

**An Evaluation of Community-Based Surveillance
in the Northern Region of Ghana** (final 27-Oct-2000)

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BACKGROUND

Ghana is divided into 10 regions (see Appendix 5 for Ghana map). The Northern Region is the largest in land area, with a population of 1,854,944 (Ghana Census, 2000-completed after this assessment), half in the capitol district of Tamale; most of the population is subsistence farmers. Overall the health indicators are less good compared with the other nine regions; Northern Region also has fewer resources, less health staff, and a poorer infrastructure (for example, roads) when compared with the other regions. Ghana began planning for health sector reforms in the 1990's with the first year of implementation in 1997; funding of the health sector is decentralized down to the subdistrict level.

In 1988 the Ministry of Health in the Northern Region of Ghana initiated a village-based surveillance system for guinea worm control as part of the Guinea Worm Eradication Program (GWEP) with assistance from UNICEF. The goal of the village-based system was the detection, containment, and eradication of guinea worm throughout the region. The system was built on the reporting of guinea worm on a village-by-village basis by a volunteer in each village. The village volunteers were chosen on the basis of their own interest and on their nomination and approval by the village leadership.

In 1996, reports of guinea worm had reached a national low, however, outbreaks of yellow fever in 1996-1997, and cerebrospinal meningitis in early 1997 reached explosive levels. In part as a results of these events, and decentralization in the health sector, the Ministry of Health developed a plan to broaden the scope of the GWEP village volunteers to serve other disease reporting needs. By tapping the valuable resource of the volunteers at the village level, the Ministry wanted to develop an active surveillance system for detecting disease outbreaks, thus enabling early public health response and intervention.

The goals of the new "Community-Based Surveillance" (CBS) system were to monthly detect and tally cases of polio, cerebrospinal meningitis (CSM), guinea worm, measles, as well as infant deaths, pregnancy-related deaths, all other deaths, new births (separately for males and females), and unusual events. In addition, detection of polio, measles, CSM, and unusual events required immediate reporting to the subdistrict. Training materials and reporting books (registers) were developed to assist the volunteers in collecting these data. (See Illustrations 1 and 2 for copies of the recording pages from the register.) After approximately 3600 volunteers received training, the CBS system became operational in January 1998.

The CBS system was first reviewed in May 1998 to assess the status of early implementation and to make mid-course corrections, with technical assistance from UNICEF. Interviews were conducted with District and Subdistrict health staff, and zonal coordinators. Overall, the review concluded that the implementation of the system was progressing well, but recommended clarifying the roles of the zonal coordinators, Subdistrict, and District staff, and made suggestions about increasing the completeness of reporting. In addition, the reportable conditions were changed to include acute flaccid paralysis (AFP) with polio, modification of the "other death" pictograph, and dropping the question mark pictograph for unusual events. Finally, recommended external review an external review after the CBS system was operational for a full year.

This report documents the evaluation of the CBS system that was carried out in March 2000, funded by UNICEF. The external evaluators were Susan Zimicki, from the CHANGE Project based at the Academy of Educational Development, Washington DC, and Edmond F Maes, from the Division of International Health at the United States Centers for Disease Control and Prevention, Atlanta Georgia. They worked with three local counterparts: Edward Abu Accrachie (CBS Coordinator, Northern Region); Emmanuel Jejeti Kandoh (Disease Control Officer, Northern Region); Anthony Gingong (Disease Control Officer, Northern Region).

From the Regional to the Subdistrict level, Ministry of Health staff freely shared information and candidly discussed issues affecting the functioning of the CBS system. Such frankness and participation greatly facilitated the work of the evaluation team.

OBJECTIVES

The terms of reference are attached as Appendix 1, and the list of daily activities as Appendix 2. The main objective was to conduct an evaluation of the community-based surveillance programme in Northern Region, Ghana and make recommendations to guide the establishment of community-based surveillance activities in other parts of Ghana. In the process of doing this, the team was expected to develop and field test a methodology for assessing the role and impact of community level surveillance that could be used in other locations.

METHODS

The Northern Region is divided into 13 districts. Each district typically consists of four or five sub-districts, with between 50 and 100 villages in each subdistrict. The population in each village ranges from as few as fifty to as many as a few thousand persons, but the median size is small -- about fifty percent of the villages have a population of fewer than 200 people (Dr Anemana, personal communication).

The limited amount of time available for field work and the access constraints imposed by the terrain and road conditions precluded obtaining a large, representative sample of different villages. To maximize the variation that could be observed, the team used a contrast sample, that is, chose areas that were considered to exemplify good and poor reporting. Based on a review of reporting statistics from mid-1998 to mid-1999 and consultation with regional staff, four districts and the capitol district of Tamale were chosen. The four districts included two that represented areas with good reporting (East Gonja and Saboba/Chereponi) and two that represented those with the most difficulty in reporting (West Mamprusi and Nanumba). Within each district, two sub-districts were chosen following a similar strategy, that is, one with good reporting and one with less good reporting were selected. Similarly, at the village level, attempts were made to select villages exemplifying good and less good reporting. In an attempt to reduce bias in data collection, each evaluation team was assigned to collect information from one good and one poor reporting district.

Interviews of health staff, zonal coordinators, and village volunteers were primarily conducted by external evaluators (EM, SZ) with close collaboration of local team members

(EAA, EJK, AG). All interviews of District and Subdistrict health staff were conducted in English, while most of the interviews with zonal coordinators and almost all of those with village volunteers were conducted in a local language. Interviews of villagers were conducted by external evaluators through interpreters, or by local team members. Interviews were conducted using questionnaires, consisting primarily of open-ended questions. See Appendix 3 for a tally of the number of persons interviewed by area and additional background on questionnaire development. See Appendix 7 for the questionnaires/interview guidelines used for data collection in this evaluation.

FINDINGS

Design of the surveillance system

The surveillance system involves activity at five levels. Box 1, “Elements of the CBS system”, shows these levels, the responsible persons at each level, and their responsibilities. At the village level, volunteers obtain information about reportable events by visiting households and keep tallies of the events in the surveillance register. Because many CBS volunteers are illiterate, the register has pictographs for each type of reportable event, with a series of zeros next to each pictograph (see Appendix 4, Illustrations 1 and 2). Each time an event occurs, the volunteer makes a slash through a zero. Volunteers are expected to report events requiring immediate action -- AFP, CSM, measles and unusual events -- to the zonal coordinator or to the Subdistrict as soon as possible. The tallies of these and of the most commonly occurring events - births, deaths (maternal, infant, other), guinea worm cases -- and neonatal tetanus are handed in to the zonal coordinator when he visits at the end of the month.

On average, zonal coordinators have responsibility for 8-11 volunteers. They are expected to visit these volunteers at least once a month. During the visit, they are responsible for translating the tallies into numbers, for recording specific information about births and deaths (date, name of the person, name of parents of a new baby, and age and any information about the cause of death for someone who died) in the lists of births and deaths in the register, and for an overall review of the work of the volunteer. They collect the monthly reports by tearing off the edge of the register page on which they have recorded the number of events and hand these slips in to the Subdistrict health team. The remaining portion of the page has spaces for recording the monthly tally, thus leaving a record behind as the coordinator collects the slips.

The Sub-district team compiles the information handed in by the zonal coordinators into a villagewise list of events that is forwarded to the District. They investigate reported cases of AFP, CSM, measles and unusual events, and carry out audits of the reported infant and maternal deaths. In addition, when members of the Sub-district health team make visits to villages for activities such as immunization outreach, they are expected to check the volunteers' work. When an event requiring immediate action is reported, either by the zonal coordinator or by the CBS volunteer directly, the Sub-district team has the primary responsibility for the response, although the District may be involved in epidemic containment activities, which require additional resources and coordination.

At the District level, the monthly lists of events submitted by the Sub-districts are compiled and totaled, and the resulting District report is forwarded to the Regional Office. As noted above, the District team may be involved in epidemic containment activities. They are also expected to check volunteers' work when they are in villages for other activities.

Staff at the Regional office compile the final list of events, enter District-level information into a computer file and produce basic tabulations. The Regional office also organizes the regular bi-annual training for volunteers.

How the system actually works

The evaluation included examination of a few specific indicators of how the CBS system actually works: the frequency of visits by CBS volunteers to households and by zonal coordinators to villages, the consistency and correctness of case definitions of events, and reporting rates overall and of different types of events. In addition, discussions with District and Sub-district staff as well as with zonal coordinators and volunteers provided some suggestions regarding funding and training.

Frequency of visits

In most cases, volunteers obtain information by visiting households on a regular basis, usually twice a month or more. A few volunteers in very small villages reported that they had no need to make special visits to households, as they saw almost everyone in the village daily. Conversely, in a few large villages, volunteers reported that they had to use informants (usually children) to alert them when a reportable event occurred, because they could not visit such a large number of households even once a month. Table 1, a tabulation of the frequency of visits reported by the 18 interviewed CBS volunteers who also reported village size, shows that overall the frequency of visits was inversely related to village size. For the most part, the system has done a good job of ensuring that CBS volunteers are not overburdened (large villages have more than one volunteer).

Information the evaluation team obtained from the village volunteers and from the zonal coordinators indicated that most zonal coordinators visit the CBS volunteers they supervise at the end of each month. There were a few cases, however, where this apparently did not occur. In one zone visited by the evaluation team, the CBS volunteers said they had been asked to bring the monthly reports to the zonal coordinator. In another, the volunteer said that the zonal coordinator had gone away for an extended visit during which there had been no replacement. The evaluation team identified these cases by asking the village volunteer, but could not confirm them, because the zonal coordinators do not consistently sign the register book when they are in the village. Some zonal coordinators apparently think that the signature page is for regular MOH staff, and that they are not supposed to sign it.

Zonal coordinators represent a second layer of volunteers, between the village volunteers and the sub-district health team. The villages in each sub-district are grouped into four to six zones; each zone usually represents 8 to 11 villages (see Box 1). Most coordinators have a bicycle.

