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**COMMUNITY BASED SURVEILLANCE:**

**A DESCRIPTIVE ANALYSIS AND EFFECTIVENESS ASSESSMENT OF A  
COMMUNITY BASED SURVEILLANCE SYSTEM IN THE YENDI  
DISTRICT OF THE NORTHERN REGION OF GHANA.**



A DISSERTATION SUBMITTED TO THE SCHOOL OF PUBLIC HEALTH,  
UNIVERSITY OF GHANA, LEGON, IN PARTIAL FULFILLMENT OF THE  
REQUIREMENTS FOR THE MASTERS OF PUBLIC HEALTH DEGREE.

**SUBMITTED BY:**

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**SEPTEMBER 1998**



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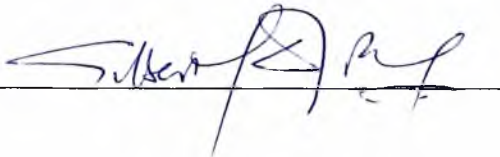
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**DECLARATION**

I declare that this is an original work done by myself, under supervision, and submitted to the School of Public Health, University of Ghana, Legon. This work is not being submitted concurrently for the award of any other degree in any institution. I am fully responsible for all that is stated herein except where duly referenced to others.

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Finally I am grateful to God who has brought me this far and pray that his will may be done in my life with this newly acquired knowledge.

## EXECUTIVE SUMMARY

The importance of disease surveillance in any health system is not debatable. For the continued health of a community the ability to detect single diseases or outbreaks, both potentially harmful to the population in general, is fundamental to maintaining a healthy community.

A novel surveillance system called the Community Based Surveillance system (CBSS), started in the Northern Region of Ghana in January 1998. The guiding principle in the development of the CBSS is “the identification of areas with poor access to health facilities either for economic, geographic, social or the real absence of the facility” (9). The objective of the CBSS is part of a regional objective to develop a sensitive and appropriate surveillance system at all levels of service delivery. It is expected that the surveillance system will be effective in data collection and analysis as well as allow for data to be analyzed locally and action taken promptly.

Data recorded so far by the CBSS and analyzed indicates an infant mortality rate (IMR) of 100 per 1000 live births in the region. This is higher than the national IMR of 82 per 1000 (2), twice the accepted target level for developing countries of 50 per 1000 by the year 2000 but lower than the national figure for the Northern Region of 128 per 1000 live births (3).

This study sets out to describe the process of disease surveillance of the CBSS and review its effectiveness by looking at its ability to detect infant deaths and aid in the determination of its causes in the Yendi district of the Northern region of Ghana.

**LIST OF ABBREVIATIONS USED**

<b>CBS</b>	<b>Community Based Surveillance</b>
<b>CBSS</b>	<b>Community Based Surveillance System</b>
<b>CSM</b>	<b>Cerebro-spinal Meningitis</b>
<b>EPI</b>	<b>Expanded Programme on Immunisation</b>
<b>FBS</b>	<b>Facility Based Surveillance</b>
<b>FBSS</b>	<b>Facility Based Surveillance System</b>
<b>GWEP</b>	<b>Guinea Worm Eradication Programme</b>
<b>IMR</b>	<b>Infant Mortality Rate</b>
<b>MOH</b>	<b>Ministry of Health</b>
<b>TB</b>	<b>Tuberculosis</b>

## **CHAPTER 1 INTRODUCTION**

### **1.1 BACKGROUND INFORMATION ON STUDY AREA**

#### **1.1.1 DEMOGRAPHY AND POPULATION**

The Yendi District is one of thirteen (13) districts in the Northern Region of Ghana, bounded by Gushiegu/Karaga District in the north, Bimbilla/Nanumba and East Gonja Districts in the south, Saboba/Chereponi District in the east and Tamale Municipality and Savelugu/Nanton District in the west. It has six sub-districts, three hundred and twenty (320) communities and an estimated population of 140,818 as at 1997. The district has a land area of 5,350-sq. km. with population density of 26 persons per sq. km. As found in the region the district also exhibits a dispersed settlement pattern and small settlement sizes. Only Yendi town, the district capital, qualifies as an urban center with a population of 50,000 whiles 62% of the district settlements have a population of less than 1000.

The main ethnic groups are the Dagombas and the Konkombas (ref. Appendix 1 district map).

#### **1.1.2 CLIMATE**

The district experiences a wet season between April - October and dry season between and December - March.

#### **1.1.3 ECONOMIC ACTIVITIES**

The main economic activity is agriculture. The traditional cash crop is sheanuts. Cereals and tubers cultivation still continues to be the peasant farmers main pre-occupation. Animal rearing involves cattle, sheep and goats.

There is no major industrial set-up in the district. The Yendi town is the only place connected to the national grid to receive electricity supply. Commercial activities here are primarily petty trading in nature.

#### **1.1.4 TRANSPORT AND COMMUNICATION**

The entire district has no tarred road. The only motorable road throughout the year is the Tamale – Yendi road. The few other roads that exist give access to a relatively small proportion of the district's communities, which are situated along these roads. Access to the majority of communities in the heart of the district is by traveling along what really is a foot or bicycle path. The terrain permitting, a vehicle may be used in the dry season to most of these communities. During the wet season most communities are inaccessible by road due to streams and rivers over-flowing their banks and the use of a vehicle is potentially dangerous since the risk of getting stuck is high. The use of the motorcycle is the best option though also limited by the terrain. The generally poor roads and unavailability of proper bridges aggravates this situation.

With the exception of the government institutions that have official vehicles (pick-ups etc.) and few private cars, public (passenger) transport, motorbikes and bicycles are the main means of transportation available. There are no taxis available.

There is a post-office where phone calls can be made from a pay- phone booth or booked with the operator present. Apart from the SSNIT district office and a construction firm working on contract in the town which have a direct telephone line, everybody must necessarily use the post-office.

### **1.1.5 EDUCATION**

The population is predominantly illiterate with a district literacy rate of 15% (averaged for both sexes).

### **1.1.6 HEALTH FACILITIES AND STAFF SITUATION**

As found in the region, only a small proportion of the population are within easy reach of the few health institutions in the district. The district has a Government hospital (the district hospital) and two small private clinics situated in the Yendi town as well as five health centers distributed in the district. It has three doctors, sixty-two nurses (20 Community Health Nurses and 42 general) and 133 paramedical staff. The doctor population ratio is 1: 45,000 and nurse population ratio 1: 2,170. Eighty percent of all health staff including all the doctors is found in Yendi town, the remaining 20% distributed in the health centers at the sub-districts.

Illiteracy, ignorance of disease causation and inadequate services as well as economic and geographic inaccessibility, prevents the people from using the health facilities. This has led to situation where health authorities know very little about the real health status of the people in the district since information gathered at the health facilities is a very small proportion of what happens in the district.

### **1.1.7 THE COMMUNITY BASED SURVEILLANCE (CBSS) SYSTEM**

Regional efforts to remedy this situation led to the formulation and implementation of a Community Based Surveillance system (CBSS); an expansion of the regional village based surveillance system established for the national Guinea Worm Eradication Programme (GWEP). This is in line with the activities set out in the framework for action (1995 – 2004) for the Ministry of Health, Northern Region, Ghana (17). The objective of this activity is to develop a sensitive and appropriate

surveillance system at all levels of service delivery. It is expected that the surveillance system will be effective in data collection and analysis as well as allow for data to be analyzed locally and action taken promptly. The CBSS is the establishment of a sustainable village-based surveillance system as part of a Health Information System (HIS) for planning and management of health services in the Northern Region of Ghana (4). Thus, as found in other districts of the region, each community in the Yendi district has a community volunteer. This volunteer is trained and tasked to record specific vital and unusual events (ref. Appendix 7) in his/her community for onward transfer to well defined levels of the health system for data analysis and action, if required, to be taken. Within the first three months of implementation of the CBSS significant relevant data has been collected (16).

## **1.2 STATEMENT OF THE PROBLEM**

The ultimate aim of any health surveillance system is to collect reliable data and make it timely available for data analysis. The timely and thorough analysis of data facilitates its utilization in planning and priority intervention design to improve the health status of the target population. The reliability and accuracy of the data collected depends on the surveillance system in place. Disease surveillance is of fundamental importance in ensuring the health of any community. The sparsely populated and dispersed settlement pattern found in the Northern region in general, Yendi district included, makes community based surveillance more important to the poorly served communities found in the district. It is estimated that the health facilities in the district provide services readily to at most some 35 – 40 % of the population. The CBSS was officially launched in January 1998 and operational in February 1998. There has been only one assessment of the CBSS to date, done in May 1998, which

assessed the CBSS in the region (16). Recommendations made in this assessment to the region included:

1. A plan for a more detailed external review should be made for the first quarter of 1999 that should include an assessment of costs and relative benefits of the community approach for surveillance as compared to facility-based surveillance.
2. Information should be collected on the CBSS to facilitate the documentation of the program and its use outside of Northern Region and outside Ghana.
3. Plan for the expanded use of deaths information.

This research is an effort to comply with these recommendations specifically for the Yendi district and generally for the Northern Region.

### **1.3 OBJECTIVES OF THE STUDY**

1. To describe the process of disease surveillance of the Community Based Surveillance System (CBSS) established in the Yendi district of the Northern Region of Ghana.
2. To review the effectiveness of the CBSS by looking at its ability to detect infant deaths in the Yendi district over the period April to May 1998.
3. To determine the probable causes of infant deaths detected by the CBSS during April to May 1998 using a verbal postmortem method.
4. To identify the strengths and weakness of the Community Based Surveillance System (CBSS) established in Yendi district.
5. To make recommendations to improve the cycle of disease surveillance of the Community Based Surveillance System (CBSS).

