   a. When was the last one?
   b. What are the objectives of these meetings?

40. Do you receive any type of support during outbreaks? Yes ☐ No ☐

41. Are you familiar with the population covered by your health facility (age, sex, population by village, total population...)? Yes ☐ No ☐

42. If yes, who provided this information?

43. Do you think you have enough resources to run the cholera surveillance system? Yes ☐ No ☐

44. If not, what do you miss?

45. How good do you think the cholera surveillance system from Guinea Bissau is?

46. How do you think it could be improved?

47. If the new “Technical guidelines” made changes, how difficult would you find the following changes?
a. To diagnose cholera during non-epidemics in the health facility through a diagnosis rapid test?
Very difficult □  Difficult □  Easy □  Very easy □

b. To diagnose cholera during epidemics in the health facility through a diagnosis rapid test?
Very difficult □  Difficult □  Easy □  Very easy □

c. To change the paper forms for collecting information from the patient?
Very difficult □  Difficult □  Easy □  Very easy □

d. To change the paper forms used to report the information from the cholera cases?
Very difficult □  Difficult □  Easy □  Very easy □

e. To send the forms to a different organization (i.e. MoH)?
Very difficult □  Difficult □  Easy □  Very easy □
CENTRAL LEVEL:

1. What is your main activity within the cholera surveillance system?

2. Did you receive specific training for this activity (detecting a case & filling the form, collect the sample)? Yes ☐ No ☐

3. If yes,
   a. When?
   b. Where?
   c. By whom?
   d. For how long?

4. What do you think the main objectives of a cholera surveillance system are?

5. Do you know what the case definition for cholera used in the reporting sites is (health centres and hospitals)?
   Yes ☐ No ☐ Unknown ☐

6. If yes, could you tell me what it is?

   a. Does it differ in non-epidemic and epidemic periods? Yes ☐ No ☐
   b. If yes, describe each:
      - Non-epidemic period:
      - During outbreaks:

7. Do you know what the procedures regarding cholera surveillance at local level (health facility) are? Yes ☐ No ☐

8. If yes, could you tell me what they are?

9. Do you know what the procedures regarding cholera at regional level are? Yes ☐ No ☐

10. If yes, could you tell me what they are?

11. Could you please describe the procedures at central level (INASA, DG) with the forms sent by the regions?

12. How many people are involved in the data management, analysis, report writing?

13. How would you describe the role of the WHO regarding cholera surveillance in Guinea Bissau?

14. How difficult it is to finish the reports on time?

15. Do you think the periodicity of the information sent by the regions is the best one? Yes ☐ No ☐

16. If not, what do you think it should be?

17. Do you think the information sent by the regions is the best one? Yes ☐ No ☐
18. If not, what should it be? What additional information would be interesting to collect?

19. Is there any information systematically collected that is not used?

20. Do you think the information sent by the regions is accurate? Yes □ No □
21. If not, how would you improve this?

22. Do you use any technique to verify the quality of the data (as cross-checking with another source –NGOs,...)? If yes, when?

23. Do you think the cholera cases declared by the regions are representative of the global “real” total number of cases?

24. If not, how do you think this could be improved?

25. Do you find the cholera surveillance system in Guinea Bissau useful to detect outbreaks (cholera cases in inter-epidemic periods)? Yes □ No □
   a. If not, why & how would you improve it?

26. Do you think some outbreaks are being missed, or declared late?

27. Do you think there might be patients that should be tested for cholera during non-epidemic periods but are not for any of this reasons?
   b. No resources (container, medium,...)? Yes □ No □
   c. No human resources? Yes □ No □
   d. They have cholera but they don’t meet the definition to be tested? Yes □ No □

28. Do you think that during an outbreak there are patients who receive treatment but are not included in the registration books for any of these reasons?
   a. Workload (very busy!)? Yes □ No □
   b. No resources (pen,...)? Yes □ No □
   c. No book (completed and there is not a new one)? Yes □ No □

29. Do you think there are cholera cases not being detected when there is an epidemic (no health-care seeking, no information regarding cholera, stigma,...)? Yes □ No □

30. If yes, what do you think the reasons are? And, how could it be improved?

31. In general,
   a. How would you improve the way a cholera case is detected during non-epidemic periods
   b. What measures would you implement to improve the control of a cholera outbreak?