Box 1 - Elements of the CBS system		
Level	Responsible persons	Responsibilities
Community	CBS Volunteer	<ul style="list-style-type: none"> • Visit households • Tally events in the surveillance register • Report AFP, CSM, measles and unusual events immediately • Hand in report at the end of the month
Zone	Zonal coordinator (On average, responsible for 8-11 CBS volunteers)	<ul style="list-style-type: none"> • Review registers • Translate tallies into numbers • Collect monthly reports and transmit them to Subdistrict • Record specific information about births and deaths • Provide feedback to volunteers
Sub-district	Sub-district health team	<ul style="list-style-type: none"> • Compile villagewise list of events and forwards it to District • Investigate reports of AFP, CSM, measles and unusual events and initiate appropriate action • Carry out audits of infant and maternal deaths • Check volunteer work in conjunction with village visits for other activities such as immunization outreach • Provide feedback to zonal coordinators
District	District health team	<ul style="list-style-type: none"> • Compile Sub-district list of events with District totals and forwards it to Region • Involved in epidemic containment • Check volunteer work in conjunction with village visits for other activities • Provide feedback to Sub-district
Region	Surveillance unit	<ul style="list-style-type: none"> • Compile final list of events • Enter District-level information in computer • Produce basic tabulations • Organize bi-annual training • Provide feedback to District

Table 1 – Frequency of household visits by village size and frequency of CBS visits to households as reported by 18 CBS village volunteers

Village Size (number of households in village)	Number of household visits per month				Total Number of Villages Selected
	<1	1-2	3-4	5	
<50		3	1	5	9
50-99		1	3		4
100-199		2	1		3
200+	2				2
Total	2	6	5	5	18

some have motorbikes; the Ministry of Health has plans to provide bicycles to those with no other means of transportation

By visiting the volunteer at least once monthly, the coordinator is a critical link for ensuring the quality of data collection and providing support and feedback to the volunteer and the community. Timely visits by the coordinator’s role are also the first step to collecting data in a timely way. Growth in the number of villages has sometimes increased the workload of the coordinator. There seems to be some variation in the extent to which the coordinators are integrated into the subdistrict health team. Coordinators who consistently submit village tallies late may have lost interest or become unable to carry out their duties. Other than including coordinators in village volunteer trainings, coordinators have not been consistently addressed by training activities. More attention should be given to supporting the role of the coordinator and also monitoring the coordinator’s performance. Visits to villages by the subdistrict staff should also check to see if the coordinator has signed the register each time they visit the village are another way of monitoring performance.

Case definitions

The accuracy of case definitions and the consistency of their application by staff at all levels of the CBS system are key to successful reporting. The evaluation team asked the persons they interviewed how they defined the events that get reported, in particular AFP, guinea worm, infant deaths and maternal deaths. Table 2 shows the percentages of persons from different levels of the CBS system who gave correct case definitions for these events. Denominators (in parentheses in the table) vary because not all answers were recorded. As evaluators were more likely to record answers reflecting incorrect case definitions, the percentages shown in Table 2 are conservative, representing the lower limit of the percentages of different types of staff who gave correct case definitions In general, the case definitions are probably very sensitive—the major cause of inaccuracy is low specificity.

Table 2. Percent of respondents at each level who gave correct case definitions

	District, Sub-district	Zonal coordinator	Village volunteer
AFP	88% (11)	0% (4)	44% (16)
Guinea worm	80% (10)	50% (4)	86% (14)
Infant death	75% (12)	66% (3)	57% (14)
Maternal death	69% (13)	33% (3)	38%(13)

In general, the accuracy of case definitions reported by health staff was greatest at the District and Sub-district levels, and lower at the zonal coordinator and village volunteer level, with village volunteers, on average, doing better than zonal coordinators. This may reflect greater attention given to teaching volunteers the case definitions, or could be due to other, unrecognized factors. However, whatever the reason, it is clear that staff at all levels of the CBS system, but especially zonal coordinators and village volunteers, could benefit from refresher training on the case definitions. Also, correct case definitions could be listed on the inside front cover of the register. This would make them available at all times to village volunteers (who could have someone read the definition) and would also serve as a reminder to zonal coordinators.

The most common types of incorrect case definitions for the four key events, as well as for neonatal tetanus and CSM, are summarized below. (The evaluation team did not ask all respondents about neonatal tetanus and cerebrospinal meningitis, but did enquire when they had time to do so.)

AFP. Case definitions for AFP (shown in Box 2) were judged to be correct if they included a reference to a sudden change, and incorrect if they referred to a long-standing difficulty in walking. On the whole, the incorrect, generally over-sensitive, case definitions given for AFP probably result in over-reporting, and may be associated with long delays between symptom onset and reporting. However, even the correct definitions (e.g., the second one listed in Box 2) may result in delay, if volunteers wait to confirm that paralysis persists before reporting it. Moreover, if this definition is common, there is a possibility that some AFP cases may be missed if they resolve spontaneously within a short period. In addition, the tendency to express the definition in terms of ‘walking’ suggests that AFP in very young children may be missed.

Box 2 - Case definitions of AFP

Scored as *correct*:

- “When I hear that someone normal suddenly can’t walk, I won’t waste time”
- “When a child walking normally suddenly for some weeks is now not walking”
- “Sudden onset of paralysis”

Scored as *incorrect*:

- “When someone is limping”
- “Difficulty walking, limb deformity”
- “Weakling with stick”

The pictograph for AFP (which shows a child with a withered leg walking with a stick; see Appendix 4) may contribute to some of this confusion. This problem could be avoided by replacing the currently used pictograph with one or more carefully selected (using pretesting) to suggest a more acute condition for children of different ages. In addition, there should be renewed and repeated emphasis, reinforced at all training, on paralysis—particularly recent onset of paralysis, rather than AFP or polio, per se—as the condition of interest. All forms should contain the term ‘paralysis’ or a local language description regard rather than only saying ‘AFP/polio’.

Guinea worm: Those who gave incorrect case definitions of guinea worm stated that they would report cases when a person had a guinea worm blister (i.e., before the worm emerges). This misdefinition probably results in some over-reporting.

Maternal death. The evaluators identified two common problems in case definitions of maternal mortality. The first is that only deaths directly due to pregnancy and childbirth should be classified as maternal mortality. This misdefinition will result in underreporting, since late postpartum deaths, for example those due to sepsis, would be omitted. The second is uncertainty in the appropriate time cutoff used to define postpartum maternal deaths, (usually too short), which would also result in under-reporting.

Infant death: Those with incorrect case definitions of infant death said they would include older children - up to age 2 or even 5 - in this category. This misclassification would result in over-reporting that would be detected at the time of investigation of infant deaths. One problem, however, is that while corrections are noted at the Sub-district, it appears that they are not consistently forwarded up the system and are unlikely to be incorporated into the computerized information kept at Regional level. Thus there is probably some inflation in the numbers of infant deaths reported by the system. This is likely to improve over time as investigations of infant deaths are carried out, particularly if those doing the investigations remind the volunteers of the correct case definition. In fact, it is possible that it has already improved since the CBS system was initiated, and that this improvement may be a partial explanation of the observed reduction in infant mortality from 1998 to 1999.

One problem that the team could not evaluate is that some early infant deaths may not be recorded, especially those that occur before the “outdooring”, when the child is named. These would be most likely to be missed if the corresponding births were also unrecorded, which can happen if a volunteer waits until a child is named before recording the birth. Some zonal coordinators reported informally asking village informants (e.g., schoolchildren) about recent births and deaths as a check on what the volunteer recorded. This practice should be encouraged, perhaps during special supervisory training for zonal coordinators. In addition, some volunteers suggested adding ‘scratch pages’ to the registers, on which they (or a schoolchild, at their request) could make notes, as they prefer the ‘official’ recording of births and deaths to be made neatly, by the zonal coordinator.

Neonatal tetanus: Many persons interviewed were uncertain about the appropriate age range to use for neonatal tetanus deaths; some stated that children could have it from birth, while others said that older children (up to a year, up to 5 years) could die from it. Also, most did not include an assessment of the onset of suckling difficulties.

The form used by those investigating infant death could easily be changed to collect information that would allow reasonably good identification of neonatal tetanus deaths (age at death, kept as a continuous variable and coded as <3 days, 3-14 or 3-20 days, depending on what is known about the epidemiology of tetanus in the Region, and 14 or 20 to 28 days; information about breastfeeding initiation and whether the infant stopped sucking in the day or two before death; and information about convulsions).

Cerebrospinal meningitis. Many respondents who were asked about CSM referred only to headaches. Thus this condition is likely to be over-reported. Some retraining of staff about the correct case definition would be beneficial. No validated outbreaks of CSM were found to occur in 1999.

Reporting rates

Overall, in 1999 74% of the expected *number of village monthly reports* were received and incorporated into the computerized system. Of the remaining 26%, an unknown portion was received late and a remainder never received. The sub-district health team is should be encouraged to forward late reports as well as to identify areas for which reports are consistently late or missed. Reporting rates for individual Districts ranged from 53% to 97% (see Table 3 for rates for each District). Some of the major causes for lower reporting rates included difficulty in access due to seasonal rains as well as the routine difficulty of access to “overseas” villages, that is, those separated from the major part of the Sub-district by rivers. In addition, shortages of funds for reimbursement of transportation costs incurred by zonal coordinators may have contributed to delays in reporting.

It is currently difficult to track nonreporting by village or zone because Sub-districts write in the names of the villages by hand on the monthly reports and do not organize the list in any particular order. Moreover, the order changes each month. Using the same order each month, and organizing the list by zone would make it much easier to identify village volunteers and zonal coordinators who are having difficulties so that they can receive special attention or in some cases, perhaps extra resources, if transport is the fundamental problem.

Table 3 also shows *crude birth rates and crude death rates* calculated using the number of events reported by the CBS system. The crude birth rates were calculated as the number of reported births (unadjusted for the overall under-reporting) over the District population estimated by forward projections at the rate of 4% per annum of the 1984 census. Similarly, the crude death rates were calculated as the number of reported deaths (unadjusted) over the estimated District population. The estimated crude birth rates range from 7 to 30 per thousand population, with an average of 20. Even after adjusting for the overall under-reporting, these rates are lower than might be expected based on the average reported birth rates for rural sub-Saharan Africa (40-43 per 1000 population). Similarly, the estimated crude death rates, ranging from 1 to 9 per thousand population with an average of 3, are low relative to what might be expected (around 21 per 1000 population). It appears that the CBS system probably misses some births, and certainly misses some deaths. However, the true extent of underreporting is hard to determine because of lack of firm information on population size. The population figures used for the rate denominators were based on projections from the 1984 census, and do not account for any population mobility. Preliminary results from the 2000 census show the regional growth rate as 2.9%, suggesting that the denominators for the current birth and death rates have been over-estimated.

Whether the over-estimated population offsets the under-estimated number of births and deaths in calculation of birth and death rates remains to be seen. The CBS system should recalculate crude birth and death rates after the new census information becomes available at the village, subdistrict, and district level (anticipated for the end of 2000), and use those estimates to assess the accuracy of reporting. In the meantime, one way of improving the accuracy of the system would be to establish an expected number of births per month or quarter for villages of different sizes. Reported births falling below this level would be a signal indicating the need for a special supervisory visit.