## **CHAPTER 2 METHODOLOGY**

### **2.1 STUDY DESIGN**

A descriptive semi-qualitative study was carried out.

Active data collection was scheduled to start in the second week of July 1998. CBSS returns for the month of June was not completely available by this time. The CBSS had data on infant deaths from February to May 1998. To ensure a sizable number of infant deaths to evaluate and minimize recall errors in the verbal post-mortem, data recorded at least three months from the beginning of the data collection date was used. Data recorded for the months of April and May 1998 was thus chosen for analysis in this study. A total of 39 infant deaths were recorded in 32 communities in the district during the period under review.

In the community, the CBSS volunteer was sought first and interviewed to confirm the death under investigation. Their knowledge about the circumstances leading to the death was also assessed. The interview with the volunteer was also to find out how they carried out their part in the cycle of surveillance of the CBSS as well as the problems or issues militating against their work.

The household where the death occurred was next visited with the CBSS volunteer, who introduced us to the head of the household or his representative, if absent. The purpose of our visit was made known to the household head and permission sought to carry out our mission. The parents of the deceased infant and any other person or persons who were directly involved in the care of the infant in the last week before its death were asked to remain. All other visitors and non-essential persons were politely asked to excuse us.

The mother was the primary interviewee to whom the interview guide was addressed. Any additional information given by the other persons present was encouraged and

confirmed by the mother. Upon completion of the interview the information gathered was summarized and presented to all those present by the interviewer and agreed upon by all as an accurate account of the circumstances and conditions leading to the death of the infant. The most probable illness was stated as the probable cause of death. As much as possible, stating symptoms as cause of death was avoided.

The Zonal coordinators that were available were also interviewed about the part they played in the CBSS.

Discussions were also held with the sub-district health center staff, district CBSS coordinator and District Director of Health Services to find out their understanding of the CBSS and their roles in it.

On average 3 interviews were conducted a day. A total of 23 days was used to collect and analyze the data. 15 of these days were out of station (staying at the respective sub-district capitals when visiting communities there cut down on travel time, total distance traveled and fuel costs).

## **2.2 DATA COLLECTION TECHNIQUE AND INSTRUMENTS**

1. Review of CBSS data on infant deaths and other relevant reports over the period under study.
2. Administration of interview / discussion guide to:
  - Women who have experienced infant deaths during the period under study
  - CBSS volunteers and health workers responsible for recording the respective infant deaths
3. Application of a district surveillance system checklist to the CBSS.
4. Informal discussion with the District Director of Health and the District CBSS coordinator.

### **2.3 ETHICAL CONSIDERATIONS**

1. Talking about deaths in general is not culturally acceptable and is emotionally distressing. Bearing this in mind particular attention was given to initially sympathizing with the bereaved family, clearly stating the purpose of our visit and ensuring consent from both parents, especially the father, before we started the interview / discussion.

### **2.4 LIMITATIONS**

1. The research was carried out during the rainy season, as such some communities were inaccessible.
2. A CBSS volunteer was not available during the period of the research and thus information on infant deaths in his community could not be accessed.
3. A verbal post-mortem on an event occurring two to three months ago will not be fully recalled.
4. The inability of the interviewee to sufficiently express or describe the condition and / or circumstances directly leading to the death of the infant.
5. There is an overlap or multiplicity of symptoms in infants, which is not specific for any of the common diseases affecting them. Thus definitive verbal post-mortem diagnosis is subjective. Time available for the research would not permit for other independent verbal post-mortem to be done by at least two other physicians. A less subjective diagnosis would then be taken as that made and agreed upon by at least two of the physicians.

## CHAPTER 3 LITERATURE REVIEW

### 3.1 DISEASE SURVEILLANCE

The term surveillance is used in two different ways (5). First, surveillance can mean the continuous scrutiny of factors that determine the occurrence and distribution of disease and other conditions of ill health. This involves the collection, analysis, interpretation and distribution of data for effective disease prevention and control. This is exemplified in the routine health information systems in most countries. Secondly, surveillance refers to a special reporting system which is set up for a particularly important health problem or disease such as that set up for the global and national Guinea Worm Eradication Programmes (GWEP). This kind of surveillance system is often organized for a limited period of time and is closely integrated with the management of the specific health program or set up in a disease outbreak situation.

In the context of health, a surveillance system can generally be said to be a system of data collection with a primary purpose to provide information upon which action can be taken to prevent and control the spread of disease and ill health. There are six main steps in the process of disease surveillance and response: (6)

1. Detecting, notifying and reporting a case or outbreak.
2. Investigating a case or outbreak.
3. Analyzing and interpreting local disease patterns.
4. Using surveillance data to plan, implement and evaluate public health actions.
5. Monitoring the quality of disease surveillance.
6. Reporting to higher levels and providing feedback to all levels.

A surveillance system should be functional at all levels of the health system, from the community and sub-district levels through the district and regional to the national level. All six steps in the disease surveillance cycle are carried out at all levels to varying degrees.

### **3.2 FACILITY BASED SURVEILLANCE SYSTEMS (FBSS)**

This is what exists to a greater extent in most countries. Information is collected when people visit the health facilities and data are written down or recorded on various types of forms. The collected data are then analyzed and included in reports, which may be communicated to higher authorities. The national ministry is responsible for collating the information for the whole country (5). This system is inherently passive in nature and it provides inaccurate, incomplete, untimely information (7). Reasons for this include:

1. The administrative requirements to make the system effective and efficient are considerable yet not present in many systems.
2. The routine nature of the data collected makes it boring and it loses meaning. Forms are filled only as an obligation.
3. Most times forms used are complicated and information difficult to extract from them.
4. Most of the reports do not get transferred up, usually remaining on one or the other officer's desk.
5. There is a lack of ownership of the information (it is felt that the information is for the Ministry so collect it and give it to them to do what they want with it).
6. The system is not sensitive to ongoing changes in the community nor is it interactive with the target population.

7. The facilities are usually not geographically or economically accessible to the population. Few people use it thus leading to gross underreporting and low coverage.

### **3.3 COMMUNITY BASED SURVEILLANCE SYSTEM (CBSS)**

The concept of community based surveillance is not new. The potential role of the community in the detection, notification and reporting of a case or outbreak of a communicable disease or relevant event is not in doubt (8). Community based surveillance has so far been used primarily for specific diseases and program purposes such as found in the GWEP.

Experiences and evidence from the GWEP, both globally and nationally, has shown the effectiveness of community surveillance systems. (9,10). The same program also realized that:

1. The village based surveillance worker still offered the additional advantage of being able to provide control measures rapidly as cases appear.
2. The experience of the village volunteers makes them potentially valuable for broader use as primary health-care workers for disease control in their village's (9).
3. 100 % community coverage can be achieved, with programmes able to record greater than 80% monthly reporting rates.

There is no documentation on the existence of a formal, established, operating CBSS in any country for general purposes. Disease specific surveillance systems have been established for cholera, malaria, cerebro-spinal meningitis and the EPI diseases for example, within their respective control programmes.

The nationwide searches for drancunculiasis have been used to gather surveillance data simultaneously about urinary schistosomiasis in Ghana and about Family Planning in Nigeria as well as to provide an opportunity for the provision of vaccinations to children in previously unreached populations in Nigeria. The Ghana and Nigeria experiences successfully expanded the use of the Guinea worm village-based surveillance system to cover another disease or event. This expansion though was for a particular purpose and limited to a specific period of time.

Village leaders, household heads, school teachers and other opinion leaders in communities have been used by health workers over the years to provide information about the health problems and needs of the community. This can be described as an informal community-based surveillance system that provides infrequent, subjective information depending upon which group provides the information and how often the health workers ask for information. The information gathered is usually not comprehensive or complete and covers only remembered periods of time.

### **3.4 LIMITATIONS OF COMMUNITY BASED SURVEILLANCE SYSTEMS**

Both the formal (disease specific) and informal (general use of community members) surveillance systems are limited in the type of information that can be collected. This is so because of the use of predominantly illiterate workers and specially trained staffs (disease specific training) who are trained to record specific well-defined events such as a single disease, common easily recognizable known diseases in the community or births and deaths. Other important disease conditions such as hypertension and diabetes mellitus cannot be reported upon.

The issue now is to build on and strengthen existing surveillance systems, integrate the various surveillance systems (for TB, CSM, Malaria, Guinea worm etc.), involve the communities and enhance and ensure data flow (17).

It is now being proposed that community based surveillance systems be developed and / or expanded to cover other diseases and events of relevance in the communities. The CBSS is meant to supplement the existing FBSS and be considered as part of it. The guiding principle in the development of the CBSS is stated to be "the identification of areas with poor access to health facilities either for economic, geographic, social or the real absence of the facility" (9). It is recognized that the CBSS may not be able to provide data on many (essential) disease conditions. This notwithstanding, the CBSS is believed to be the most appropriate form of surveillance system for most developing countries considering their economic, technological and infrastructural states. The proven failure of the FBSS to provide reliable, accurate and timely data to work with is further compounded by the poor access to health facilities of the majority of the population in most developing countries. Within Africa, the variation among countries in the level of development of the health care infrastructure will translate into different needs of the respective surveillance programmes (17). It is thus not being suggested that continent-wide community-based surveillance will be required or promoted. The Community Based Surveillance System in the Northern Region of Ghana is a formal system providing general surveillance data (within its limitations) and developed to be sustained and integrated into the existing FBSS in the Region (10).