32. What do you think about the quality of the data declared by the regions?
33. Do you think it could be improved, and if yes, how?

34. Do you use any technique to complete the missing information?

35. To whom does INASA/DG send the reports on cholera? With what periodicity?

36. Does this change during epidemics? How?

37. Would you make changes on the way the reporting is done? How?

38. Who does the reporting to the WHO in Guinea Bissau (what department of the MoH)?

39. Do you think that during a cholera outbreak, there might be non-cholera cases that are registered as cholera? Yes ☐ No ☐

40. How do you think this could be improved?

41. Could you tell me how many meeting per year do you have with the Regions?

42. When was the last one?

43. What are the objectives of these meetings?

44. Could you tell me how many meeting per year do you have with the nurses from the health facilities?

45. When was the last one?

46. What are the objectives of these meetings?

47. Do you think you have enough resources to run the cholera surveillance system? Yes ☐ No ☐

48. If not, what do you miss?

49. How do you think the problems with the salaries may affect the cholera surveillance system?

50. How good do you think the cholera surveillance system from Guinea Bissau is?

51. How do you think it could be improved?

52. Do you consider that the adaption of the “technical guidelines” and the “Plan Estrategique Cholera” has been a difficult process? Yes ☐ No ☐

53. If yes, why?
54. If the new “Technical guidelines” made changes, how difficult would you find the following changes?

a. To change the paper forms for collecting information from the patient?
   Very difficult ☐ Difficult ☐ Easy ☐ Very easy ☐

b. To change the paper forms used to report the information from the cholera cases?
   Very difficult ☐ Difficult ☐ Easy ☐ Very easy ☐

c. To send the forms to a different organization (i.e. MoH)?
   Very difficult ☐ Difficult ☐ Easy ☐ Very easy ☐

d. To diagnose cholera during non-epidemics in the health facility through a diagnosis rapid test?
   Very difficult ☐ Difficult ☐ Easy ☐ Very easy ☐

e. To diagnose cholera during epidemics in the health facility through a diagnosis rapid test?
   Very difficult ☐ Difficult ☐ Easy ☐ Very easy ☐

f. On your opinion, what would be the hardest change to implement?
   ______________________________________________________

55. How easy do you think it would be to implement a parallel surveillance system (as a sentinel system) in the country, and why?
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________
9.2 Annex 2. Focal discussion methodology

Objectives

The aim of this study is to gather information from experts regarding the organization and the attributes of the surveillance cholera system in Guinea-Bissau. We will use this information for the evaluation of the system and to make recommendations in order to improve it.

Methods

A 3-round modified Delphi was developed. The Delphi approach is a consensus technique that involves the participation of a group of experts and has four distinguishing features: anonymity, iteration (the procedure involves at least 1 round), controlled feedback (results of each round are analyzed separately and responses fed back to Delphi participants) and statistical group response (expression of the degree of consensus among the group).

A purposeful sample of 17 experts from different health levels (regional level, national level, MPH, OMS and NGO’s) were invited to participate. An expert was defined as any person involved at any stage of the cholera surveillance system in Guinea Bissau.

The questionnaire was developed keeping in mind simplicity and covered some of the attributes of the surveillance system (utility, simplicity, acceptability, flexibility, representativeness, timeliness). The instrument was pre-tested on a convenience sample of 3 epidemiologists of Epicentre staff not involved in the evaluation of the cholera surveillance system. Responses from the pre-testing were not included in the final analysis.

