CHRISTIAN CHILDREN`S FUND
ANGOLA

Emergency Health and Nutrition Project
Bocoio, Angola

OFDA Grant Reference Number: DFG-G-00-03-00079-00

Final Evaluation

October-November 2004

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ACRONYMS AND ABBREVIATIONS

BP-Amoco	British Petroleum-Amoco
CCF	Christian Children's Fund
Comuna	Administrative subdivision of a Municipality. The Municipality of Bocoio has 5 comunas: Bocoio, Monte Belo, Cubal do Lumbo, Passe and Chila
CRS	Catholic Relief Services
CORE	US-based USAID-sponsored NGO coordinating body for child health
DMS	Municipal Delegation (or Delegate) of Health
FAS	Fundo de Assisstência Social, a semi-governmental entity funding infrastructure projects
HIS	Health information system
IMC	International Medical Corps, an NGO
IMCI	Integrated Management of Childhood Illness
LQAS	Lot quality assurance sampling, a random sampling method for sample surveys
MCH	Maternal and child health
MOH	Ministry of Health
NGO	Non-governmental organization
OCHA	Organization for coordinating humanitarian assistance, a UN agency
OFDA	Office of Foreign Disaster Assistance, USAID
ORS	Oral rehydration salts
ORT	Oral rehydration therapy (treatment for diarrhea)
PAR	Programa de Assistência à Reconstrução, European Funded reconstruction infrastructure project.
PIP	Plano de Investimento Público, Angolan government reconstruction and infrastructure plan
SCM	Standard case management (use of standard protocols for diagnosis and treatment)
TB	Tuberculosis
TBA	Traditional birth attendant
UN	United Nations
UNICEF	United Nations Children's Fund
UNFPA	United Nations Family Planning Agency
USAID	United States Agency for International Development
WFP	World Food Programme (UN agency)
WHO	World Health Organization

A. Introduction and summary

1. Executive Summary

The cessation of hostilities in Angola in early 2002 created both a crisis and an opportunity. Large numbers of people, already in poor health, began returning to their areas of origin where health and other services were largely unavailable. At first, large numbers of people were concentrated in resettlement and demobilization camps in the town of Bocoio and immediately surrounding areas. CCF launched an emergency health and nutrition project with support from WFP and OCHA in mid-2002 with a focus on providing emergency food aid to the populations in the camps, identifying and feeding malnourished children, and providing emergency health and obstetrical services to the accessible population.

By the end of 2002, the population had begun moving back to newly accessible rural villages. CCF shifted its priority to reestablishing a working health care system while continuing support to malnourished children. CCF secured funds from OCHA, BP-Amoco, OFDA, WHO, CCF/USA, and food from WFP to support that effort, which had five principal objectives: 1) improving access to health services, with emphasis on immunization, maternal care and basic curative primary health care services; 2) improving nutritional status of children through support to a supplemental feeding program and establishment of a therapeutic feeding center in Bocoio; 3) rehabilitation and equipment of key infrastructure, including a maternity ward, pediatric ward, therapeutic nutrition center, laboratory and three health posts; 4) improving the quality of primary health care services through classroom training, in-service training and supervision and 5) community mobilization and education through the training and supervision of volunteer community activists. The target population was the population of 107,000 in Bocoio with emphasis on children under five and women of childbearing age.

This participatory impact evaluation covering the period of January 2003 to the end September 2004 was carried out using a rapid sample survey as well as a review of relevant documents and key informant interviews and site visits. This short project was quite successful in extending access and improving quality of health services at a reasonable cost in a relatively short space of time. The key findings included the following:

- Access to services: immunization coverage improved from a very low base to 78% for polio 1, 41% for DTP 1 and measles, but coverage for DTP 3 is still close to zero. Curative consults have increased from a baseline of 2300 per month to about 3100 per month and prenatal care coverage is at about 43%. About 21 women each month are now giving birth in the new maternity ward. What is more impressive is that these increases occurred against a backdrop of increasing population dispersion. Services are now more accessible at the periphery was the case in 2002, though coverage is still poor in some areas.