Irrespective of the type of surveillance system, the ability of the system to quickly analyse and interpret collected data for relevant action to be taken is the key to the real success of any surveillance system.

### **3.5 INFANT MORTALITY RATE**

#### **3.5.1 THE USEFULNESS AND IMPLICATIONS OF IMR**

The infant mortality rate (IMR) is a measure of the yearly ratio of deaths of children less than one year of age relative to the number of live births in that year in a defined community. It is expressed as the number of deaths per 1000 live births (11). The IMR is composed of two biologically and epidemiologically distinct components, the neonatal and postneonatal components. The neonatal component refers to deaths in infants between birth and the seventh day of life (early neonatal) and the eighth to the 28<sup>th</sup> day of life (late neonatal) mortality. The postneonatal component refers to deaths in infants between 1 and 11 months of age (12).

It is documented that for Third World countries in particular, one of the most useful indicators of health in a community is the IMR (12). IMR and childhood mortality in general is a very sensitive measure of the prevailing environmental and socio-economic conditions in any society.

As opposed to crude mortality rates, from a comparative and planning point of view, the IMR an age specific (or standardised) mortality rate is more satisfactory in enabling comparison of mortality between various communities (11). In many developing countries age adjusted rates are usually not available due to paucity of data. Specifically for mortality rates, deaths are not properly certified, causes of death guessed at or simply not recorded at all (this is especially so with neonatal and infant

deaths in general). This situation is particularly true for rural and poor urban areas. Official mortality statistics, the IMR inclusive, are at best guesstimates (11). The examination of mortality causes and their patterns can indicate important things about changes in society in a demographic sense, as well as in terms of levels of living and public health (11).

### 3.5.2 INFANT MORTALITY RATE (DEVELOPING WORLD)

Differential mortality between developed and developing countries are largest in the infant and under 5 mortality rates. This is primarily due to the differential mortality from infectious and parasitic diseases, which affect the young dis-proportionately in the developing countries (11). IMR in the developed countries is primarily due to congenital diseases as compared to the developing countries (Africa) where perinatal and neonatal causes are estimated to be responsible for more than 50% of infant deaths. (16)

### 3.5.3 INFANT MORTALITY RATE IN GHANA

The comparatively high mortality afflicting infants in Ghana is well documented. In Ghana, as in many other African countries, estimates of the IMR vary considerably because they come from different sources and are derived using different techniques, creating problems for planning and programme implementation

Table 3.1

Source Variations in IMR In Ghana for 1989

SOURCE (year)	IMR per 1000 live births
Ghana Demographic Health Survey (1989)	77
World Bank (1989)	91
Adjei (1989)	96

IMR using the Brass indirect estimate technique was estimated to be 160 per 1000 live births in the early 1960, 121 per 1000 live births in 1971 and 100 per 1000 live births in the mid-1980's (6). Other studies based on the direct approach came up with IMR ranging from 87 per 1000 live births in 1971 to 77 per 1000 live births in 1988 (GBS, 1983 and GSS, 1989). Table 2.6 below shows technique variations in IMR calculated for Ghana for specific years.

Table 3.2

Technique Variations in IMR in Ghana

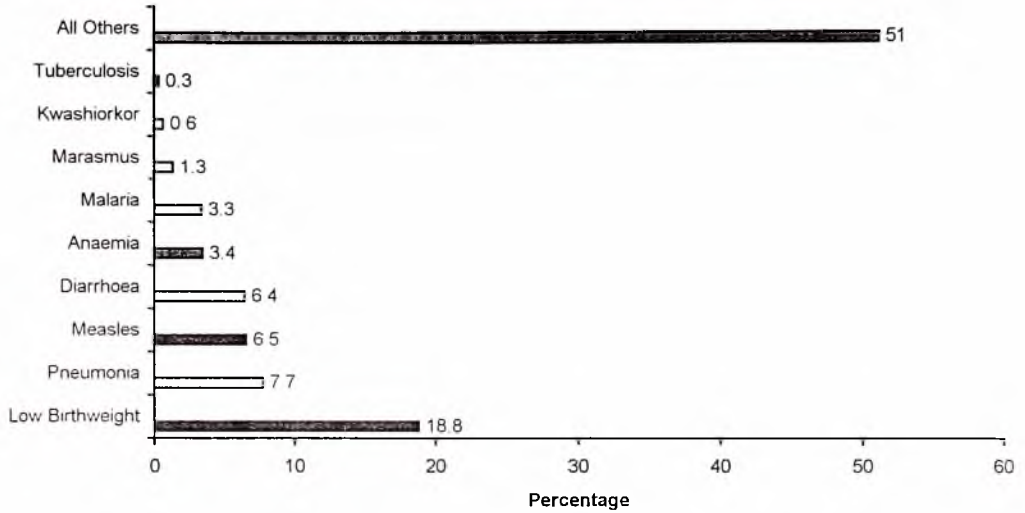
YEAR	INDIRECT METHOD	DIRECT METHOD
1971	121	87
1980	100	
1988	104	77

Despite the reductions in IMR observed since the 1960's, the most recent IMR for Ghana for 1992 is 82 per 1000 live births (2). This figure derived from survey data using an indirect technique, is still high enough to rank Ghana among the countries with a high IMR.

### 3.5.4 CAUSES OF INFANT MORTALITY IN GHANA

Fig. 1 below shows the causes of infant deaths in Ghana (18).

**Fig 1. Bar Chart Showing the Causes of Infant Mortality in Ghana**



The major causes of infant mortality in Ghana as shown in Fig. 1 above are all treatable and preventable.

## CHAPTER 4 RESULTS

Results will be presented under the following headings

1. General background information and reporting coverage of the CBSS
2. Detecting, notifying and reporting a case or outbreak.
3. Investigating a case or outbreak.
4. Analyzing and interpreting local disease patterns.
5. Using surveillance data to plan, implement and evaluate public health actions.
6. Monitoring the quality of disease surveillance.
7. Reporting to higher levels and providing feedback to all levels.

### 4.1 General background information and reporting coverage of the CBSS

The Community Based Surveillance System (CBSS) was thought of and developed by the Northern Regional Health Administration. The then Regional Director of Health Services, Dr. Sam Bugri, prepared a formal proposal for the establishment of a Village based Surveillance System for the Northern Region of Ghana (10). Dr Bugri was and still is the National Guinea Worm Eradication Programme Director and thus used his substantial experience with the Guinea worm village surveillance system to develop the CBSS. This proposal was presented in July 1993 to UNICEF, Ghana, which agreed to, and continues to fund substantially the implementation of the CBSS. Officially the CBSS started in January 1998 but began actively in February the same year.

The Yendi district has 305 communities, each with a CBSS volunteer. These 305 CBSS-volunteers are grouped into 20 zones each with a zonal coordinator. These volunteers and coordinators are all persons involved in the Guinea worm village

surveillance system and were given a one day further training to enable them carry out other surveillance activities required by the CBSS in the communities. There is a district CBSS coordinator who is the district Guinea worm coordinator. This person is responsible for sending CBSS returns to the district and regional offices.

Data to be collected monthly by the CBSS volunteer are (10):

1. Number of cases of drancunculiasis (for case containment this can be done daily)
2. Number of maternal deaths
3. Number of neonatal deaths
4. Number of child/infant deaths with causes if known
5. Number of flaccid paralysis seen
6. Number of measles cases seen
7. Number of visits by health workers (outreach team)
8. Number of deaths general, and causes if known
9. Number of births

Justification for the above data to be collected was documented (10) as:

1. Mortality rates; (crude, infant, maternal, neonatal) are well-established indicators of health status of the population. There have been conflicting estimates of maternal mortality rates in the Northern Region from various sample surveys. The CBSS would give us a more accurate figure since it would immediately record the event.
2. Vaccine preventable diseases e.g. measles is common and easily recognized. The CBSS volunteer can be instructed to report these immediately to the nearest health center instead of waiting for the end of the month.

3. Flaccid paralysis: this is easy to notice and it was included in anticipation of the worldwide elimination of polio.
4. Visit of health teams is to monitor the outreach services

Out of these 305 communities, returns were received from 171 of them each month over the period under review (April and May). The original Guinea worm eradication program structure at the district level has been maintained in the design of the CBSS. This is primarily a vertical structure that has its own reporting system directly to the regional level through the district coordinators, bypassing the sub-district staff.

The Yendi district surveillance system has 3 recognizable levels described in Table 4.1 below. The CBSS is found at level 1.

Table 4.1

The Yendi District Surveillance System

LEVEL	LOCATION	PERSONNEL INVOLVED	FUNCTION
1	Community	<ul style="list-style-type: none"> <li>• CBSS volunteer</li> <li>• Zonal coordinator</li> </ul>	<ul style="list-style-type: none"> <li>• Data collection</li> <li>• Informal case investigation</li> </ul>
2	Sub-district	MOH staff namely <ul style="list-style-type: none"> <li>• Medical Assistant</li> <li>• Community and General nurses</li> <li>• Midwives</li> </ul>	<ul style="list-style-type: none"> <li>• Collation of community data</li> <li>• Analysis / interpretation of data</li> <li>• Formal case investigation</li> <li>• Data utilization</li> <li>• Supervision and monitoring</li> <li>• Data quality control</li> </ul>
3	District	<ul style="list-style-type: none"> <li>• District Director of Health Services</li> <li>• District Health Management Team members</li> <li>• District CBSS coordinator</li> </ul>	<ul style="list-style-type: none"> <li>• Further collation of data</li> <li>• Analysis / interpretation of data</li> <li>• Formal case investigation</li> <li>• Data utilization</li> <li>• Supervision and monitoring</li> <li>• Data quality control</li> </ul>

Before the establishment of the CBSS, the district surveillance system consisted only of levels 2 and 3 in the table above. This constitutes the routine facility based surveillance system with its structures and personnel as found in the Ministry of Health.