At the beginning, the evaluation of the cholera surveillance system was presented, as well as the objectives and methodology used. During the first-round, participants were asked to rate the importance or the agreement with different statements of the 35 items using a 9-point Likert-type scale (1 = totally disagree and 9 = totally agree). Afterwards, a presentation on the cholera surveillance system in Guinea Bissau as well as on the attributes needed to evaluate a surveillance system took place.

In round 2, the results form the previous round were fed-back to the participants (anonymously) establishing the consensus achieved on importance/agreement. Following the presentation, the experts were divided in groups of five people with a moderator from Epicentre (groups were previously organized depending on the experts’ role on the surveillance system). Each group re-discussed a particular number of statements and tried to identify solutions to the main problems identified. At the end, a representative of each group shared their conclusions in a plenary session.

Finally, experts were asked to answer to the questionnaire again.

Proportions and percentages were generated for categorical data. Information from the Likert scales were treated as continuous data and are reported as medians with interquartile ranges (IQRs). Data entry will be done in Epidata© and all the analysis will be developed using Stata©.
Dear colleague,
Epicentre is organising a one-morning working shop on the cholera surveillance system in Guinea Bissau. This workshop includes a questionnaire that aims to obtain information about your point of view regarding the cholera surveillance system in Guinea Bissau. This is an anonymous questionnaire. Later, we will discuss the answers in group in order to obtain consensus. Based on your experience, we kindly ask you to review and answer these questions. Thank you very much.

Instructions
- We use a 9-point scale. Please choose the score most applicable from your point of view where ‘1’ equals ‘completely disagree’ and ‘9’ equals ‘completely agree’
- Choose only one score per statement
- When you cannot answer a question, please choose the option “not able to assess the item” (NA in the questionnaire)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Completely disagree</th>
<th>Nor agree nor disagree</th>
<th>Completely agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I enjoyed my meal from yesterday evening</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
1. **Usefulness**

These are the objectives of the cholera surveillance system in Guinea Bissau according to the Technical Guidelines:

- to detect and respond quickly and appropriately to cases and outbreaks of watery diarrhoea;
- to confirm an outbreak, take stool samples and carry them on Cary-Blair medium;
- to notify immediately cases and deaths when an outbreak is suspected.

<table>
<thead>
<tr>
<th></th>
<th>Completely disagree</th>
<th>Nor agree nor disagree</th>
<th>Completely agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The objectives are appropriate</td>
<td>1 2 3</td>
<td>4 5 6</td>
<td>7 8 9 NA</td>
</tr>
<tr>
<td>2. The current surveillance system is useful for detecting cholera cases and outbreaks</td>
<td>1 2 3</td>
<td>4 5 6</td>
<td>7 8 9 NA</td>
</tr>
<tr>
<td>3. The current surveillance system allows rapid notification of cases and death in case of outbreak</td>
<td>1 2 3</td>
<td>4 5 6</td>
<td>7 8 9 NA</td>
</tr>
<tr>
<td>4. The current surveillance system allows rapid and adequate response to outbreaks</td>
<td>1 2 3</td>
<td>4 5 6</td>
<td>7 8 9 NA</td>
</tr>
<tr>
<td>5. The current surveillance system allows confirming cholera cases by means of laboratory culturing</td>
<td>1 2 3</td>
<td>4 5 6</td>
<td>7 8 9 NA</td>
</tr>
</tbody>
</table>

6. In your opinion, are there other objectives that should be in the system?
_________________________________________________________________________________________________
_________________________________________________________________________________________________