Table 3. District reporting rates, 1999

	Reports handed in	CBR	CDR
		per 1000 population	
Bole	83%	21	8
East Gonja	94%	17	2
East Mamprusi	75%	19	3
Gushiegu/Karaga	62%	30	3
Nanumba	63%	21	5
Saboba/Chereponi	76%	26	3
Savelugu/Nanton	97%	15	3
Tamale	54%	19	1
Tolon/Kumbungu	87%	19	4
West Gonja	64%	7	4
West Mamprusi	53%	25	6
Yendi	72%	16	2
Zabzugu/Tatale	84%	19	3
OVERALL	74%	20	3

Infant mortality rates were calculated as the number of reported infant deaths over the number of reported births. Thus, these rates are internally consistent, unaffected by missing monthly reports or by the accuracy of population estimates. Table 4 (next page) shows the rates for each District in 1998 and 1999. What is surprising is the large difference between the 1998 and 1999 rates. In 1998 the IMR for all Districts was 101, ranging from 64 in Saboba/Chereponi to 146 in Tolon/Kumbungu, while in 1999 it was 46, ranging from 32 in Tamale District to 106 in Bole. This drop needs to be investigated, as it is possible that it reflects the effect of interventions to improve child health (specifically, measles immunization and distribution of vitamin A). One puzzling aspect is the difference in the size of the declines in different Districts, ranging from 2 in Bole to more than 90 in Savelugu/Nanton and Tolon/Kumbungu Districts.

Alternative explanations that need to be ruled out include an improvement in the accuracy of volunteers' classification of infant deaths. As discussed above, just under half of the volunteers who were interviewed during the evaluation gave the correct case definition for an infant death. The most common problem was including deaths of children more than a year

old. It seems reasonable to think that this overreporting of infant deaths could be decreased over time by the cumulative effect of feedback from the Subdistrict team auditing infant deaths. An additional factor is the lack of a system for incorporating corrections to the original monthly information in the computerized data. Thus, even when the audit determines that a death cannot be classified as an infant death because the child was more than a year old, the correction is not carried up the data stream to the computerized information. Both of these possible explanations can be investigated using existing information.

Despite these problems, the infant mortality rates (101/1000 and 54/1000), calculated from data reported in the two years that the CBS system has been running, enclose the overall infant mortality rate of 70/1000 estimated for Northern Region in the period 1988-98 by the Demographic and Health Survey (DHS) of Ghana, conducted in 1998.

Table 4 - District Infant Mortality Rates Reported by CBS
(reported infant deaths/1000 reported births)

District	1998	1999
Bole	108	106
East Gonja	86	43
East Mamprusi	84	44
Gushiegu/Karaga	101	37
Nanumba	91	75
Saboba/Chereponi	64	35
Savelugu/Nanton	139	47
Tamale (excl Central)	97	32
Tolon/Kumbungu	146	55
West Gonja	100	46
West Mamprusi	117	87
Yendi	119	51
Zabzugu/Tatale	74	39
OVERALL	101	54

AFP rates. The CBS system complements health facility-based surveillance (FBS) of AFP/polio. Based on recommendations of the May 1998 evaluation, AFP reporting includes

information on the source of report so it is possible to assess the role of the CBS and FBS systems. Table 5 shows the source of AFP reports of flaccid paralysis in children less than 15 years old during 1998 and 1999.

Table 5 - Source and timing of AFP reports

Year	Source	N of cases	Interval (days) post onset	
			Range	Median
1998	CBS	28	0-178	26
	FBS	13	1-34	6
1999	CBS	7	2-89	30
	FBS	10	1-57	6

These results were based on review of a line listing of polio/AFP cases under 15 years of age, residing in the Northern Region, and by taking the difference in days between date of onset and date of notification. The CBS system provided just over three-quarters of the polio/AFP reports in 1998 and about 40% of the polio/AFP reports for 1999. The time between the reported onset of symptoms and case reporting (notification) varied from 0 to 178 days in 1998 and 2 to 89 days in 1999; the median time between onset and report was 26 days in 1998 and 30 days in 1999.

The 1998 reports include an outbreak of polio, 29 cases (another 4 cases of polio did not have information on source of report). After removing the actual polio cases, CBS detected 10 of 12 cases of AFP. Between 1998 and 1999, physicians received extra training on the importance of detecting and reporting AFP. Thus in 1999, the total number of AFP cases increased, particularly in FBS.

When the CBS system was initiated, the expectation was that it would result in a shortening of the interval between reported onset of symptoms and case reporting, especially for cases that were not identified through health facilities. This did not happen, perhaps because of the “chronicity” suggested by AFP pictograph or case definition issues discussed above. However, it is clear that the CBS system did improve reporting, picking up cases that were not identified by the facility-based system.

Unusual events. In 1999, the CBS system provided timely information on the occurrence of outbreaks of cholera and measles and has also identified at least one setting in which anthrax was transmitted.

Immunization rates. Although the register contains a section of pages for recording immunizations (of the children whose births are entered in the register), the evaluation team found that this section had been completed only rarely. The biggest barrier seems to be the time required to enter children’s names, as well as the extra time needed to record the vaccinations. One possible, partial solution would be for zonal coordinators to enter the

names in the immunization section at the same time as they are entered in the birth register. Outreach teams also need to remember to examine both the current and previous year's register books to identify all children less than one, and to enter all vaccination information in the book. In contrast, it may not be practical to use the register as an immunization record when the child also receives some of his or her immunizations at the health facility.

Observations regarding funding and training

Some Sub-district staff reported shortages of funds for training incentives (allowance for meals or transportation). Continued shortage of these funds could eventually result in decreased participation in training and loss of morale among volunteer staff.

In addition, several village volunteers asked for help with means of transportation, particularly for reaching their Sub-district team. Most village volunteers do not have bicycles; a few that did have bicycles asked for help with repairs.

The CBS in Tamale

The evaluation team could only devote part of one day to finding out about the CBS system in Tamale District, so focused on Tamale Central in order to learn about the effect of the urban context. While the system was not examined in detail, it was immediately apparent that there have been major challenges to creating and maintaining a CBS system there. The idea had been to use unit committee members as the CBS volunteers. However, although forty-four volunteers had been trained, only three were actually making reports. One reason for this low level of involvement may be that persons living in urban settings are generally either employed in wage positions, and thus have less discretionary time than those living in rural areas. Another is that the areas (and populations) set for them to cover may be too large. Finally, in some parts of the city there may be a different sense of community than exists in rural villages.

The system is now trying to get political support through the Municipal Health Committee and the Assembly. Early in 2000 a review meeting was held with Assemblymen about the level of nonreporting. The team was told that "they apologized, and promised help."

Surveillance in an urban setting may require a different strategy compared the rural villages. The urban setting lacks the village headman and some of the traditional close links between extended families; households may be more transient and difficult to develop the level of trust among persons living in traditional villages. Also, persons are employed in wage-earning positions, with more regular hours. Finally the cost of living is higher and cash is required to exchange for more necessities of daily living. The three persons interviewed (two volunteers, one coordinator) in Tamale center were motivated by a desire for community visibility and opportunity for election to political office. These lifestyle and motivational differences may be substantial for rural populations.

One of the anticipated elements of the evaluation was obtaining information about the costs of the CBS system (# 3 in the list of proposed questions for evaluation). The evaluation carried out in May 1998 had recommended collection of cost information to benefit planners

who might want to consider implementing community-based surveillance systems elsewhere. It was not possible to collect cost information from the field they had. There is no separate budget for CBS; all activities are mixed in the health budget. In addition, one District team pointed out that the budget was kept at the Regional Office, and that Districts received money when it was necessary. This pattern is replicated down the system. For example, Sub-districts do not obtain fuel directly, but from the District.

An additional problem with costing is that District and Sub-district staff rarely go to villages solely for CBS activities; instead, they accomplish tasks for several programs in the same visit. This practice makes it hard to allocate costs for supervision to the CBS system. As an approximation, during several interviews the evaluation team tried asking for an overall estimate of what proportion of health staff's time in the field was spent on CBS activities. The East Gonja District Health team estimated that about 1/3 of outreach transport costs could be attributed to CBS; Chamba Sub-district team estimated that about 10% of outreach time was spent on CBS activities (but they distinguished outreach time – CBS combined with, say immunization activities – from supervisory time, which took about 8 person-days a month).

The evaluation team received information documenting UNICEF costs for supporting the CBS activities between 1997-1999. The major cost items were training, transport, supervision and monitoring and incentives for the volunteers; Appendix 6 shows the distribution of the UNICEF assistance of approximately \$245,777.

The first cost item - training - accounted for 28% of the total investments for the period. Training materials were first printed in 1997 and distributed by MOH NR before the CBS activities started officially in January 1998. The second batch of materials, incorporating changes recommended by MOH staff or by Dr. Jane Zucker after the May review of the CBSS, was printed in 1998. The third batch of materials was printed in 1999 for two reasons: 1) to replenish the stocks for Northern Region and, 2) to support the CBS expansion plan which MOH proposed after the annual meeting of Public Health Officers in Wa, Upper East Region. The printing costs of \$78,830 were split among the ten regions, thus giving Northern Region a disproportionate share of the costs (20%).

Other cost items such as transport and monitoring/supervision accounted for 30-31% of the expenditure during the study period. These costs were presented here as CBS costs although the potential benefits of these investments extend to other public health activities in districts and sub-districts such as Guinea worm surveillance, epidemic preparedness, and NIDs. The next item of expenditure includes the cost of printing T-shirts which the MOH in NR had recommended as an incentive for each volunteer in 1998 and the insecticide treated mosquito nets distributed to the volunteers in 1999.

UNICEF supported other costs such as technical assistance and evaluation by Dr. Jane Zucker in 1998 and by Drs. Ed Maes and Susan Zimicki in 2000 and limited support for out-of-country travel

As a general problem with the health system, all Districts and Sub-districts are struggling with limitations imposed by budgetary constraints: insufficient fuel and money for spares as

well as for training allowances (meals and transport) and is not specific to the CBS. It would be helpful to have specific budget lines and guidelines for these items. To guide planners, both in Northern Region and other regions of Ghana, the CBS team may want to consider a small study, involving prospective documentation of cost and level-of-effort information at different levels. In addition the system would benefit from tracking expenditure on the medical exemptions for the volunteers.