## 4.2 DETECTING, NOTIFYING AND REPORTING A CASE OR OUTBREAK

The resident CBSS volunteer does the detection, notification and reporting of cases or outbreaks. Discussions and interviews held with the volunteers, zonal coordinators and respective families indicated that:

- As a cultural practice all deaths (infant or adult) occurring in the community is communicated to all residents.
- Particular effort is made to specifically inform the CBSS volunteer in the community because the community is aware that he is there and they are to keep him informed about such and other events.
- Provided the CBSS volunteer has not traveled he becomes aware or is directly informed about the respective event within 48 hrs.
- The zonal coordinators primarily undertook the task of data transfer to the sub-district (level 2) by collecting on a monthly basis the records of the CBSS volunteer in the community. These coordinators have between 10 – 30 community volunteers from different communities to collect data from.
- In the process of collecting the data from the volunteers the zonal coordinators are to look at the records, ask questions and where necessary actually follow-up the death to verify it.
- Notification and reporting of cases is done both verbally and by documentation. For perceived urgent or unexplained events the CBSS goes to the respective zonal coordinator or directly to the nearest health center to report.
- For infant deaths and all other non-urgent events the provided CBSS register is marked accordingly and collected or sent to the respective zonal coordinator for onward transfer to the sub-district health center by the CBS volunteer (ref. Appendix 7) on a monthly basis.

Table 4.2 below shows the recorded number of infant deaths in the district during the period under review.

Table 4.2

Table showing the number of recorded infant deaths in the district during April and May 1998 by the CBSS and the institutions

MONTH	NUMBER OF INFANT DEATHS RECORDED		
	CBSS	INSTITUTIONAL	GRAND TOTAL
APRIL	11	3	14
MAY	28	NIL	28
TOTAL	39	3	42

From the above table the following statistics arise:

1. For the month of April the CBSS detected 78.6% of recorded infant deaths in the district.
2. For the month of May the CBSS was the only system that detected infant deaths in the district.
3. For the period under review the CBSS detected 92.9% of all recorded infant deaths in the district.

### 4.3 INVESTIGATING A CASE OR OUTBREAK

The CBSS volunteer and zonal coordinator are not formally tasked to carry out case or outbreak investigations, but by virtue of their registration activities they invariably undertake some case investigation activities. The study revealed the following:

- The CBSS volunteer does informal case investigation and follow-up.
- At the time of detection of an event (here infant death) in the community, the volunteer visits the bereaved family as tradition demands. He takes this

opportunity to ask further questions about the circumstances surrounding the death as well as to confirm the death and get the relevant statistics about the death. This was done in all the communities visited.

- The CBSS volunteer had fairly accurate information about the deaths. A few of the CBSS volunteers made errors in stating the age of the dead infant though the description of the circumstances surrounding the deaths was not significantly different from what the bereaved mothers and family members said.
- Recall of the circumstances surrounding an event in the community was much better and significantly more detailed from the CBSS volunteer than the general population. This was realized when on arriving at one community the CBSS volunteer had traveled and though those met could remember vaguely about some deaths in the community they could not agree as to when it occurred or which family it affected.
- Where the affected persons were playing down important information the CBSS volunteer encouraged them to say all that happened since everything was important. The presence of the CBSS volunteer encouraged more information from the affected, in this instance the bereaved mother and family members.

Formal case or outbreak investigation was to be done by the sub-district health staff. A few of the sub-districts said they had followed up on questionable cases or events recorded by the CBSS in the communities. Generally though there was no evidence of such an activity by the sub-district staff.

#### **4.4 ANALYSING AND INTERPRETING LOCAL DISEASE PATTERNS**

In the proposal for the implementation of the CBSS, data analysis and interpretation was to be carried out at the sub-district level, the District level and at the Regional level. There is no analysis and interpretation of the CBSS data by the CBSS volunteers or coordinators. Data collected from the CBSS by the zonal coordinators is taken to the sub-district health center for further collation, analysis, formal case investigation and follow-up as well as interpretation and utilization. What was found to prevail in this area is as follows:

1. Data received from the CBSS is summarized at the sub-district on summary sheets designed for that purpose and provided by the regional office.
2. There is little evidence of analysis and interpretation of this data before transfer to the district level. There are no other forms of data summary such as graphs or formal comments about the data received. The summary sheets are for all intents and purposes sent to the district as is.
3. The district CBSS coordinator collated all the sub-district summaries as well as did some amount of analysis and interpretation of the data.
4. The district CBSS coordinator did follow-ups on questionable data in the sub-district summaries at times.
5. The collated district data is then copied to the DDHS and the regional CBSS secretariat.
6. There was no evidence of incorporation of the CBSS data into the overall district FBSS data that was collected for analysis or interpretation.
7. Virtually two sets of data were available at the district level, the CBSS data and the routine surveillance data. The district reported on the CBSS in its

reports as an activity, giving statistics on its coverage and problems being encountered in its implementation.

Through informal discussions and observation it was realized that the health staff at the sub-district centers were not conversant with basic data summary, analysis and interpretation techniques such as the creation and use of graphs and tables.

At the district level the data summary, analysis and interpretation skills were adequate but because the CBSS data was not incorporated into the routine surveillance data no analysis was done on it.

#### 4.5 USING SURVEILLANCE DATA TO PLAN, IMPLEMENT AND EVALUATE PUBLIC HEALTH ACTIONS

Determining the probable causes of infant deaths recorded by the CBSS for the period under review using a verbal postmortem method was an attempt to analyze the data collected and find out whether it can be used. The following information was generated:

1. All the mothers were illiterate, having no formal education and all were farmers.

Other relevant maternal characteristics are as follows:

2. The parity of mothers interviewed

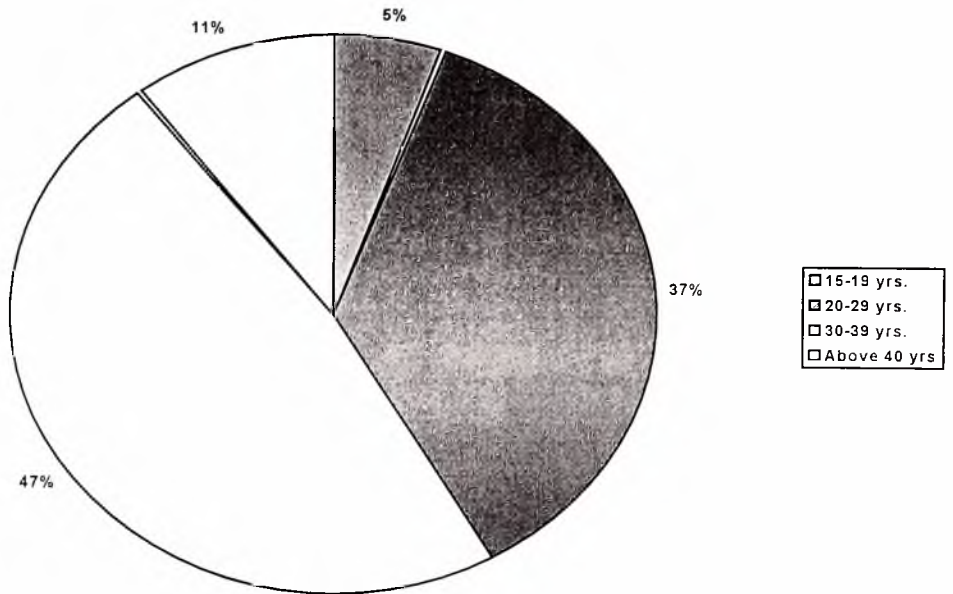
Table 4.3

Parity Distribution of Mothers

PARITY	PERCENTAGE OF MOTHERS (%)
0 – 3	36.8
4 – 6	26.3
Above 6	36.8

## 2. Age Distribution of Mothers

**Fig.2 Pie Chart Showing The Percentage Distribution of Ages of Mothers Interviewed**



3. Table 4.4 shows the breakdown / classification of infant deaths recorded by the CBSS

Table 4.4

Classification of Infant Deaths

CATEGORY	NUMBER OF DEATHS	% OF TOTAL DEATHS
Neonatal (a)	15	57.7
Early neonatal	12	46.2
Late neonatal	3	11.5
Postneonatal (b)	11	42.3
Total infant death (a+b)	26	100

Table 4.5

Probable Causes of Infant Deaths Recorded by the CBSS during April and May 1998 in the Yendi District.

PROBABLE CAUSE	NUMBER OF DEATHS	PERCENTAGE
Malaria	6	23.1
ARI	4	15.4
Diarrhea and Vomiting	4	15.4
Prematurity	3	11.5
Malnutrition	2	7.7
Aspiration	2	7.7
Anemia	1	3.9
Still Birth	4	15.4
	26	100.1

#### 4.6 MONITORING THE QUALITY OF CBSS

Monitoring the quality of data of the CBSS was to be carried out at two levels:

- At the community level where the zonal coordinators were to check on the records made by the CBSS volunteer and confirm the event occurred as recorded
- At the sub-district level health staff are to check the register of the CBSS volunteer whenever they went to the respective communities, validate recorded events and update and educate the CBSS volunteers and zonal coordinators on their roles.