7. With the current surveillance system, the objectives that you have proposed could be achieved without difficulty

8. The current system is being used for purposes other than those detailed in the technical

<table>
<thead>
<tr>
<th></th>
<th>Completely disagree</th>
<th>Nor agree nor disagree</th>
<th>Completely agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. The information gathered from the cholera cases is readily available</td>
<td>1 2 3</td>
<td>4 5 6</td>
<td>7 8 9 NA</td>
</tr>
<tr>
<td>10. Getting information from cholera cases at basic health care units is easy</td>
<td>1 2 3</td>
<td>4 5 6</td>
<td>7 8 9 NA</td>
</tr>
<tr>
<td>11. Sending information to the upper level is easy</td>
<td>1 2 3</td>
<td>4 5 6</td>
<td>7 8 9 NA</td>
</tr>
<tr>
<td>12. The case definition of cholera is simple</td>
<td>1 2 3</td>
<td>4 5 6</td>
<td>7 8 9 NA</td>
</tr>
</tbody>
</table>

2. **Simplicity**

3. **Acceptability**

These are case definitions for cholera in non-epidemic and epidemic periods:

- Suspected case: person aged 5 or more with serious dehydration or death by acute watery diarrhoea. In case of epidemic, a suspected case is all people aged 5 or more with acute watery diarrhoea with or without vomiting.
- Confirmed case: a suspected case with *Vibrio cholerae* 01 or 0139 isolated in faeces.
### 4. Flexibility

Rapid Intervention Teams (Equipas de Resposta Rápida para as Emergências em Saúde) are intended to contribute to reducing morbidity and mortality linked to outbreaks of diseases with epidemic potential and also from public health events of international concern.

<table>
<thead>
<tr>
<th>Completely disagree</th>
<th>Nor agree nor disagree</th>
<th>Completely agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. The case definition in non-epidemic period is adequate</td>
<td>1 2 3</td>
<td>4 5 6</td>
</tr>
<tr>
<td>14. The case definition in epidemic period is adequate</td>
<td>1 2 3</td>
<td>4 5 6</td>
</tr>
<tr>
<td>15. The case definition is used by health care workers</td>
<td>1 2 3</td>
<td>4 5 6</td>
</tr>
<tr>
<td>16. I am satisfied with the declaration forms</td>
<td>1 2 3</td>
<td>4 5 6</td>
</tr>
<tr>
<td>17. I am satisfied by how I receive the information from the lower level</td>
<td>1 2 3</td>
<td>4 5 6</td>
</tr>
<tr>
<td>18. Cholera data provided by the system capture the real number of cholera cases</td>
<td>1 2 3</td>
<td>4 5 6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Completely disagree</th>
<th>Nor agree nor disagree</th>
<th>Completely agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>19. It was easy to adapt the RIT to the surveillance system of cholera</td>
<td>1 2 3</td>
<td>4 5 6</td>
</tr>
<tr>
<td>20. There will be interferences with existing surveillance and outbreak response activities</td>
<td>1 2 3</td>
<td>4 5 6</td>
</tr>
</tbody>
</table>

### 5. Representativeness

<table>
<thead>
<tr>
<th>Completely disagree</th>
<th>Nor agree nor disagree</th>
<th>Completely agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>21. There are specific population groups which are excluded from the surveillance system</td>
<td>1 2 3</td>
<td>4 5 6</td>
</tr>
<tr>
<td>22. In some areas there are access problems to health care are specific population groups are excluded from the surveillance system</td>
<td>1 2 3</td>
<td>4 5 6</td>
</tr>
<tr>
<td>23. There are differences in access to health care between rural and urban areas</td>
<td>1 2 3</td>
<td>4 5 6</td>
</tr>
<tr>
<td>24. Which is in your opinion the main reason for not seeking for healthcare?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25. Cholera epidemics are timely detected in the country</td>
<td>1 2 3</td>
<td>4 5 6</td>
</tr>
<tr>
<td>26. If not, which are the main causes for a late detection?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 9. Stability

When a case of cholera is detected in the country, a reinforcement of epidemiological surveillance and response plan to the epidemic is launched.