Why the system works

Volunteer motivation

Motivation of traditional village volunteers appears to be primarily based on providing service to their communities; while motivation of volunteers in urban areas appears to be primarily based on achieving political visibility. In addition to pride in their work, volunteers outside of Tamale mentioned receipt of T-shirts and help with reading and writing as benefits. Some, but not all, knew of the recently agreed-on exemptions for their medical fees at health centers; some Subdistricts are waiting until they can provide identification cards to the volunteers. One unemployed volunteer was hoping that his voluntary work would lead to a job.

What is extraordinary is the almost universal declared willingness of volunteers to continue working ‘as long as I am needed’, as well as the negligible dropout reported by the zonal coordinators who were interviewed. Many of the volunteers had been recruited by the Guinea Worm Eradication Program. The evaluation team did not have time to go into the details of how they were recruited or the selection criteria used, but did learn that initial drop-out rates were quite high. Perhaps some of that drop-out was due to the volunteer’s initial lack of understanding the demands of the position. It is possible that the volunteers who began working with the CBS system represent the truly dedicated ‘persisters’. An additional factor is undoubtedly the positive perception of the CBS by both communities and health system staff. In summary, recruiting volunteers for a CBS-like system outside of the Northern Region, should allow for time to select the volunteers who will remain with the system.

Perceptions of the CBS

A standard question asked by the evaluation team concerned the purpose of the CBS. Most respondents at all levels of the system responded in pragmatic terms (Box 3).

Box 3 - Perceptions of the purpose of the CBS

- “To facilitate easy and early reporting, to keep vigilance at the community level” (Director, DHMT)
- “To get the community involved so they understand their health problems. To know what problems the community has so the SDHT can act” (SDHT)

- “To help people to be free from diseases” (Volunteer)
- “To improve the health of the people” (Villager)
- “[The volunteer] gives reports about the village to the health facility” (Villager)

A richer picture emerges from responses to a question about the perceived benefits of the CBS. As consistently reported by villagers and volunteers, the CBS system has improved relations and communications between persons in the villages and the Ministry of Health staff (see Box 4 for examples). On direct questioning, community members and volunteers mainly noted improvements in health conditions and that they see health workers more often. The recording of exact dates of birth is also seen as a valuable service by the community. Health staff noted that their work in villages was easier. One Sub-district reported that they use information about recent births to make more efficient plans for outreach trips for BCG.

Box 4 - Perceived benefits of CBS

On the part of community members

- “Relationships with health worker have improved. Response to our health situation has also improved” (Male Villager, Dogon-Kole)
- “It has helped to reduce guinea worm. The health problems of the community are also reduced” (Female Villager, Kpalbusi)

On the part of volunteers

- “We are able to find illness and eliminate it” (Volunteer, Tamale)
- “People are getting awareness on their health”
- “We the people shall benefit from it. This thing will help us. There is a better relationship between health workers and the village. They say it is easy to do the work. We see them more often”

On the part of health workers, about the community-health system relationship

- “People are more cooperative now” (DHMT, East Gonja)
- “First they thought we were just coming to treat and go back. Now they have realized they are part and parcel of the whole program” (SDHT, Chamba)
- “It helps us to know what is going on in the village. Helps us to plan our program - what to do at any time in a village” (SDHT, Makayili)

- “Now they come out for immunization, they have their own people to mobilize them. They’ve seen the benefit. Volunteers feel free to make reports..” (DHMT, Nanumba)

On the part of health workers, about the health system

- “The District now understands why we need materials to go into the community. There are more resources to go to communities” (SDHT, Makayili)

Other health workers said that the register helped direct immunization and vitamin A administration teams to appropriately aged children. Finally, a staff member at one Sub-district mentioned that the CBS had improved relations between different levels of the health system. One recurrent theme in many of the remarks by persons at all levels of the CBS system is that of a partnership between health workers and the community.

Reasons for success and lessons learned

The success of CBS in the Northern Region may stem in large part from its growth out of the guinea worm eradication program (GWEP). GWEP gave the community a common, clearly visible target for action, easily identified by residents and health staff, as well as subject to effective interventions (community health education, medical management, and environmental risk reduction). Those developing CBS in other areas that are not endemic for guinea worm may need to identify other conditions with similar potential for recognition and relative ease of control (perhaps onchocerciasis or severe diarrhea; measles might also be considered, but given reasonable levels of vaccination will probably be too rare an event). It should be noted that not all Districts or Subdistricts of the Northern Region had guinea worm immediately prior to the introduction of CBS. In the limited sample of Sub-districts visited, there did not appear to be a relation between timeliness of CBS reports and prevalence of guinea worm.

Lack of timely reporting appears to be related to one of two situations: delays due to water barriers (rain-associated flooding and routine difficulty in traversing wide rivers), or management problems (lack of effective supervision of zonal coordinators, or lack of coordination among ministry of health staff and non-ministry of health personnel). In contrast, common findings in areas with timely reporting were frequent field visits by staff from the District and Sub-district level. In particular, frequent field visits appeared to outweigh problems related to water barriers and leads to effective CBS management.

Many of the CBS village volunteers interviewed by the evaluation team had previously served as guinea worm eradication volunteers. Nevertheless, previous experience in the guinea worm program did not seem to be related to reporting timeliness of village volunteers. Also, virtually all of the CBS volunteers had been serving since CBS began in January 1998. Together these findings suggest that a volunteer based system is sustainable and that CBS could be extended into regions without a history of guinea worm disease.

In summary, the reasons for success of the CBS system, which are replicable, include:

- a limited number of events are tracked
- some of the events tracked are common
- some of the events are actionable
- most case definitions err on the side of over-reporting
- the volunteers' workload is reasonable; weekly to monthly visits are feasible
- volunteers are not asked to handle money
- surveillance benefits both communities and the health system

The underlying reasons for success, which may not be replicable, include the fact that Northern Region CBS was built on the Guinea Worm eradication program, as discussed

above. Most importantly, in Northern Region there has been dedicated staff at all levels, which go to the field frequently. The CBS benefited from the support of a few visionaries who believed that community-based surveillance was possible, and from an innovative team at the regional level. Finally, timely technical and financial support from UNICEF supported the regional initiative.

Is initiation of CBS related to the resurgence of Guinea Worm reports in 1999?

From 1995 to 1998, the reports of guinea worm cases and infected villages have fluctuated every other year while the level of containment has remained very steady (see Table 6). The number of cases and villages with guinea worm in 1998 - the first year of CBS - was much lower than 1997. From 1998 to 1999 the number of guinea worm reports increased 65%, the number of villages infected increased 49%, and the percent of cases contained dropped from 76% to 61%. While this 1999 resurgence is coincident with the second year of the CBS activities, we believe it is unwarranted to attribute this change to CBS.

Table 6. Guinea worm reports, villages infected, and percent of cases contained, Ghana 1994-Qtr1/2000.

Year	Guinea Worm Cases	Villages with Guinea Worm	Percent of Cases Contained
Qtr1/2000	4257	?	84%
1999	9027	934	61%
1998	5473	625	76%
1997	8921	765	74%
1996	4877	602	74%
1995	8894	1057	74%
1994	8432	?	--

Some of the previous fluctuations in guinea worm reports have been attributed to delays in GWEP funding shortfalls, complacency, disruptions in clean water supplies, and the availability of cash bounties to the persons affected or the health worker for timely reporting of a guinea worm infection (1). There have also been resurgences in guinea worm cases in regions neighboring the Northern Region (Volta, Brong-Ahafo) in 1997 (2).

Guinea worm reports are typically highest from November through February. In the first quarter of 1998, there were delays in funding for the GWEP associated with the introduction of a new budgetary system and the introduction of the “common pot” for funds (3,4,5). Simultaneously, supplies of Abate were also inadequate (4). Also, in July to September 1999

the Northern Region experienced severe flooding and displaced populations. October 1999 floods in Volta and Brong Ahafo regions were severe enough to disrupt polio immunization days. The funding delays and lack of Abate in early 1998 could be related to the resurgence of guinea worm in 1999. Although the first quarter of 2000 shows a relatively large number of cases, we must wait for the results of the second and third quarter of 2000 to see if additional cases materialize as a result of the flooding of 1999. (Alternatively, examining these data by quarter would be a more sensitive way of estimating the impact of programmatic activities in the subsequent 9 to 15 months. On a more hopeful note, although preliminary, the first quarter of data for 2000, shows a large increase in case containment over 1999.

Challenges and opportunities for the future

In general, the CBS system is working well and appears to be sustainable. However, four specific areas should be addressed:

Workload of the CBS volunteer. Because the CBS volunteers are working effectively at the village level, there is a tendency consider expanding their role – for example, to train the volunteers to assist with growth monitoring activities, or with bednet treatment or other malaria control activities. However, the evaluation team concluded that one of the reasons for the effectiveness of the CBS system is that the volunteers are able to manage the work involved without compromising their other workload. Thus the CBS team must ‘protect’ the time of the volunteer. On the other hand, they also need to consider the fact that additional tasks, such as helping with National Immunization Days or vitamin A distribution, have been a welcome source of incentives. The balance between providing opportunities for incentives and not overburdening the volunteers is critical. In particular, the ongoing supervision of volunteers should be sensitive to detect any potential negative impact of the volunteers’ expanded responsibilities on the operation of the Guinea Worm Eradication Program.

Further integration of the CBS system and its output with District and Sub-district activities. In almost all Districts and Sub-districts the entire team is involved with the CBS system, in the sense that they participate in formal and informal supervision of the volunteers. The evaluation team found that some Districts and Sub-districts use information obtained by the volunteers to plan outreach activities (e.g., Nanumba District uses birth information to plan BCG outreach itineraries) or to organize work in the villages. However, this was not true in all Districts visited. Also, the team found that the health system has not yet begun to use CBS information for strategic, rather than logistic, planning. For example, information about maternal and infant mortality does not appear to be used to plan preventive activities. The CBS team should promote routine utilization of CBS information by District and Sub-district staff. An additional consideration is whether the CBS system could be considered as a model for developing community-based IMCI

Role of the zonal coordinators. The key role of the zonal coordinator in the timely transmission data, in assuring consistency in data collection, and other means of supporting and supervising the village volunteers merit special additional attention and training activities. Training in giving feedback and showing the value of the data could help ensure long-term participation of the volunteer, as well as draw the community more into the

surveillance process. For example, giving the communities examples of how CBS data was used successfully to curtail an outbreak may strengthen their support of the volunteer and cooperation with CBS. Giving the coordinator more guidance in how to detect errors in reporting will improve the data as well as show him the importance of his role.