The study found that supervision of the CBSS volunteer by the zonal coordinator or both from the sub-district level was virtually non-existent. What was actually happening on the part of the zonal coordinators was:

1. Zonal coordinators either sent for the monthly records through someone else or the CBSS volunteer sent it personally to them.
2. The zonal coordinators infrequently visited the CBSS volunteers in the communities.
3. The CBSS volunteers more often than not did not meet the zonal coordinators and just left their returns behind to be given to the coordinators.
4. The zonal coordinators were not significantly better trained to be able to adequately supervise or monitor the CBSS volunteer.
5. There was a general growing apathy on the part of both volunteers and coordinators. They complained about the inadequacy of incentives presently being given to them.

Formal supervision and monitoring of the quality of the CBSS and the data it records from the sub-district is generally not done. Provision has been made in the CBSS register for health staff to sign in after supervision. Portions allocated for the health staff to sign were blank. Objectively therefore there was no evidence of supervision at this level.

The health staff are specifically tasked to validate the entries made in the register, correct errors and maintain a form of continuous education for the volunteers and coordinators on the events they are to be recording. This is to be done by the sub-district staff when they visited the communities or the CBSS volunteer at any time (10).

A few of the sub-districts had followed up on questionable cases or events recorded by the CBSS in the communities. Reasons given by the sub-district staff for their lack of supervision and monitoring included:

1. They did not know what they were to check in the registers.
2. When they got to the community there was no copy of the past months records to check and the present months was not completed.
3. They did not know what to ask the CBSS volunteer by way of supervision.
4. They did not sign the books because they did not know they were to do so.
5. They did not understand what the CBSS was all about. They felt it was another vertical program that had its own supervisors in the person of the district CBSS coordinator.

#### 4.6.1 DATA QUALITY ANALYSIS OF CBSS RECORDED INFANT DEATHS

Assessing the ease of interpretation and utilization of the CBSS register in general and infant deaths in particular, by the volunteers and zonal coordinators the following was realized:

- With the exception of births, all the other pictorial representations of events in the register could be potentially mis-interpreted and was being mis-interpreted to various degrees (ref. Appendix 7).
- Specifically for infant deaths it was realized that the technical definition of an infant as a child of age 0 – 11 months was not culturally or communally appreciated. The pictorial representation of the infant death only reinforced the cultural concept of a small child dying. A small child was anyone from 0 – 12 /13 years. In fact the size of the individual played a more significant role in determining the classification as an infant or not. Thus the death of a smallish 6-year-old may be recorded as an infant death and that of a big 6- year -old as 'any other death'.
- For the event 'other deaths' the pictorial representations were interpreted as deaths of old men, deaths due to a snake bite or as a place to record the number of people bitten by snakes in the community in the month. Most of the volunteers did not record the death of an old woman because "there was no place to mark it"
- In the case of maternal deaths any pregnant woman who died of any cause was recorded there, this was irrespective of the gestational age and definitely not related to the technical definition of maternal death. Any woman with a child still breast-feeding could be marked there. Some volunteers said "a woman with a child of 2 – 3 years of age whether breast-feeding or not could be marked there"

Of the 39 infant deaths recorded:

1. Five were found not to be infant deaths but child deaths of ages 2, 3, 7, 8, and 12 years. These were noted as disqualified deaths.
2. Three were infant deaths but occurred before the period under review and were recorded there when the volunteer remembered he had not recorded the deaths the previous month because he was not aware or informed early enough to record it that month. These were classified as wrong records.
3. Five recorded deaths could not be assessed. For three the communities had become inaccessible because of the rains and for the other two that were in the same community, the CBSS volunteer had traveled and did not return before the end of the study. No one in the community was convincing enough nor seemed to recall the deaths under study.

This information is represented in the table below showing the data quality analysis.

Table 4.6

Data Quality Analysis of CBSS Recorded Infant Deaths

Recorded infant deaths (a)	39
Disqualified deaths (b) (i.e. wrong age)	5
Wrong records (c)	3
Inaccessible (d)	5
Actual infant deaths (a-(b+c+d))	26
Error in recorded infant deaths $[(b+c)/(a-d)] * 100$	23.5%
Error in recorded infant deaths if wrong records included as correct $[(b)/(a-d)] * 100$	14.7%

During data collection it was realized that it took very little time to discuss the register and recorded information.

#### **4.7 REPORTING TO HIGHER LEVELS AND PROVIDING FEEDBACK TO ALL LEVELS**

As stated in the findings on detection of cases, the CBSS reports within 48 hrs of the occurrence of an event, if urgent, to the health center. The delay in transfer further up is found at the sub-district health center. The health staff thinks the volunteers do not know what they are talking about and fail to give them the benefit of the doubt that they may be right. Also because the health staff do not understand the CBSS and their part in it, they perceive the report of the volunteer as instructions from them and delay in follow-up.

Very little feedback is done from any level higher up down. During the research the image of the volunteers and coordinators were greatly enhanced and they were themselves impressed that their records had been followed up and problems with it discussed.

## CHAPTER 5 DISCUSSION

Discussion of the findings will be presented under the following similar headings:

1. General background information and coverage of the CBSS
2. Detecting, notifying and reporting a case or outbreak.
3. Investigating a case or outbreak.
4. Analyzing and interpreting local disease patterns.
5. Using surveillance data to plan, implement and evaluate public health actions.
6. Monitoring the quality of disease surveillance.
7. Reporting to higher levels and providing feedback to all levels.
8. Summary of strengths and weaknesses of the CBSS

### 5.1 GENERAL BACKGROUND INFORMATION AND REPORTING COVERAGE OF THE CBSS

The relatively low reporting coverage of the CBSS in the district is primarily due to the Yendi sub-district, one of the sub-districts, which alone has 140 (nearly half) of the district's communities. The large size and poor organization and management of the Yendi sub-district leads to the poor coverage. The effect of the sub-district on coverage is such that excluding it, the CBSS reporting coverage is estimated at 65% 70 % of the communities in the district. Including Yendi sub-district, the CBSS has a reporting coverage of 56% of communities in the district for the period April – May 1998. This seriously creates the impression that the CBSS reporting coverage is low and comparable to that of the routine FBSS (30% – 40%). As explained, if the organizational and managerial problems of the sub-district are resolved it should be easily possible to achieve not less than 70% reporting of the CBSS in the district. This, with time and improvement of the system could be raised significantly.

The CBSS has been promoted as a 'new' surveillance system in the district. The impression in the district is that there are two surveillance systems, the CBSS with the district CBSS coordinator as its head and what exists under the disease control unit with the district disease control officer as head.

This situation could not be avoided since in the development of the CBSS it was agreed to use the existing Guinea worm village volunteers structure in the district (10). This structure is vertical in nature and designed for a specific purpose, the data collected from it not necessarily having to pass through the health facilities. The district Guinea worm coordinator doubles as the district CBSS coordinator and the Guinea worm volunteers as CBSS volunteers. Here it is necessary to discuss the issue of the use of volunteers in the system.

A common finding with all the volunteers and coordinators was that they appreciated that they were volunteers and did not expect a salary but they did expect some form of remuneration or incentive both in cash and kind. The present practice of giving them T-shirts and at most 3000 cedis a year alongside a refresher course where their per diems and transportation allowances was paid is no longer fully appreciated. Most said that they were ridiculed in the community that "they say they are working but what do they have to show for it?" Others said that "they needed to pay people to farm their land on days that they had to send reports or the health workers needed their services." The issue of 'volunteerism' is complex and has social and ethical implication. Questions that are asked about volunteer work include:

1. Is it proper for a poor person to be taken on or considered as a volunteer?

2. Does providing funds for feeding, transportation and other direct financial costs incurred during the implementation of the voluntary activity count as a salary or pay?
3. Does providing funds for indirect financial costs, here paying for someone to work on your farm, whiles you undertake your voluntary activity defeat the principle of volunteerism?
4. Is providing cash incentives in general against the tenets of volunteerism?

It is appreciated that once cash incentives come in, defining voluntary work becomes extremely difficult but if that is what the volunteers appreciate and will keep them motivated it must be critically considered. This is crucial for the CBSS, which depends virtually exclusively on volunteers.

The vertical nature of the Guinea worm surveillance system has prevailed and is not appropriate for the modified and expanded use it is being put to since it does not promote integration of the CBSS and FBSS systems. The presence of a designated district CBSS coordinator who is in fact the district Guinea worm coordinator and the lack of participation of the district disease control unit in the functions of the CBSS further re-enforces the impression that the CBSS is another surveillance system in itself. Two sets of data are available at the facilities, the CBSS data and the routine FBSS data. The inability of the district to incorporate the CBSS data into or with the routine FBSS data is a major problem since large amounts of data is wasting away.

It should be appreciated that there is only one district disease surveillance system and only one district disease control unit with its recognized staff and unit head. The introduction of the CBSS makes the Yendi district surveillance system structurally

different from the routine FBSS in that primary data collection is done at the community level as soon as it is present or occurs.