Tell us your level of agreement with the following statements:

<table>
<thead>
<tr>
<th></th>
<th>Completely disagree</th>
<th>Nor agree nor disagree</th>
<th>Completely agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>29. This reinforcement in face an epidemic is appropriated</td>
<td>1 2 3 4 5 6 7 8 9</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>30. The change of case definition during an epidemic is appropriate</td>
<td>1 2 3 4 5 6 7 8 9</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>31. Rapid diagnostic test use will be useful during an epidemic</td>
<td>1 2 3 4 5 6 7 8 9</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>32. Information on residency/living place of patients is appropriate</td>
<td>1 2 3 4 5 6 7 8 9</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>33. Resources to reinforce the surveillance system are appropriate</td>
<td>1 2 3 4 5 6 7 8 9</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>34. Resources to develop response (hygienic/environmental measures, treating cases) are appropriate</td>
<td>1 2 3 4 5 6 7 8 9</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>35. Cholera vaccine could have a relevant role in cholera epidemic control in Guinea Bissau</td>
<td>1 2 3 4 5 6 7 8 9</td>
<td>NA</td>
<td></td>
</tr>
</tbody>
</table>
## 9.3 Annex 3. Results of the focal discussion

Level of agreement of the system users' with the following statements:

<table>
<thead>
<tr>
<th></th>
<th>First round</th>
<th></th>
<th>Second round</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>median</td>
<td>IQR</td>
<td>median</td>
<td>IQR</td>
</tr>
<tr>
<td><strong>Usefulness</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Objectives are appropriate</td>
<td>8.00</td>
<td>6.25-9.00</td>
<td>9.00</td>
<td>8.00-9.00</td>
</tr>
<tr>
<td>2. System is useful for detecting cases and outbreaks</td>
<td>7.50</td>
<td>3.50-9.00</td>
<td>8.00</td>
<td>1.50-9.00</td>
</tr>
<tr>
<td>3. System allows rapid notification in case of outbreak</td>
<td>7.00</td>
<td>4.25-8.00</td>
<td>3.50</td>
<td>1.50-8.00</td>
</tr>
<tr>
<td>4. System allows rapid and adequate response to outbreaks</td>
<td>7.00</td>
<td>5.25-7.75</td>
<td>4.50</td>
<td>2.25-7.50</td>
</tr>
<tr>
<td>5. System allows confirming cases by laboratory culturing</td>
<td>7.50</td>
<td>6.00-9.00</td>
<td>8.50</td>
<td>8.00-9.00</td>
</tr>
<tr>
<td>7. Objectives you have proposed could be achieved easily</td>
<td>3.50</td>
<td>1.50-8.00</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8. System is being used for other purposes</td>
<td>7.00</td>
<td>1.25-8.00</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Simplicity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Information gathered from cases is readily available</td>
<td>7.00</td>
<td>3.75-7.00</td>
<td>6.50</td>
<td>2.25-8.75</td>
</tr>
<tr>
<td>10. Getting cases information at basic health care units is easy</td>
<td>3.00</td>
<td>1.0-5.75</td>
<td>3.00</td>
<td>1.25-7.50</td>
</tr>
<tr>
<td>11. Sending information to the upper level is easy</td>
<td>7.00</td>
<td>3.25-8.00</td>
<td>8.00</td>
<td>3.25-9.00</td>
</tr>
<tr>
<td>12. The case definition of cholera is simple</td>
<td>8.00</td>
<td>7.25-9.00</td>
<td>9.00</td>
<td>7.50-9.00</td>
</tr>
<tr>