Potential role for women volunteers. The team did not observe any women serving in the role of CBS volunteers. When we asked the volunteers how they were selected, all indicated that the village chief had chosen them to serve. We can only speculate that the chiefs selected men to serve because it was more socially or culturally acceptable. Perhaps further discussion between health personnel and chiefs or village leaders could suggest that they also consider using women volunteers. Perhaps women volunteers might be considered in activities for which child are closely affected, such as nutrition, and mobilization around maternal and child health issues.

Rising expectations of communities. As reporting has improved, so has the expectation of communities that health workers will follow up reported events. However, regular follow-up requires transport, fuel and staff time – all of which are severely constrained. The CBS system may want to begin considering now how they would like the link between communities and the health system to develop.

Summary of overall findings

The Ghana Northern Region CBS system works well:

- It builds on the strength and infrastructure developed by the GWEP
- It provides good information.
 - It complements facility-based reporting of AFP, has improved response to measles outbreaks, and has identified outbreaks of cholera and anthrax.
- It benefits both communities and the health system
- It has improved relations between communities and the health system
- Its functions at a high level of sensitivity for reporting of the targeted diseases
- It provides many opportunities for exchange among the levels of the health system (region, district, sub-district)
- It provides a vehicle for transmitting data routinely
- It is an active, rather than a passive, surveillance system

However, there is room for improvement:

- Case definitions need reinforcing at all levels, but particularly zonal coordinators and volunteers

- The key role of zonal coordinators should be recognized, and they should be provided with special supervisory training
- Specific changes to the register book, the reporting process and analysis of results (listed below) should further improve reporting
- Specific line item allocation of budgets to transport, training and repair of motorbikes and bicycles should be considered
- A range of types of incentives for volunteers should be considered

Summary of Specific Recommendations

Concerning the CBS system:

- Change emphasis of the case definition and revise the associated pictograph to increase detection of recent onset of paralytic symptoms in children of different ages (infant, toddler, young children) rather than muscle wasting due to chronic paralysis.
- Remove neonatal tetanus as an event that volunteers report. Revise the infant death investigation form to obtain information that will allow identification of any deaths due to this condition during routine investigation of infant deaths.
- Consider adding deaths associated with diarrhea as an event requiring immediate reporting.
- Recognize the importance of zonal coordinators, and consider providing them with special supervisory training and support for transport. Monitor their performance and consider replacing the very few who no longer have time for the work or who lack interest
- Encourage all members of DHMT and SDHT teams to take some responsibility for CBS. Develop a checklist for all visitors to villages, and recommend that all visitors (including zonal coordinators) should sign the register
- Feed back information from investigations and audits to villages; link this feedback to relevant health education

Related to the register and other forms:

- In the next printing of the community disease register, consider making the following changes:
 - a) Modify the polio/AFP picture to support the revised case definition
 - b) If diarrhea-associated deaths replace neonatal tetanus deaths, replace the neonatal tetanus picture with a pictogram conveying the idea of diarrhea-associated death
 - c) Include simple case definitions on the inside cover
 - d) Add a calendar

- e) Add blank pages at end for note making
- f) Consider expanding the signature section to accommodate all visitors' signatures

- Consider revising the investigation form for infant deaths:
 - a) Include questions about breastfeeding that would facilitate ascertainment of neonatal tetanus deaths
 - b) Revise the age at death categories to highlight the most probably time of neonatal tetanus death (3-14 or 3-20 days, depending on local epidemiology)
- Change 'polio' to 'paralysis' in all column headings on the reporting forms.
- Consider providing Sub-districts with preprinted compilation forms for reporting monthly village information, so that villages are listed by zones and in the same order every month. This will facilitate tracking of report completion. Include an 'other deaths' column on the form.

Training-related

- Develop training specifically for zonal coordinators emphasizing
 - a) supervisory skills, including a checklist for activities that zonal coordinators should perform on supervisory visit (e.g., review case definitions, tally register, query reports when no births and no events are reported, sign register, praise volunteer for efforts).
 - b) review of case definitions
 - c) the need to make supervisory visits to village volunteer at least once per month and to sign the register when doing so
- Use the most successful zonal coordinators to help develop training materials for volunteers and to help train other zonal coordinators when possible.
- Continue to involve District and Sub-district Health team and CBS coordinators in training of zonal coordinators and village volunteers.
- Continue to improve the routine refresher training for village volunteers and ensure that all volunteers attend regularly. This training should include:
 - a) review of case definitions with special emphasis on needs to detect paralysis soon after onset (use results of the audit protocols to help refine training on CBS case definitions)
 - b) review the need to report unusual events.
 - c) tell volunteers of their ability to get free medical care for themselves as an incentive for their work.
- Encourage zonal coordinators and subdistrict health team members to meet with community leaders at least twice per year to reinforce the value of the village volunteers' work.

- Showcase successful examples where village volunteers have provided timely information leading to a health team intervention; the goal is to demonstrate the value of the CBS approach and the key role of the village volunteer.

Budget and incentives

- Consider creating specific budget lines and guidelines for:
 - a) training incentives (meals and transportation costs)
 - b) transportation. Assist all zonal coordinators with the acquisition and maintenance of bicycles. Allocate money specifically for the costs of getting returns from ‘overseas’ areas. Prioritize villages having the most difficult access to health facilities with extra assistance for means of transportation.
 - c) repairs and continuing and expanding training sessions on bicycle maintenance. (Consider maintaining a set of bicycle repair tools in the Sub-district office)
- Consider seeking donor help for purchase of bicycles, as well as bicycle and motorbike maintenance tools and supplies.
- Consider seeking support for purchase of T-shirts with an attractive CBS-related logo or message for distribution at an upcoming training session. (Perhaps school children could be involved in a design contest for CBS)
- Continue to identify simple, and time-limited, opportunities for village volunteers to earn incentives, for example, NIDs, vitamin A administration, census taking. Explore literacy training as an additional incentive to volunteers.
- Consider requiring that all volunteers should have their own means of support (e.g., farming or wage-paying employment); lack of means of subsistence interferes with ability to do voluntary work.

Analysis

- Regularly assess completeness of reporting by examining the number of births by villages by month. If a village has more than a minimum number of consecutive months with no births (exact number will depend on village size), initiate a supervisory visit by a member of the Sub-district health team to validate the accuracy of the reporting.
- Regularly assess timeliness of village reports. If a zonal coordinator gives late reports for two consecutive months review causes for late reports. (Determine whether zone is too large for coordinator to complete his job in a timely manner.)
- Make a quarterly assessment of the timeliness of reporting at the level of the Subdistrict and District. Develop a system to incorporate late returns from zonal coordinators, Subdistricts, and Districts into final results, perhaps on a quarterly basis.
- Examining patterns of reporting of measles can assess the adequacy of measles control - Subdistricts with measles reports for three consecutive months require further investigation.

- At the District level, graph the number of events by Sub-district by month. Investigate substantial changes for occurrence of disease outbreaks or changes in reporting procedures.
- Use results of the audit protocols to help refine training on CBS case definitions.
- Just as AFP surveillance assesses the role of CBS and FBS in reporting, any investigation of disease outbreaks should specifically assess whether CBS was involved in case detection and reporting. The results of these investigations could be useful in refining CBS and help demonstrate the impact of CBS on overall disease reporting.
- Conduct a “capture-recapture” analysis of data from CBS and FBS systems to estimate the sensitivity and specificity of these surveillance systems. (This would require developing line listing of cases from the CBS system to compare with a line listing of cases from FBS. This analysis was not possible within the time and personnel constraints of the current evaluation.)

Expansion-related

- Developing CBS in other regions must take into account the need for support at all levels (i.e. Regional, District, Sub-district, as well as village.)
- Health staff in other regions should consider developing CBS in a few pilot Districts to gain experience before implementing region-wide expansion.
- Consider using Northern Region CBS as an explicit model for developing CBS in other regions. Bring staff from other regions to see the Northern Region CBS and involve Northern Region staff in the planning for other Regions.
- Explore the feasibility of having leaders from Northern Region communities help introduce the CBS concept to leaders in other communities. The CBS concept and approach, as well as the role of the volunteer, should be explained to community leaders in these communities.
- Consider community-specific adaptation of the list of events that are reported - e.g., instead of neonatal tetanus, let communities decide on one specific type of event they would like to have reported. Seek input from communities to help identify their health priorities. Focus on activities that have relatively high frequency and that have simple interventions. One example might be diarrhea deaths or severe diarrhea (watery diarrhea of more than two? days duration) and training in use of homemade oral rehydration solution.
- Identification of volunteers is critical to the success of the CBS system. The experience of the GWEP and CBS in Northern Region should be reviewed, and the lessons applied to expanding CBS in other regions. with a request for them to solicit and identify a motivated volunteer.

➤ CBS is not likely to work as a volunteer-based system in more urbanized areas where the traditional ties among residents are missing.

References

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Appendix 1 - Terms of Reference: Evaluation of Community-based Surveillance

Objective:

- 1) To develop and field test methodology to assess the role and impact of community level surveillance;
- 2) To conduct an evaluation of the community-based surveillance programme in Northern Region, Ghana;
- 3) To finalize an instrument and recommended methodology for conducting similar evaluations of community-based surveillance projects in other countries.

Background:

Africa presents greater public health problems and challenges than other regions because of the poor development, the low accessibility and the under utilization of health services in many parts of the continent. Over 50% of the population live more than 10 kilometers from a health center, making access difficult. Information obtained prior to the implementation of specific disease elimination or eradication efforts, indicated that only few of paralyzed children and even less of neonatal tetanus or guinea worm patients reached health facilities for care because of the above reasons and because of traditional beliefs.

In part, to overcome these obstacles, a number of programmes have been developed and implemented at the community level (for example, Guinea worm eradication, Leprosy control, Onchocerciasis, and ORT promotion). These programmes provide a base on which to build such a surveillance system. There are existing networks of volunteers and community workers (community health workers, traditional birth attendants, Guinea worm volunteers, women groups, youth associations) that are actively and/or interested in participating in these activities.

Discussions on implementing acute flaccid paralysis (AFP) surveillance for polio eradication focus primarily on facility-level reporting. However, it was recognized that a system that relied solely on the health center may not be sufficient to achieve adequate performance for the reasons outlined above. For this reason, it was recommended at the Technical Consultation Meeting on Global Eradication of Poliomyelitis held in April 1997 that in areas with poor access to health facilities or low utilization rates, the use of innovative community-based activities should be explored and integrated into surveillance for other diseases of importance.