It is important here to re-emphasize that in real terms the CBSS ends where the sub-district begins. From the sub-district onwards is the already existing surveillance system found in the Ministry of Health. The presence of the CBSS was not intended to improve the existing FBSS in the district. The inherent inefficiencies and shortfalls of the FBSS are rather being exposed and substantially masking the positive effect of the CBSS in the provision of timely, fairly complete and accurate data. The inability of the CBSS data to be used is not because the CBSS is not efficient but rather because the routine FBSS that it supplements is unable to do so. This is primarily due to the fact that staffs of the FBSS are not adequately skilled in the area of data analysis and utilization nor are they well oriented to the role and function of the CBSS.

## **5.2 Detecting, notifying and reporting a case or outbreak**

The ability of the CBSS to detect cases or outbreaks is undisputedly far superior to the routine FBSS as shown clearly in the table on page 23 for infant deaths. This is a direct reflection of the effectiveness of the CBSS in case detection. During the period under review there was a total of 406 births recorded by the CBSS. Applying the regional IMR of 128 per 1000 live births one can expect approximately 52 infant deaths. The CBSS has thus detected 55.7% of expected infant deaths as against 5.8% detected by the institutions. It is important here to note that there was no record of infant deaths at the district births and deaths registry for the period under review. The presence of the CBSS volunteers in the community makes case or outbreak detection virtually instantaneous and total enumeration of cases much more

accurately recorded. The importance of this cannot be underestimated in disease control activities. Such instantaneous and practically total enumeration of cases is difficult if not rare for the FBSS to achieve.

Even though the CBSS volunteers and zonal coordinators were not technically trained to make definitive diagnosis it is clear that their high index of suspicion for unusual or perceived dangerous conditions was useful. The rapidity with which they reported these events, if taken seriously by the sub-district health staff would significantly improve the ability of the CBSS to detect more complex conditions than it is now doing.

Given the background and preparation of the CBSS volunteers and zonal coordinators they are doing very well. They are capable of recording the required data and are generally not finding any difficulties in making the records. They appreciate the relevance of the data they are recording but there are local conditions of importance that they have not been asked to record and therefore do not. Significant relevant information was not being recorded because of this. They give verbal reports on these conditions such as skin diseases, convulsions and septic conditions such as boils and cellulitis.

### **5.3 INVESTIGATION OF CASE OR OUTBREAK**

The purpose of case investigation is to:

1. Confirm the case or outbreak. This activity entails history taking and patient examination including laboratory specimen collection to confirm that the reported case satisfies the case definition. Data analysis is also done to confirm or discard whether an outbreak has occurred.

2. Gather information on who was affected, when they were affected, where they were affected and possibly the interventions instituted to contain the case or outbreak so far.
3. Look for other yet undetected cases.
4. Control or contain the case or outbreak by planning and implementing appropriate public health actions.

Though the technical aspects of case investigation is beyond the CBSS volunteer, their informal case investigation activities can and does speed up the investigation by:

1. Immediately identifying the cases and providing important background information on them.
2. Making verification of the initial report and patient identification information easy to collect and case investigation forms for each patient easier to complete.
3. Making contact tracing easier and more complete.
4. Looking out for and providing information on more or new cases in the community.
5. Serving as an immediate reliable source of information on the progress of the cases, the success or failure of the intervention as well as assist to ensure that the planned intervention activities are carried out or adhered to by the community where indicated.
6. The presence of the CBSS volunteer encourages more information from the affected, in this instance the bereaved mother and family members.
7. The CBSS volunteer is an invaluable source of considerably accurate information.

The verbal postmortem was greatly facilitated by the presence of the CBSS volunteers. It would have been virtually impossible to carry it out otherwise as easily and completely in the time allotted.

#### **5.4 ANALYSING AND INTERPRETING LOCAL DISEASE PATTERNS**

At the sub-district and district levels analysis, interpretation of the CBSS data is not being done as expected. In real terms, two sets of data are available at the facilities, the CBSS data and the routine FBSS data. Already there are problems analyzing and interpreting the limited FBSS data available. Processing of the significantly increased amount of data being provided by the CBSS may be asking too much of the staff at the sub-district unless steps are taken to upgrade their data analysis skills.

The CBSS district coordinator was not a part of the district disease control unit. Staff of the disease control unit had scanty knowledge and no function in the CBSS activities. The inclusion of the CBSS district coordinator in the disease control unit would go a long way to improve the analysis and utilization of the CBSS data.

#### **5.5 USING SURVEILLANCE DATA TO PLAN, IMPLEMENT AND EVALUATE PUBLIC HEALTH ACTIONS**

The results of the verbal post-mortem exposed a wealth of useable and valuable information that can be obtained easily using the CBSS. Unfortunately this information is not being used. Since there is very little analysis of the data it is no surprise that very little data utilization is done.

The sole purpose of the verbal postmortem was to find out if data from the CBSS could be easily retrieved analyzed and potentially used using infant deaths as an example.

Potential uses of the CBSS data include:

1. The calculation of crude growth rates for the communities and sub-districts. Considering the very inaccurate population figures being used, this would go a very long way to getting closer to the actual population of the sub-districts and district in general. This is simply done since deaths and births are recorded by the CBSS and very little migration occurs within the population
2. Improving the immunization coverage of infants since births in the community are easily identified and located. It should be possible in the near future to have 100% immunization coverage for the target population in a community.
3. Analysis of recorded deaths (both infant and adult) in the community should enable specific interventions to be planned, where applicable, in reducing the causes of morbidity and mortality in the community.
4. Health education based on the problems recorded in the register would be more relevant and practical to the community and they would see relatively immediate results from the interventions decided upon.
5. The CBSS is providing a direct measure of infant mortality.
6. The knowledge of causes of mortality can be used directly to plan intervention programmes to reduce the mortality levels.

## **5.6 MONITORING AND DATA QUALITY OF THE CBSS**

The study showed that there was a significant amount of error in the records of the CBSS for infant deaths. The error in the recorded infant deaths for the period under review was found to be 23.5%. This though high need not be so. For the event under review (infant deaths) since an annual calculation of the IMR is the norm, errors due

to wrong recording will be absorbed, considerably reducing the error in the data. For this study, if wrong records were not considered as errors, the error in the data would reduce to 14.7% ref. Table 4.6, page 31.

The study found that supervision of the CBSS volunteer or the zonal coordinator from the sub-district level was virtually non-existent. During the data collection it was realized it took very little time to discuss the register and recorded information. This is what the sub-district staff is to do when they visit the communities or the CBSS volunteer at any time (10). If this supervisory and monitoring activity of the sub-district health staff was improved the disqualified data could be eliminated or significantly reduced. The design and interpretation of the register needs also to be looked at. The potential for mis-interpretation of the pictorial representation of the events needs to be reduced as much as possible through redesigning and continuous updating and refreshing the knowledge of the volunteers and coordinators.

Further discussions with staff at this level revealed the following:

1. Health workers at this level did not identify with the CBSS. To them it was just another vertical program being embarked upon by the district / region. This was evidenced in the fact that staff felt that they had to go to a community specifically to collect or sign the CBSS register.
2. They did not understand that the CBSS register was to be reviewed each time they went to the community for any reason, since events were potentially occurring all the time. Those who did sign the register did so because they understood it to verify that they had been to the community and did not bother to read or analyze the records in the register.
3. The integrative and supplementary nature of the CBSS to the improvement of community coverage and disease control at this level is not appreciated.

4. There was insufficient preparation of the staff at this level on the CBSS concept and the part they are to play in it. The region to prepare sub-district staff used a trainer of trainers' approach. The health center head participated in a two day workshop on the CBSS and was supposed to train their staff at post but did not.
5. No formal guidelines are available at the health centers on health staff's roles or expected activities to be undertaken in the CBSS process.
6. For the centers that appreciated somewhat their role, logistics became a limiting factor. Fuel was the major constraint.

#### **5.7 REPORTING TO HIGHER LEVELS AND PROVIDING FEEDBACK TO ALL LEVELS**

The general absence of direct supervision and monitoring of the CBSS from the sub-district centers and similarly the sub-district by the district health authorities brings about the poor reporting and feedback cycle. A better-defined and stringent supervision and monitoring system would rectify this problem.

#### **5.8 STRENGTHS AND WEAKNESS OF THE CBSS**

The main strengths of the CBSS in general and specific for the Yendi district are:

1. It has the ability to achieve 100% community coverage and reporting.
2. Case detection and enumeration is virtually instantaneous and complete in the community.
3. Case or outbreak investigation is easily and rapidly done.
4. Information retrieval and analysis is easy and rapid.
5. Immediate utilization of the data, locally, can be done.

6. Changes in the health status of a community can be detected in a relatively short time.
7. Can be very useful in disease prevention and control in a community.

The weaknesses of the CBSS are:

1. The reliance on so many volunteers may not be sustainable.
2. The kind of data to be recorded is limited by the caliber of the volunteers.
3. A very high level of supervision and monitoring is required to maintain acceptable data quality.
4. Frequent retraining of the volunteers and coordinators is essential.
5. The integration of the CBSS with the FBSS especially at the sub-district level has not been established.
6. The absence of a copy of the records in the community with the CBSS volunteer makes supervision and monitoring difficult.

Table 5.1 below further highlights the strengths and weaknesses of the CBSS as compared to the FBSS.