- Nutrition: many thousands of children were screened during the project, and a supplemental feeding program distributed food regularly at six sites in the municipality. The number of children enrolled rose to a peak of 255 in April 2004 and has since fallen to 132 at the end of September 2004, with the global malnutrition rate in Bocoio estimated at 4%. A therapeutic nutrition center was opened in the Bocoio Municipal Hospital in May 2004, the first of its kind in Angola, and 83 children have been admitted to this unit in a period of five months. The number of severely malnourished children being admitted is roughly twice the number of children previously referred to Catumbela. Families are increasingly presenting spontaneously with malnourished children, now that they know the resources exist in Bocoio for treatment.
- Infrastructure: all the planned projects were completed, including a newly rehabilitated and equipped maternity ward, pediatric ward and therapeutic feeding center, installation of a hospital generator, rehabilitation of health posts in Passe and Monte Belo. Additionally, the health posts in Cateque and Fasil were also newly rehabilitated and equipped. All these are sustainably providing services as planned. Unfortunately, other complimentary infrastructure projects promised by other agencies have not materialized. The comunas of Chila and Cubal do Lumbo have no functioning fixed health services.
- Quality of services: The baseline assessment of the quality of the primary health care services showed serious deficiencies in all areas. Nurses in the municipal hospital, from the health post teams and nurse supervisors received refresher training in immunization, maternal care, supplemental feeding, and diagnosis of common illnesses and use of essential medicines. However, only about 20 of the over 100 nurses participated in each module of training. CCF also invested heavily in in-service training and supervision for nurses in the hospital and health posts, with emphasis on pediatrics, nutrition and maternal care. Nurses in the hospital and health posts in Fasil, Cateque, Passe and Monte Belo are now able to provide basic maternal and child health services of a reasonable quality to the populations in their immediate catchment areas. There are no primary health care services in Cubal de Lumbo and Chila. Patient education and the ability to use contacts for additional opportunities for prevention is very weak throughout the system. CCF catalysed the setting up of a municipal data analysis committee which is helping the DMS use health system data for making management decisions.
- Community mobilization: 30 volunteer activists were trained and proved instrumental in mobilizing the communities to participate in immunization campaigns and they promoted greater uptake of antenatal care, mosquito nets and greater awareness of malnourishment. In the final assessment, 19% of caretakers reported that children slept under a mosquito net the night before and 76% could name two danger signs of illness in children.

Key constraints found include the continued inadequate infrastructure in Chila and Cubal do Lumbo which hamper extension of facility-based services to those areas, including immunization. The local municipal health structure does not have the resources to provide any level of mobile services. The quality of human resources remains very

uneven, and continued training and supportive supervision is necessary. However, supervision and in-service training are expensive, and the DMS will not be able to sustain the effort at the level that CCF has been supporting. Local structures are likely to be able to sustain and possibly expand antenatal care, nutritional screening in health posts, immunization and essential medicines services.

The most important lesson learned from this project is the importance of an integrated on-site approach to rehabilitating health services. This includes close coordination with local authorities, and simultaneous attention to infrastructure, equipment, supplies, training, supervision and community mobilization. None of these components can be successful without the others, and timing is also essential to success. This project was largely successful in achieving a sustainable improvement in access to services. The quality of services was also improved at a cost far lower than other infrastructure projects.

The supplemental feeding program at peripheral sites is not sustainable but can be safely discontinued as the global malnutrition rate is moderate, though the therapeutic and supplemental programs in Bocoio should continue. Active nutrition surveillance will be important in the future, as food security remains precarious.

It is also important to extend basic primary health services to the majority of the population rather than investing in poorly delivered specialist services for a small geographic area. Establishing basic fixed health care services in Cubal de Lumbo and Chila is the single most important priority intervention in the short term. Also, continued support for community based IMCI in preparation for stronger and better integrated services in the health posts is also important.