The Northern Region in Ghana is highly endemic for Guinea worm. As part of the National Guinea Worm Eradication Programme, a village level volunteer has been identified from each community. The volunteers have been trained in case identification and containment, and are in place in nearly every village (over 3,740) in the region. This programme has been functioning since the mid 1990s. Due to the success of the programme, many villages are no longer endemic for Guinea worm but they are still required to report cases each month. To address need for continued reporting, to use existing manpower, to meet the needs of other programmes (for example polio eradication and EPI), and to address early notification related to recent outbreaks (yellow fever and in particular cerebrospinal meningitis) □ it was decided by the Regional Health Team (RHT) in the Northern Region to expand the number of diseases under surveillance through the existing community-based Guinea worm volunteer infrastructure. During 1997, with support from UNICEF, the RHT moved forward □ training materials were developed and nearly every volunteer (approximately 3,600) received training in the expanded community-based surveillance activities. The programme became operational in January 1998. The initial response has been very favorable, so much so that there is interest in expanding similar activities to other regions in Ghana.

As expected with initial implementation of a new programme, through the supervisory and monitoring activities, the RHT, had identified several changes that need to be made, for example, that revisions are required in the forms; process changes have been made, for example, regarding the relationship between zonal coordinators and sub-districts; and concerns have been raised, for example, about the burden placed on health staff. After four months of the project, an external assessment was requested to take an early look at the status of implementation, to identify existing constraints, and to make recommendations to improve operationalization of the integrated community-based surveillance system (cbs). The review recognized the enormous success to date and made recommendations for further improvements in the system, particularly focusing on areas with low reporting. The preliminary data from the cbs system after one year indicates that cbs is feasible. In 1998, in the

Northern Region, a total of 20 cases of AFP were identified, 16 of which were identified through the community level surveillance system.

It was recommended that a formal external review be conducted after the project has been fully operational for one year. The purpose is to assess the role of community level surveillance for case detection, advantages and constraints to case notification, and to identify the added value of community level surveillance compared with facility-level surveillance activities. The information from this review will foremost assist the RMT to strengthen the existing cbs system but it will also provide a basis for lessons learned to guide implementation in other Regions of Ghana and projects in other countries considering initiating cbs projects. Furthermore the methodology developed as part of this evaluation will be modified for use in other cbs projects.

Proposed scope of work:

I. The three primary questions to evaluate CBS:

- X *Has it happened-is community based surveillance occurring as envisaged?*
- X *What are the rates of reporting, (numbers, timeliness, responsiveness, comparative assessment)?*
- X *What is the impact of CBS?*

II. Elements to be evaluated:

- 1) process: does system work the way it is supposed to?
- 2) epidemiologic outcome: event detection rates, comparison with health-facility detection rates for level and timeliness, AFP outbreak detection, and accuracy of reporting (missed and over-reporting);
- 3) cost-effectiveness of cbs over facility-based surveillance: supplementary and additive effects on district budget, maintenance, and cost of running the system;
- 4) effects on the health system: health worker perception and knowledge, additional benefits- linkages with other initiatives, and effects in the Community and the Health system (include ability to respond, referral etc);
- 5) effects on the community: community perception and knowledge;
- 6) lessons learned about determinants of success and constraints.

III. Sampling for evaluation of community-based surveillance:

The primary objective is to assess the rates of detection of AFP and determine if they are significantly different from the expected background level of AFP or significantly different from health facility detection rates. A sampling framework will need to be developed that will depend on the level of aggregation of reports and coverage, so for example if there is high and overall good coverage, then there will be no need to sample; simply compare reports with HF reporting and background level .

Proposed questions for evaluation:

1) process:

- case definition used compared with recommended case definition;
- reporting rate of return at different levels (% of units submitting reports);
- use of data (response adequate, timely);
- Cbs volunteer retention rate: number of cbs volunteers trained, % still working 6 months later, 1 year later;
- Cbs volunteers that has reporting forms?

2) epidemiological outcome:

- event detection rates: measles, meningitis, guinea worm, polio, births (male, female), deaths (infants, pregnancy related, other);
- compare with health facility reporting of diseases for the same time period (the proportion of cases identified through facility-based vs. community-based surveillance systems);
- the level were the cases identified and the time from onset until case identification and investigation;
- for specific types of events, compare timeliness of reporting (onset-report).

3) cost:

- running cost: cbs volunteer payments (time, transport), materials (reporting forms); retraining, replacement

training;

- cost information of the community-based surveillance activity: how much additional money does it cost; at what benefit, i.e. how many more cases are identified by this approach, are they identified earlier; programme implications, i.e. the effect on fuel consumption.

4) *effects on the health system:*

- health worker attitude about role relative to community surveillance (do they feel threatened or aided) and the time/effort/funds required to maintain it;
- health worker knowledge about local rates of illness;
- health worker attention/response to reportable events;
- health worker attitudes about communities;
- appreciation of better denominators?
- improvement in vaccination rates?
- any other activity suffer because of surveillance activity? – specifically address indicators of the guinea worm eradication programme.
- other (open-ended)?

5) *effects on communities:*

- community attention to reportable events (any attempt to report back to community?);
- community knowledge about local rates, level of problem of different diseases;
- perceptions about prevention and importance of prevention;
- perceptions of health system involvement (is this just one more thing that communities are required to do, or something that's bringing communities and health workers together).

6) *lessons learned (correlates of success):*

- training: build on materials that are already developed;
- what are the requirements of supervision that are necessary for a well run project;
- can essential elements be identified that are important for replication in other projects;
- how do successful cbs volunteers organize and manage the surveillance?

7) *linkage initiatives:*

It is also expected that the proposed activities targeting community-based surveillance will also simultaneously provide the opportunity to:

- improve birth monitoring at village level in order to ensure appropriate immunization against killer childhood diseases,
- accelerate the reporting and improve the districts response capacities to epidemics (meningitis, cholera yellow fever and measles),
- favor the promotion of community based activities to extend coverage and foster community participation in revitalized health systems, and
- contribute to the ongoing regional discussion about the problems and potential of activities at community level .

Expected/proposed activities:

Proposed time frame: 2-2.5 weeks

Two person team -- External team (CHANGE and CDC plus UNICEF/WHO)

Anticipated schedule:

travel (Day 1 and 2): US to Ghana;

Day 3: briefing Central level, Accra;

Day 4: travel, briefing Tamale with Regional Team, begin work (reviewing forms, discussions with key personnel);

Day 5: team splits - sample districts;

Day 6, 7: field work;

Day 8: rest;

Day 9: continue field work/data collection;

Day 10/11: finish data collection if necessary, synthesis and report writing;

Day 12: debriefing/recommendations at regional level;

Day 13: return to Accra, debriefing at central level;

Day 14: travel home.

Expected outcomes:

1. Draft data collection form/ instrument for Ghana field work (prior to departure);
2. Final report outlining work conducted and findings during the field tests that would address:
 - Achievements and constraints;
 - Lessons learned and success determinants;
 - Communication strategies - effectiveness, constraints and recommendations;
 - Key Components and strategies (to enable replication and adaptation of cbs);
 - Process/Guidelines for cbs (materials, approach with community, training strategies, sustainability, continuity etc);
3. Recommendations to the Ghana programme;
4. Final instrument to be completed that could then be used by other country offices (after mission).

Appendix 2 - Daily Activities

Date: Activity

1. Mar6(Mon): Arrive in Tamale, meet with regional staff; review CBS summary data reports.
2. Mar 7: Review questionnaires with regional staff, make modifications; select districts and Subdistricts for evaluation.
3. Mar 8: Pilot test questionnaire in Savelugu, review results and modify questionnaires.
- 4,5. Mar9-10: EM and EJK conduct interviews in West Mamprusi District
SZ and EAA conduct interviews in East Gonja District
- 6,7. Mar11-12: EM and SZ review interview results and modify questionnaires
- 8,9. Mar13-14: EM and EJK conduct interviews in Saboba/Chereponi District
SZ and AG conduct interviews in Nanumba District
10. Mar15: EM, SZ, EJK, and AG conduct interviews in Tamale District.
Preliminary findings presented to Regional and District staff.
11. Mar16: Continue data analysis and begin drafting report
12. Mar17: Travel to Accra; present findings to Ministry of Health staff and UNICEF.

Appendix 3: Development of Questionnaire/Interview Guidelines

The questionnaires used in this evaluation consisted primarily of open-ended questions; initial drafts were developed prior to arrival in Ghana. Originally there were separate questionnaires for staff working with CBS at each of the following levels: District, Subdistrict, and health facility; there were also separate questionnaires for zonal coordinators, village volunteers, village leaders, and community members. During the course of the evaluation, the questionnaires were modified twice. The second modification led to use of one form for staff at District/sub-district/health facility/zonal coordinator, and separate forms for village volunteers, community members; more general guidelines were produced for village leaders.

Number of Persons Interviewed by District, Subdistrict, Village

Geographic Area District Subdistrict	Number and Type of Persons Interviewed			
	District and Subdistrict Staff	Zonal Coordinators	Village Volunteers	Villagers
East Gonja	2			
Kpalbe	2	1	2	5
Salaga	2	1	2	7
West Mamprusi	3			
Janga	1		1	1
Kpasenke	1		1	
Walewale	1	1	3	3
Nanumba	3			
Chamba	2	1	2	6
Makayili	1		2	5
Saboba-Chereponi	3			
Wapuli	2		2	1
Saboba			1	1
Sambuli	1	1	1	
Chereponi	1			
Tamale	1			
Tamale Central	1	1	2	
TOTAL	27	6	19	29

Appendix 4 – Illustration 1 - First of two pages from the Community-based Surveillance Register for recording monthly health events

CBS TALY SHEET FOR VITAL EVENTS AND DISEASES

COMMUNITY.....






COMMUNITY:

SUBDISTRICT.....