Table 5.1 A Comparison of Facility Based (FBSS) and Community Based (CBSS)Surveillance Systems

CHARACTERISTICS	FBSS	CBSS
Coverage	Low	High
Completeness of data	Moderate	Moderate
Timeliness of data	Poor	Very good
Accuracy of data	Low	High
Accuracy of disease / condition recorded	High	Moderate
Level of supervision needed	Moderate	High
Reaction time	Slow	Fast
Information transfer	Slow	Fast
Potential for disease detection/eradication	Low	High
Cost (perceived)	High	Low
Community linkage	Low	High

## CHAPTER 6 CONCLUSIONS AND RECOMMENDATIONS

### 6.1 CONCLUSIONS

1. The CBSS taken in context is serving the purpose for which it was set-up.
2. The poor reporting coverage of the CBSS in the Yendi district is directly attributable to the poor organization and management of the Yendi sub-district. If this is resolved very good reporting coverage could be achieved for the district.
3. The inability of the CBSS to be fully integrated into the existing district surveillance system is primarily due to the maintenance and use of the original vertical Guinea worm village surveillance structures as well as the inadequate preparation of both volunteer and formal health staff on the CBSS.
4. The CBSS is not an independent system and should not be promoted as such.
5. The ability of the CBSS to detect, notify and report cases or outbreaks is far superior to the routine FBSS in existence.
6. Informal case investigation by the CBSS is invaluable and of great assistance to formal case investigation by health workers.
7. The inability of the existing FBSS to analyze the data being generated by the CBSS is defeating the purpose of the CBSS.
8. The data generated by the CBSS is immediately useable at all levels of the surveillance system.
9. There is inadequate supervision and monitoring of the CBSS. This activity is relatively not time consuming and very easy to carry out if done as proposed for the CBSS.
10. Improvement in the supervision and monitoring of the CBSS would fairly immediately improve the level of accuracy and reliability of the data it collects.

11. Considering the duration of operation of the CBS to date and the relatively little preparation given to both volunteers and health workers the quality of the CBSS data is commendable.
12. Reporting of the CBSS to the sub-district is not problematic nor does it delay. Reporting from the sub-district onwards and feedback is the problem.
13. The issue of incentives or some form of 'remuneration' for the volunteers and coordinators is becoming a problem and may militate against the sustainability of the CBSS. The bulk of workers involved in the CBSS are volunteers.

## 6.2 RECOMMENDATIONS

1. The organization and management of the Yendi sub-district must be looked at critically and solved.
2. The inherent vertical nature of the CBSS should be removed by incorporating the district CBSS coordinator into the district disease control unit and having the sub-district take complete responsibility of volunteers and zonal coordinators in their areas.
3. The level of first formal contact of the CBSS with the existing FBSS is made at the sub-district health center. There should be clear and concise guidelines available as to the roles of both the volunteers and the health workers at this level.
4. To realize the potential of the CBSS the health staff should be adequately prepared on the concept and function of the CBSS.
5. Health staff should be upgraded on their knowledge, attitude and practice of disease surveillance activities.
6. To improve the quality of the CBSS data supervision and monitoring should be ensured from the sub-district level. District coordinators and other identified

supervisors should be encouraged to prepare supervisory schedules and checklists.

7. The CBSS register should be improved to include more easily interpretable pictorial representations of events. This should be done with the participation of the community volunteers and zonal coordinators.
8. The CBSS register should be improved so that a copy of the monthly returns is kept in the register in the community for inspection at any time.
9. Provision should be made in the register for the zonal coordinators to sign when they collect forms and supervise the volunteers.
10. There should be integration of the district CBSS coordinator into the district disease control unit. The CBSS should be considered as a district disease control activity not the sole responsibility of the designated CBSS coordinator.
11. The concept of the CBSS should be promoted clearly as a supplementary system to the existing routine surveillance system.
12. Further studies should be carried out at the end of a year's operation to calculate vital statistics such as the Infant Mortality Rate, Crude population growth and maternal mortality rates in the district.
13. Further research should be done to look at the practice and sustainability of the 'volunteerism' in the operation of the CBSS.
14. The concept that should be promoted is that there is only one district surveillance system and that it has two parts, the CBSS and the FBSS. The CBSS is not a system in itself but rather the natural beginning of the routine FBSS so to say.

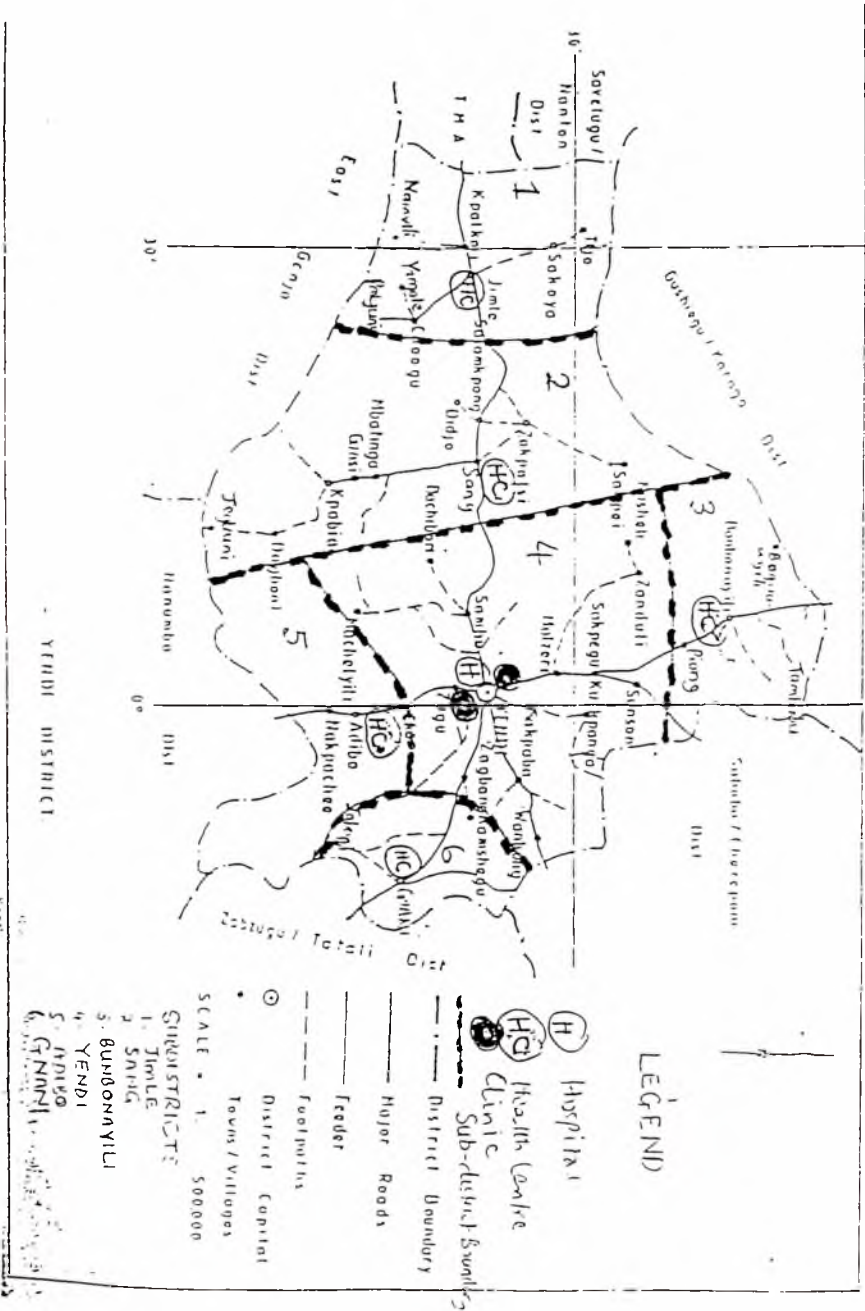
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Appendix 2 District Map of Yendi showing sub-districts and health facilities



## Appendix 3 SCHEDULE FOR INTERVIEWS

SUB-DISTRICT [C]	COMMUNITY [C]	DEATHS [C]	DISTANCE	DATE	DAYS
YENDI [6]  0	JAGRIDO [03]	1 [6031]	8	15/07/98	1
	NIYEDO [05]	1 [6051]	1		
	KUNGA [04]	1 [6041]	1	16/07/98	1
	SUNSON [06]	1 [6061]	12		
	GAMBUGUI [01]	1 [6011]	10	17/07/98	1
	GBUMGBALIGA [02]	2 [6021, 6022]			
ADIBO [1]  12 miles	CHOMPONYILI [02]	1 [1021]	4	18/07/98	1
	MENDOYILI [05]	1 [1051]	1		
	NAKPACHI [07]	1 [1071]	1	20/07/98	2
	KPACHINYILI [03]	1 [1031]	1	21/07/98	
	ADIBO [01]	2 [1011, 1012]	0		
	MALIYA [04]	2 [1041, 1042]	10	22/07/98	1
	NAGBILYILI [06]	1 [1061]	10	23/07/98	1
NGANI [4]  15 miles	KUNI [01]	2 [4011, 4012]	9	24/07/98	1
	NMOKHUDO [02]	1 [4021]		25/07/98	1
	TINGBAJADO [03]	1 [4031]	3		
JIMLE [3] 38 miles	TIDJO [01]	1 [3011]		27/07/98	1
BUMBON [2]  20 miles	SANDONIYA [04]	1 [2041]	5	28/07/98	1
	TINSONG [05]	1 [2051]	5		
	MAYEFUNI [03]	1 [2031]	7	29/07/98	1
	MAMADA [02]	1 [2021]	6		
	BUMBONAYILI [01]	1 [2011]	0	30/07/98	1
	YAPALA [06]	1 [2061]	6		
SANG [5]  21 miles	KPABIYA [04]	1 [5041]	12	03/08/98	1
	BUGUYILI [02]	1 [5021]	20		
	SANG [08]	1 [5081]	0	04/08/98	1
	TRINIYANI [09]	1 [5091]	3		
	KULIGINI [05]	1 [5051]	4	05/08/98	1
	ZALKPALSIS [10]	2 [5101, 5102]	4		
	SALKPANG [07]	1 [5071]	2		
	AFAYILI [01]	2 [5011, 5012]	5	06/08/98	2
	GUNSI [03]	1 [5031]	10		
	PALARI [06]	1 [5061]		07/08/98	

NOTE: 1 Distance is in miles one way from the subdistrict capital to the respective community.