<td><strong>Acceptability</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Case definition in non-epidemic period is adequate</td>
<td>7.00</td>
<td>5.50-9.00</td>
<td>7.00</td>
<td>2.25-9.00</td>
</tr>
<tr>
<td>14. Case definition in epidemic period is adequate</td>
<td>8.00</td>
<td>5.50-9.00</td>
<td>6.00</td>
<td>3.00-8.75</td>
</tr>
<tr>
<td>15. Case definition is used by health care workers</td>
<td>8.00</td>
<td>6.25-9.00</td>
<td>6.00</td>
<td>3.00-8.00</td>
</tr>
<tr>
<td>16. I am satisfied with the declaration forms</td>
<td>7.00</td>
<td>4.00-8.75</td>
<td>8.00</td>
<td>3.25-9.00</td>
</tr>
<tr>
<td>17. I am satisfied how I receive information from lower level</td>
<td>3.50</td>
<td>1.25-7.00</td>
<td>3.00</td>
<td>2.00-4.50</td>
</tr>
<tr>
<td>18. System captures the real number of cholera cases</td>
<td>3.50</td>
<td>2.25-6.50</td>
<td>2.50</td>
<td>1.0-4.50</td>
</tr>
<tr>
<td><strong>Flexibility</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. It was easy to adapt the RIT to the system</td>
<td>4.00</td>
<td>2.00-6.00</td>
<td>7.00</td>
<td>3.00-8.75</td>
</tr>
<tr>
<td>20. There will be interferences with existing response activities</td>
<td>6.00</td>
<td>3.00-7.00</td>
<td>6.25</td>
<td>1.60-8.00</td>
</tr>
<tr>
<td><strong>Representativeness</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. Specific population groups are excluded from the system</td>
<td>5.00</td>
<td>1.0-8.00</td>
<td>9.00</td>
<td>7.25-9.00</td>
</tr>
<tr>
<td>22. In some areas there are access problems to health care</td>
<td>9.00</td>
<td>8.00-9.00</td>
<td>9.00</td>
<td>9.00-9.00</td>
</tr>
<tr>
<td>23. Differences in health access between rural and urban areas</td>
<td>8.00</td>
<td>7.00-9.00</td>
<td>9.00</td>
<td>9.00-9.00</td>
</tr>
<tr>
<td><strong>Timeliness</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25. Cholera epidemics are detected on time</td>
<td>5.00</td>
<td>1.0-7.00</td>
<td>6.00</td>
<td>3.00-7.75</td>
</tr>
<tr>
<td>27. It is possible to deliver information on time</td>
<td>6.00</td>
<td>3.00-8.00</td>
<td>3.00</td>
<td>1.00-3.00</td>
</tr>
<tr>
<td>28. Time for sending the information is adequate</td>
<td>6.00</td>
<td>3.00-8.00</td>
<td>3.00</td>
<td>2.00-4.50</td>
</tr>
<tr>
<td><strong>Stability and miscellaneous</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29. Reinforcement in face an epidemic is appropriated</td>
<td>7.00</td>
<td>4.00-8.00</td>
<td>3.00</td>
<td>3.00-7.75</td>
</tr>
<tr>
<td>30. Case definition change during an epidemic is appropriated</td>
<td>4.00</td>
<td>3.00-7.00</td>
<td>5.00</td>
<td>1.25-9.00</td>
</tr>
<tr>
<td>31. Rapid diagnostic test use will be useful during an epidemic</td>
<td>9.00</td>
<td>8.00-9.00</td>
<td>9.00</td>
<td>9.00-9.00</td>
</tr>
<tr>
<td>32. Information on residency of patients is appropriated</td>
<td>7.00</td>
<td>3.00-8.00</td>
<td>6.00</td>
<td>2.25-8.00</td>
</tr>
<tr>
<td>33. Resources to reinforce the system are appropriate</td>
<td>3.00</td>
<td>2.00-5.00</td>
<td>3.00</td>
<td>1.25-3.00</td>
</tr>
<tr>
<td>34. Resources to develop response are appropriated</td>
<td>3.00</td>
<td>2.00-5.00</td>
<td>3.00</td>
<td>1.00-3.00</td>
</tr>
<tr>
<td>35. Cholera vaccine: relevant role in cholera epidemic control</td>
<td>3.00</td>
<td>1.00-6.00</td>
<td>7.00</td>
<td>1.50-8.75</td>
</tr>
</tbody>
</table>