SUBDISTRICT:

JANUARY

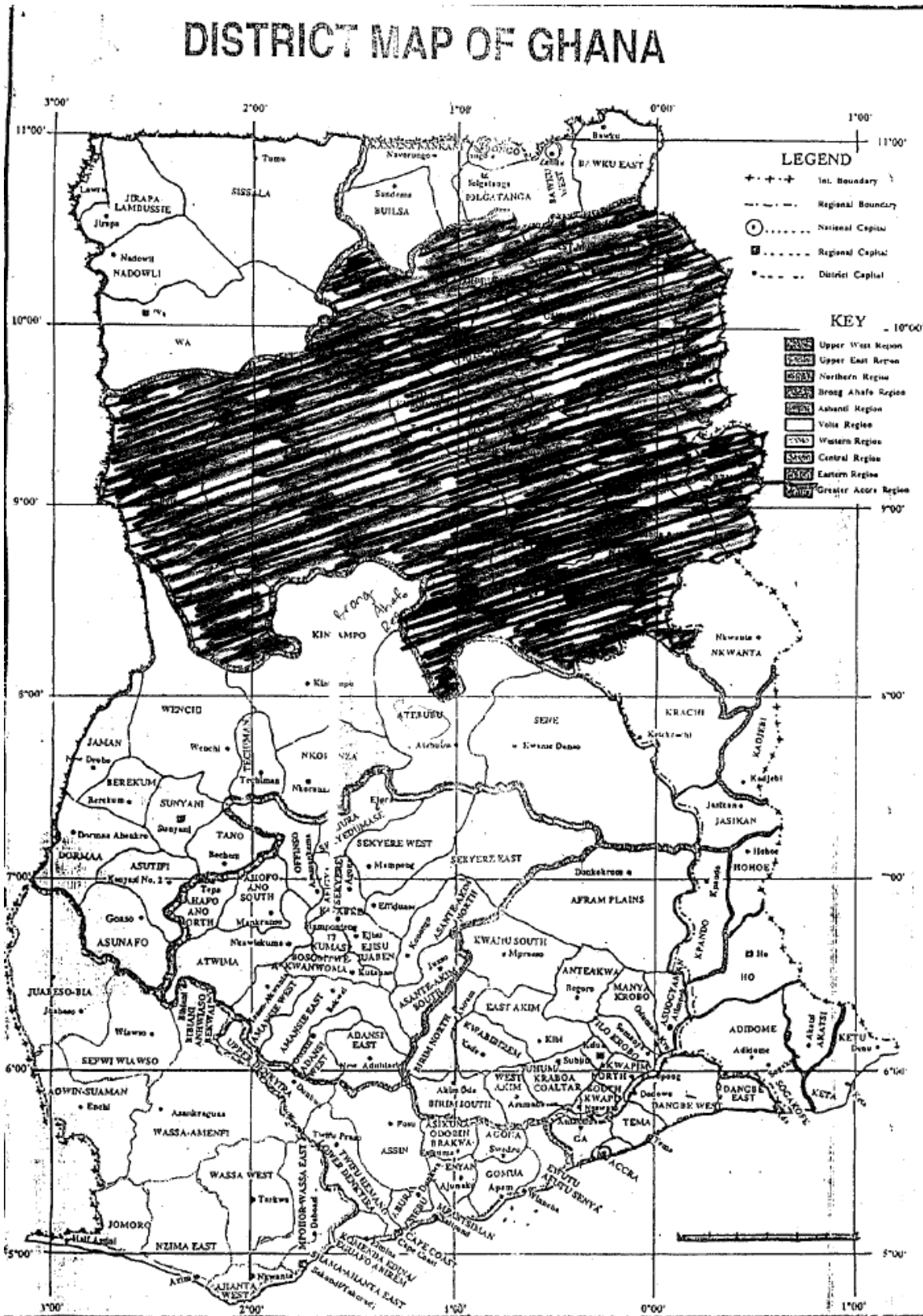
JANUARY

CEREBRO-SPINAL MENINGITIS (CSM) No.....		00000 00000 00000 00000 00000 00000	CSM No.....
AFP (POLIO) No.....		00000 00000 00000 00000 00000 00000	AFP No.....
GUINEA WORM No.....		00000 00000 00000 00000 00000 00000	GUINEA WORM No.....
MEASLES No.....		00000 00000 00000 00000 00000 00000	MEASLES No.....
NEONATAL TETANUS 0 - 28 days No.....		00000 00000 00000 00000 00000 00000	NEONATAL TETANUS No.....

Appendix 4: Illustration 2 - Second of two pages from the Community-based Surveillance Register for recording monthly health events

<p><u>BIRTHS:</u> MALE No.....</p>	<p><u>BIRTHS:</u> MALE No.....</p>		<p>00000 00000 00000 00000</p>
<p>FEMALE No.....</p>	<p>FEMALE No.....</p>		<p>00000 00000 00000 00000</p>
<p><u>DEATHS:</u> INFANT (0 - 12 Mths) No.....</p>	<p><u>DEATHS:</u> INFANT (0 - 12 Mths) No.....</p>		<p>00000 00000 00000</p>
<p>PREGNANCY RELATED No.....</p>	<p>PREGNANCY RELATED No.....</p>		<p>00000 00000 00000</p>
<p>OTHER DEATHS No.....</p>	<p>OTHER DEATHS No.....</p>		<p>00000 00000 00000</p>

Appendix 5: Map of Ghana (Northern Region shaded)



Appendix 6 - UNICEF Financial Support for CBS Activities in Northern Region – 1997 to 1999

			AMOUNT
#	ISSUE DATE	DESCRIPTION OF ACTIVITY	US \$
1	9/16/97	PRINTING OF TRAINING MATERIALS FOR CBS	7,988
1	12/16/97	TRAINING FOR VILLAGE VOLU. ON CBDS	8,666
1	6/5/98	TRAINING OF SUB-DIST. HEALTH AND VILLAGE VOLUNTEERS	16,353
1	7/23/98	PRINTING OF COMMUNITY REGISTERS	20,884
1	5/19/99	PRINTING OF TRAINING MANUALS FOR CBS	15,766
2	10/13/99	BICYCLES TO STRENGTHEN THE CBS	14,565
2	10/15/99	MOTORCYCLES FOR CBS & GW - 32	61,571
3	1998-9	COMPUTER EQUIPMENT	7,100
3	7/21/98	DISSEMINATION OF INFORMATION ON CBS	4,380
3	7/10/99	STRENGTHEN MON. & SUPERVISION - NR	47,736
3	7/10/99	IMPROVE HEALTH TEAM RESPONSE - NR	12,642
3	7/10/99	COMMUNITY PARTICIPATION IN CBS/GWEP - NR	2,264
3	7/12/99	MONIT. & SUPERV. OF CBS VOLUNTEERS	284
4	6/5/98	PRINTING OF 4000 T-SHIRTS	8,383
4	10/26/99	PERMETHRIN FOR BEDNETS (168 LITRES)	3,195
4	10/26/99	MOSQUITO NETS FOR CBS VOLUNTEERS	14,000
			245,777

1 = training

2 = transport costs for CBS/GW program

3 = monitoring, supervision,, response including community orientation

4 = incentives for the volunteers(T-shirts provided during training)

N.B. = in 1999, MOH requested UNICEF to print registers for all 10 regions as part of the MOH plan for CBS expansion. We have assigned approximately 20% of the costs to the Northern Region (i.e., 20% of \$78,830)

N.B. = costs do not include technical assistance from Dr. Zucker, costs of the evaluation, and the cost of sending Dr. Anemana to a conference in Kenya to present a paper on the CBS. Also, these costs do not include the costs of staff time of the UNICEF Accra team.

Appendix 7 - Questionnaires/Guidelines Used in Field Data Collection

District, Sub-District Health Team, Zonal Coordinator, Health Facility

We are here to learn about the CBS programme. Because it is a new programme, we expect that there may be some problems doing everything the way the ministry planned it. We are here to learn about these problems and to see if there are ways to fix them. We are also here to learn about the successes of the programme so that the ministry can decide whether to start the program in other regions. Our job is to talk to the people who know about the project and tell us about their experiences. We know how the programme is supposed to work, but we don't know if it is working that way. That is why we have come to ask you about your experience with the CBS programme.

NOTE: try to get 1 person who visits field and 1 person who handles the data

District _____ Sub-District _____ Size of Team _____

Name _____ Title _____ Time in job _____

Name _____ Title _____ Time in job _____

Name _____ Title _____ Time in job _____

No. of health facilities in sub-district _____ No. of villages supervised _____ No. of volunteers supervised _____

Travel time to furthest village _____ Travel time to the district _____ No. of villages cut off during rainy season _____

Estimated population _____ Rural Urban Group Individual interview

*= question not for District

Knowledge of CBS/Community

What are the main health problems in the area?

Can you please tell me about the purpose of CBS?

What is the role of you/your team? Probe: supervision, investigation, audit, data summary and feedback, training

*How is this different from the role of the (others) SDHT / Zonal Coordinators/health facility staff??

Has the information received from the villages changed your perception of the health problems in the SD?

Would you say that the CBS has helped you do your work? How?

Training

Would you recommend any changes in training of volunteers? If yes, what?

*Think of your best CBS volunteer, what makes him the best?

*Think of the weakest volunteer, what makes his performance the weakest?

***Attrition**

About how many volunteers have you lost since the programme started?

Why?

Were there any problems replacing them? If yes, what kind of problems?

Supervision

Do you have a supervisory plan? (Is there any documentation?)

*Are you able to supervise all volunteers on a monthly basis?

If no, what are the circumstances that prevent this?

Volunteers have been given a lot of responsibilities. What are the most important activities of the volunteer?

Do you think they are handling them well? Examples?

What activities are the volunteers having the most trouble with?

III. Health worker attitudes

In general, has your relationship with the community stayed the same, improved, or gotten worse since the CBS project started? Please explain.

(For SDMT, zonal coordinators) Has your relationship with the DHMT stayed the same, improved or gotten worse since the CBS project started? Please explain.

(For District and zonal coordinators) Has your relationship with the SDMT stayed the same, improved or gotten worse since the CBS project started? Please explain.

Has your relationship with facility staff stayed the same, improved or gotten worse since the CBS project started? Please explain.

Has your relationship with GWEP staff stayed the same, improved or gotten worse since the CBS project started? Please explain.

Verification of case definitions

*What do you do when you check the volunteer=s book?

When should the volunteer mark the book for each:

AFP

Measles

Guinea worm

NNT

Infant death

Maternal deaths

*Are you ever unsure about any of these conditions? Which ones?

*Besides asking the volunteer, what do you do to check if there have been any births or deaths?

VI. Reporting and response

Do you routinely schedule meetings to review data? If yes, how often? (Ask for minutes)

(For SDHT, zonal) Please describe what happens to the data from the village to the sub-district office?

(For DMHT, zonal) Please describe what happens to the data from the sub-district to the regional office?

What is your role? What do you do with the information? (Probe for collating it, analyzing it.)

Please describe any problems you have encountered?

Have these problems been addressed?

Do you have suggestions as to how your work (compiling and analyzing data) could be streamlined?

Do you have any suggestions for changing any of the CBS forms?