Distances indicated below the subdistricts are their distances from Yendi town.

2 Total distance traveled to all communities both ways is 532 miles.

This is equivalent to 851 km.

3 Making allowances for re-interviewing etc. a total of 25 days will be used to collect the data.

**Appendix 4****INTERVIEW / DISCUSSION GUIDE FOR BEREAVED FAMILIES THAT HAVE EXPERIENCED AN INFANT DEATH IN APRIL AND MAY, 1998(VERBAL POSTMORTEM GUIDE)**

Introduce yourself first and tell them what the purpose of your visit is to be:-

This questionnaire is meant to find out what caused the death of your infant in April/May this year. The information is going to be used to help the health service in Yendi District to help you and others prevent such unfortunate events in the future.

<b>IDENTIFICATION</b>	<b>CODE</b>
1. Name of sub-district	
2. Name of community	
3. Name of infant	
4. Category of death	1. Neonatal 2. Post neonatal
5. Date of interview	
6. Result of interview	1. Completed 2. Uncompleted 3. Refused 4. Not at home 5. Postponed to

**Background information on Caretaker**

1. Apart from the mother, was there any other person involved in the care of the infant?  

<b><u>Name of Person</u></b>	<b><u>Relationship</u></b>
------------------------------	----------------------------
  
2. Who were those around when the infant was ill before death?  

<b><u>Name</u></b>	<b><u>Relationship</u></b>
--------------------	----------------------------
  
3. Is mother of child alive? If no ask circumstances leading to death.
  
4. List name and relationship of all those present at the interview/discussion.  

<b><u>Name</u></b>	<b><u>Relationship</u></b>
--------------------	----------------------------

**SECTION I - BACKGROUND INFORMATION ON MOTHER**

- 1.1 First name: Last name
- 1.2 Mothers Age:
- 1.3 Marital Status
1. Single
  2. Married (only wife)
  3. Married (other wives)
  4. Divorced
- 1.4 Occupation
1. Unemployed
  2. Farming
  3. Petty Trading
  4. Office Work
  5. Other (specify)
- 1.5 Level of Education
1. No formal education
  2. Primary
  3. Middle/JSS
  4. Secondary
  5. Tertiary

**SECTION II - OBSTETRIC HISTORY**

- 2.1 How many times have you ever been pregnant?
1. Once
  2. 1 - 3
  3. 4 - 6
  4. >6
- 2.2 How many children do you have?
1. One
  2. 1 - 3
  3. 4 - 6
  4. >6
- 2.3 Have any of your children died? If yes, at what ages?
- 2.4 Were you ill or unwell during this last pregnancy?
- 2.5 Were you pregnant for the full 9 months or did you deliver early?
1. Nine months
  2. Early

**SECTION III - HISTORY OF DELIVERY**

- 3.1 Where did you deliver?
1. Home
  2. Health Centre
  3. Hospital/Clinic
  4. Other (specify)
- 3.2 If home delivery, who was there to assist you?
1. T.B.A.
  2. Staff from Health Centre
  3. C.B.S. Volunteer
  4. Relative (specify)
  5. Other (specify)
- 3.3 Did you have any problem during delivery?
- 3.4 Describe delivery?

**SECTION IV - BACKGROUND ON INFANT**

- 4.1 How old was your infant before it died?
- NB: If neonatal age in completed weeks?  
If post neonatal age in completed months?
- 4.2 Was infant singleton, twin or other multiple birth?
- A. Singleton                      B. Twin                      C. Other (specify)

**SECTION V - OPEN HISTORY (Allow uninterrupted narrative)**

- 5.1 Could you please tell us about the illness and what happened to your infant that led to its death?
- a. Prompt at end asking if there is anything else she wants to tell us.
  - b. Ask if others have anything else to add.



- 6.10 Was your baby jaundiced or show any yellow coloration of the eyes or body?
- 6.11 If yes how long did it last?
- 6.12 Was it there till the baby died?
- 6.13 Did the navel heal properly or was there a discharge from it?
- 6.14 Did your baby have a fever before it died?
- 6.15 Did the baby vomit?
- 6.16 Did the baby have diarrhea/watery stool?
- 6.17 Did the baby have frequent stools?
- 6.18 Before the baby died was it coughing?
- 6.19 Did it have difficulty in breathing?
- 6.20 Was it breathing quickly?
- 6.21 Did it make any noises during breathing (described)?
- 6.22 Did your baby have a fever and become stiff?
- 6.23 Did the baby develop a rash (describe)?

If postneonatal ask further questions on the suspected ailment from the history given. Exclude other systemic conditions not mentioned or implied from the history. Be sure to

## **SECTION VII- TREATMENT SOUGHT**

- 7.1 What did you do when you noticed that your infant was ill?
1. Self medication
  2. Traditional Healer
  3. Health Centre
  4. C.B.S. Volunteer
  5. Other (specify)

**RECORD OF PROBABLE CAUSE OF DEATH**

1. Perceived cause of death
2. Stated cause of death
3. VPM cause of death
4. Underlying cause
  - 1.
  - 2.
  - 3.
5. Contributing cause
  - 1.
  - 2.

## Appendix 5

### Community Based Surveillance System Checklist

Keep the following areas in mind:

1. Diseases or health problems being reported:
  - Which cases
  - Diagnostic criteria and working definitions being used
2. Sources of health information:
  - Health facilities
  - Death registration
  - The community
  - Outbreak investigations
3. Analysis and presentation:
  - Registers
  - Files
  - Monthly graphs
  - Spot maps
  - Special reports.
4. Communication of findings:
  - Ministry of health and regions
  - Primary health care workers and district staff
  - Village councils and organizations
  - Non-governmental and voluntary organizations
  - Local mass media, radio.
5. Use of information in health planning:
  - Coverage of reporting and surveillance system
  - Improvements to community health programmes
  - Improved district health plans
  - Use of information in community health education
  - Changes in district health status indicators.

**Things to look for:**

1. Is there a register or notification form? Assess its ease of use and retrieval of information.
2. Check the dates on the documents to assess the timeliness of notification.
3. Look for standard case definitions.
4. Look for evidence of formal procedures in case investigation modalities.
5. Look for graphs and other forms of summarised data.
6. Look at action plans or project proposals if any for signs of data utilisation.
7. Look for evidence of supervisory visits.
8. Ask for supervisory checklist.
9. Look for reports and review contents looking out for evidence of data being communicated to higher or lower levels.

## Appendix 6

### **Discussion Guide For Community Based Surveillance System Volunteers and Zonal Co-ordinators**

Please tell me what you know about the infant death being reviewed. Allow uninterrupted narrative.

#### **SECTION 1 DETECTION, NOTIFICATION AND REPORTING OF CASES**

1. How do you detect your cases?
2. How soon do you get informed about cases?
3. Who do you notify when you get informed about a case or event?
4. Is there a register in which you record your cases?
5. Is it appropriate and comprehensive enough?
6. How do you report a your cases?

#### **SECTION 2 INVESTIGATION OF CASES**

7. When a case is reported what do you do?
8. Do you have a standard definition of cases you detect?

#### **SECTION 3 DATA ANALYSIS AND INTERPRETATION**

9. How d you summarise your data?
10. Comment on the data you have. (take the data available and ask them to comment , assess interpretation skills)

#### **SECTION 4 DATA UTILIZATION**

11. Is there any programme or intervention you have planned or implemented as a result of the data you have collected?

#### **SECTION 5 MONITORING THE QUALITY OF THE SURVEILLANCE**





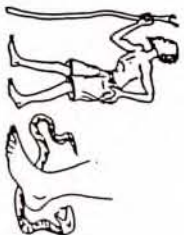
12. Who supervises your work?
13. How often are you supervised?
14. What is checked during supervision?

#### **SECTION 6 REPORTING AND FEEDBACK**

15. How often do you send in reports?
16. Are you sent comments or any kind of feedback?

**NB. ASK FOR THEIR GENERAL COMMENTS AND VEIWS ABOUT THE CBS SYSTEM**





**Appendix 7**  
**Copy of GBSS register recording sheet**

BIRTHS:			
MALE		00000 00000	00000 00000
FEMALE		00000 00000	00000 00000
DEATHS:			
INFANTS		00000 00000	00000 00000
PREGNANCY RELATED		00000 00000	00000 00000
OTHER DEATHS		00000 00000	00000 00000

**VBS TALLY SHEET FOR VITAL EVENTS AND DISEASES**

NAME OF DISTRICT: ..... MONTH: .....

SUB-DISTRICT: ..... COMMUNITY: .....

CEREBRO-SPINAL MENINGITIS		00000 00000	00000 00000	00000 00000
POLIO		00000 00000	00000 00000	00000 00000
GUINEA WORM		00000 00000	00000 00000	00000 00000
MEASLES		00000 00000	00000 00000	00000 00000
UNUSUAL EVENTS	? ? ? ? ?			