Do you think AFP reporting has improved since CBS was started? In what ways?

Impact

Do you think that the Guinea Worm Eradication Program has suffered since CBS was started?
In what way?

Use of information (for SDHT, Zonal coordinators)

What feedback do you receive from the district level?

How do you use this feedback?

What feedback do you give to the volunteer?

(For District) Is there other information that would be more useful for your area? (Reminder to interviewer: Western region B substituting cholera for CSMB an example of decentralizing decision making to modify items.) If yes, what?

IX. Costs and Sustainability

Have there been any problems with obtaining the supplies necessary for CBS?

If yes, what? (fuel, forms, spare parts, other). How frequently?

What problems have you been able to solve?

In your experience, what are the main problems with the CBS programme?

In your opinion, what is the best thing about the CBS programme?

Do you think CBS is sustainable?

Why or why not?

In what ways does the district's involvement with the GWEP interfere with the success of the community-based surveillance programme?

**Supporting Documentation to be collected/reviewed
Sub-District Level**

1. Copies of all CBS forms used (modifications necessary?, utility of information collected?
Change polio to AFP?)
2. Monthly CBS reports (to what level can this data be disaggregated?)
 - reporting rate of return
 - Event detection rates
 - Change in vaccination rates
3. GWEP
 - Budget info
 - Monthly reports
 - reporting rate of return
 - Event detection rates
4. Facility
 - Monthly communicable disease reports from facilities (is response time available for
comparison with CBS data?)
 - reporting rate of return
 - Event detection rates
 - Facility utilization rates
 - Immunization rates (fixed and outreach Cit was reported that outreach services in some
areas were expanded due to an increased understanding of need through the use of
CBS data)
5. Unusual event reports
 - Type of events
 - Event detection rates
 - percent responded to
 - types of responses
 - percent forwarded to district/region
 - appropriateness of response (cost implications)
 - time from onset to report
 - time from onset to response
 - accuracy of initial report
6. CBS cost information
 - training, retraining and replacement training
 - fuel consumption
 - transport costs
 - spare parts
 - supplies for response visits
 - cost per response
 - forms
 - volunteer incentives
 - staffing
 - equipment
7. Case definitions
8. Reports from the CBS monitoring committee
9. Reports, memos about CBS (demonstrating use of data collected: e.g., reports, charts, GIS maps)

10. Training materials for volunteer, SDHT, others
11. Job descriptions/memos documenting CBS responsibilities
12. Documentation for CBS procedures (monitoring, supervision, implementation, etc.)

Community Interview: Volunteer

We are here to learn about the CBS programme. Because it is a new programme, we expect that there may be some problems doing everything the way the ministry planned it. We are here to learn about these problems and to see if there are ways to fix them. We are also here to learn about the successes of the programme so that the ministry can decide whether to start the program in other regions. Our job is to talk to the people who know about the project and tell us about their experiences. We know how the programme is supposed to work, but we don't know if it is working that way. That is why we have come to ask you about your experience as a volunteer. First I will ask you a few questions about the programme and then I would like you to show me the community register.

District _____ Sub-District _____

Name of village _____ urban/rural _____

Name _____ Length of time as volunteer _____
(compare with name on baseline date in register)

Other names known by _____ Sex: M/F

Community register available for review :Y/N location of register _____

No. of households _____ Travel time/distance SDHT _____
(compare with information from baseline data in register)

Travel time/distance to the district _____ Cut off during rainy season _____

What other health programmes are active in this village?

(MOH/NGO) _____

I. Knowledge of CBS

1. Please tell me how the CBS programme works and what the goals of the programme are?
2. Please tell me about the different responsibilities that you have as a CBS volunteer.

Training and supervision

3. Are you involved in any other community projects (health, agriculture, etc.) Y/N

What are they?

4. Were you a Guinea worm eradication program volunteer before you became a CBS volunteer?
5. Why did you become a volunteer?

Impact and sustainability

12. Do you think the SDHT appreciate the work you are doing or not?
13. How has this changed since the beginning of the project?
14. When you go around to the people in the village, do they welcome you into their house, or do they think you are troubling them? Give examples.
15. How has this changed since the beginning of the project?
16. In most villages it is hard for the villagers to pay volunteers in cash. But most volunteers still think there are benefits to being a volunteer. Please tell me about the different ways you benefit from being a CBS volunteer. (*probes: training, in-kind gifts from villagers, help with farm work or childcare, recognition from villagers, recognition from health workers*)
- 16a. When you go to health facilities for treatment for yourself, do you pay?

Use/availability of Information

17. What are the main questions that people in the village have for you about the CBS program?
18. What are the main complaints you hear from people in the village about the CBS program?
19. Does the SDHT or zonal coordinator ever bring you information/give you feedback about the programme? What kind?
20. Do you ever receive any information about the programme from the district? What kind.
21. Does the community ever receive information about the program? What kind? From whom?
22. In your opinion, what is the best thing about this programme?

Recording, reporting and response

Now I would like to review the community register with you. Can we go get the community register?

23. Case definitions: First I'd like to go over the forms that you use to record the births and deaths and new sicknesses. We will go through each picture and I would like you to tell me when you record something - probe: how do you know a person has this disease

	<u>Identified picture</u>	<u>How determined</u>
X CSM	Y/N	
X AFP	Y/N	
X guinea worm	Y/N	
X measles	Y/N	
X neonatal tetanus	Y/N	
X unusual events	Y/N	
X pregnancy related deaths	Y/N	
X infant deaths	Y/N	

X other deaths Y/N

24. *Review the picture for each event with the volunteer.* These forms were made to help you do your job better and to make it easy to do your job.

How could we change them to help you even more?

How could we change them to make your work easier?

	<u>help more</u>	<u>make work easier</u>
X CSM	Y/N	
X AFP	Y/N	
X guinea worm	Y/N	
X measles	Y/N	
X neonatal tetanus	Y/N	
X unusual events	Y/N	
X pregnancy related deaths	Y/N	
X infant deaths	Y/N	
X other deaths	Y/N	

25. Sometimes it is difficult to know for sure what sickness a person has and whether it is one of the sicknesses that should be recorded in the register. This can even be difficult for health workers. I am going to list the diseases you are looking for in the village and I would like to know if there was a time you were not sure whether to report the disease or which disease you should report, and how you decided which disease to report.

	<u>trouble diagnosing</u>	<u>how resolved</u>
X CSM	Y/N	
X AFP	Y/N	
X guinea worm	Y/N	
X measles	Y/N	
X neonatal tetanus	Y/N	
X unusual events	Y/N	

25a. When someone dies, are you ever uncertain about where you should record it? Please give me an example?

26. Did it every happen that you are not sure whether to record the disease in the community register or report it as an unusual event? Y/N
What did you do?

27. What are the different ways you find out that someone is sick or that there is a death or birth in the family?

- X routine visits to villagers
- X family of sick person notified you
- X health committee notified you
- X traditional healer notified you
- X TBA notified you
- Others in the village (describe)

28. How do you know when to start recording on a new page? (If 'when the month ends' probe: How do you know when that is?)

29. I learned that some volunteers' take the report to the SDHT or zonal coordinator every month, and some SDHTs or zonal coordinators visit the volunteers every month. Which way

does it work in this village.

Could this system be improved?

30. Have you reported any measles, AFP, CSM or neonatal tetanus in this village?
Y/N
31. If yes, how did you find out about it?
32. What did you do then?
33. (*Ask if not mentioned*) How did you get the report to the facility/SDHT?
34. What was the response?
35. Were people in the village satisfied? Why or why not?
36. Have you reported any “unusual events” in this village? Y/N
37. If yes, how did you find out about it?
38. What did you do then?
39. (*Ask if not mentioned*) How did you get the report to the facility/SDHT?
40. What was the response?
41. Were people in the village satisfied? Why or why not?
42. Suppose you learn from the TBA that a women in the village delivered a baby 2 days ago and the baby died this morning. What do you do?

Review the register (Now I’d like to look at your register):

Did you have a problem getting the register at the beginning of this year?

43. *Note the condition of the register :*

Are entries up-to-date:

Frequency of visits from SDHT: (no. of months village visited by health staff, no. of visits per month)

Are immunizations up-to-date/consistent with birth information?

Interviewer: Conclude the interview: These are my questions to you. Do you have any questions for me? Thank you for your help.

“Chief’s Page”

1. Why is it important that the volunteer get information from every house in the village?
2. Do you think the volunteer is getting information from every house in the village?
3. What do you think could be done to be sure that the volunteer is getting information from every house in the village?
4. When was the last time he visited your house? Month_____ Year_____
5. In your opinion, what is the best thing about this programme?
6. Can you recommend anything that we could do to make the programme better?

Thank you for your help.

Community Interview: Community Member

We are here to learn about the CBS programme. Because it is a new programme, we expect that there may be some problems doing everything the way the ministry planned it. We are here to learn about these problems and to see if there are ways to fix them. We are also here to learn about the successes of the programme so that the ministry can decide whether to start the program in other villages. Our job is to talk to the people who know about the project and tell us about their experiences. We know how the programmed is supposed to work, but we don't know if it is working that way. That is why we have come to ask you about how the programme is working in your village.

District _____ Sub-District _____ Village _____

Name _____ Sex: M/F

DOB(age if dob not known) _____ Length of residence in village _____

1. How did you first hear about the CBS project?
2. What is the name of the CBS volunteer in this village?

_____ unknown

3. What does he do? (Probe: anything else?)

Has s/he ever talked to you about guinea worm, sickness or health issues?

- 3a. What is the purpose of his activity?

4. Has (s)he ever visited your house? Y/N

5. If yes, when was the last time (s)he visited your house?

Interviewer: If not already mentioned by the respondent, explain that for 2 years the village has been keeping a register where all birth, deaths, and vaccinations are recorded and all cases of polio, CBS, GW and measles are recorded.

8. Has anyone in your family gotten guinea worm in the last 2 years? Y/N

Did the volunteer know about it?

How did the volunteer come to know about it?

What did the volunteer do when he found out about it?

9. Has anyone in you family had a baby in the last 2 years? Y/N

Did the volunteer know about it?

How did the volunteer come to know about it?

What did the volunteer do when he found out about it?

10. Do you think it is important for the community to keep a register that keeps track of births and deaths and sicknesses?

Y/N

Why or why not?

11. In your opinion, what is the best thing about this programme?

11a. Do you think what the volunteer is doing is beneficial to you? Y/N

In what way?

Try showing pictures, ask if villager knows what condition/event the picture represents

These are my questions to you. Do you have any questions for me? Thank you for your time.