On-going supervision and in-service training is key to improving and sustaining improvements in the quality of services. This report suggests using the hospital in patient services as teaching centers and periodically rotating health-post nurses through these services to upgrade their skills at an affordable cost.

Finally, in the communities, activists have proved effective at mobilizing communities. Supporting large numbers of them is not sustainable in the long-term but there is a strong argument for ensuring reasonable geographic coverage while the health care services are still markedly limited in coverage and accessibility. A moderate increase in their number to a total of about 60 would seem reasonable. They should have concrete tasks which compliment the existing health programs such as selling mosquito nets, distributing albendazol, measuring mid-arm circumference and distributing condoms. They should have a direct link for supplies and supervision with the local health post. The municipal health supervision should be managed through the health education program. Community education and behavior change would probably be best approached through existing entities such as schools, churches and the health system. Taking better advantage of the relatively high coverage for antenatal care for educating expectant mothers is an example of one such strategy. Modest support for existing traditional birth attendants is another way to improve maternal care and encourage the uptake of at least one post partum visit.

2. Project description

a. Brief history and overview of the project

The cessation of hostilities in early 2002 and the subsequent rapid resettlement of demobilized troops and displaced created an emergency of its own. Large numbers of people, many already undernourished and in poor health began returning to their homes in the municipalities. The Municipality of Bocoio was cut off from the rest of the province until May 2002. At that time, the population of the municipality was estimated at between 30 to 50 thousand people. An assessment done by CCF in June 2002 found an absolute lack of drinking water, global malnutrition of over 23% and no medicines, many cases of measles were registered and there were no immunizations. In June 2002, with support from OCHA, WFP, UNICEF and BP-Amoco, CCF launched an emergency health and nutrition program with the objectives of providing emergency nutrition screening and supplementary feeding for malnourished children, to develop basic maternal-child health services and to train volunteers for health education activities. This first phase was originally planned as a six-month emergency intervention, but with additional support CCF extended the activities for another six months into mid-2003.

During the second half of 2002, access was largely restricted to the comuna of Bocoio (including the hospital, and two health posts Fasil and Cateque), a displaced peoples camp and a receptions area with 3,000 ex-military of UNITA and an additional 8,000 plus family dependents. The nutritional status of children improved rapidly with the establishment of a supplemental feeding program and regular surveillance, and CCF discontinued community kitchens in November 2002 as conditions gradually improved. CCF, together with the MOH provided basic curative care and MCH services including antenatal care and immunization, essential medicines and non-surgical obstetric care at the hospital.

By the end of 2002, things were changing rapidly. Most of those settled temporarily in the areas around Bocoio had returned to their homes, and the reception area for the ex-military of UNITA was closed entirely in March 2003. In the first months of 2003, local government administration was reestablished in three of the four outlying comunas and populations had returned to the comunas of Passe, Monte Belo, and Cubal do Lumbo. Access to Chila was only possible from mid-2003. By early 2003, Bocoio's estimated population had swollen to 107,000.

b. Target population

There were rapid population shifts during the second half of 2002, with large numbers of people returning to their homes in the scattered rural villages. During the next two years, there was a slower gradual shift as well. The Municipality of Bocoio is divided into five administrative areas, (comunas), Bocoio, Passe, Monte Belo, Cubal do Lumbo and Chila.

The project targeted women of childbearing age and children under five. The target population was estimated as follows:

Proposed Emergency Target Groups—Direct Beneficiaries

Area	Total Population	Estimated population in project target areas		
		Children 0-5 y (20%)	Women of Childbearing Age (25%)	Total Pop.
Bocoio	35,622	7,124	8,905	16,029
Passe (including Lucungo quartering area)	16,300	3,260	4,075	7,281
Monte Belo	24,144	4,829	6,036	10,865
Cubal do Lumbo	10,155	2,031	2,539	4,570
Chila	20,832	4,166	5,208	9,374
Total	107,053	21,410	26,763	48,173

Source: Bocoio municipal administration, early 2003

These were the best official estimates available as of March 2003. Several comments must be made about these estimates, however:

- These estimates were crude, based on prewar information and standardized growth rates. They were subject to artificial inflation as aid was sometimes based on population estimates.
- Populations have been shifting rapidly. A recent informal census was carried out by PAR as part of its planning process in 2003. A head-count in each village led to the following population estimates: Bocoio comuna: 37,934; Chila 21,895; Cubal do Lumbo: 17,826; Monte Belo 30,680 and Passe 19,857. PAR estimated the total population of the Municipality of Bocoio at 128,192.
- Another difficulty in applying these population estimates is that they are based on standard estimates of population breakdown (the MOH estimates children under five years at 20% and women of childbearing age at 25%). Given the unusual circumstances in Angola at present, these percentages may not be correct. Adult men are likely to be underrepresented, and young children likely make up a higher than normal percentage of the population due to the expected post-war births. Therefore, using these standard population breakdowns to estimate coverage for programs is likely to lead to an exaggeration in the coverage estimates for children.
- Access to services by different subpopulations varies widely, with some groups remaining still without any access at all.

The above factors make the use of service statistics for the calculation of coverage very approximate, and these calculations likely overestimate true coverage for most interventions. This should be kept in mind when interpreting the results in the following sections. For the sake of continuity, and in spite of potential inaccuracies, the original

population data from the proposal will be used as the denominators in the calculations unless otherwise noted.

c. Health infrastructure and human resources

In Bocoio as in most other areas, the health infrastructure was largely destroyed, human resources were scarce and of poor quality, and in areas outside the municipal capital there were no services whatsoever.

In 2002, the physical infra-structure in the health system was completely inadequate for the health needs of the municipality. The colonial-era municipal hospital was originally constructed as a private hospital for plantation workers. As such it had only two open inpatient wards, one for men and one for women, each with about 15 beds. Children were hospitalized in the women's ward. The hospital also had three poorly-equipped, small outpatient consultation rooms with no day light, a working kitchen (with gas stove) and non-functioning laundry area. Two small basement rooms served as the maternity ward with a capacity for only three inpatients, and only the most basic equipment for deliveries. A small laboratory could perform hemoglobin measurement, urine, feces, TB slides, and malaria slides using an old solar microscope. There was no inpatient pediatric ward or nursery and no surgical capability. The municipality had only two vaccine coolers (both new). Electricity was available only in the evening from a small generator at the municipal administration, and water was carried from a nearby river. Health posts in Cateque and Fasil, both near the capital, were in very precarious shape and very poorly equipped.

The project aimed to reestablish essential infrastructure at the hospital and in key peripheral health posts, improve the capacity of health workers to provide primary health care services and provide essential equipment, medication and support to allow them to do so, improve the capacity of the municipality to manage the health system, and to improve the community's ability to prevent illness and to use the newly established services in a rational and timely manner.

Human resources

The following table outlines the quantity and distribution of public sector human health resources in health in Bocoio at the beginning and end of the project:

	March 2003	**November 2004**
Secondary level nurses	1	10
Primary level nurses and health promoters in Bocoio	69 total (47 available, rest in training)	83 total (63 available, rest in training) [includes 43 demobilized UNITA health workers, of which, 15 are away in training]
Primary level nurses in health posts		
Fasil	1	4
Cateque	1	5

Monte Belo	0	13
Cubal do Lumbo	0	4
Passe	0	4
Chila	0	4
Laboratory	1	2
Pharmacy	1	4

Source: personnel department, DMS

d. Project objectives and scope of the evaluation

This evaluation spans the period from January 2003 through October 2004, which roughly corresponds to the period after the closing of the displaced and reception camps as populations returned to their villages and rural comunas gradually became more accessible. Some comparisons will occasionally be made with services available during the immediate post-war period during the last half of 2002.

Although there were four sources of funding during the life of the project, the OFDA proposal prepared in mid-2003 was the most comprehensive, and therefore served as the basis against which this evaluation was performed. The following section lists the objectives, as stated in the OFDA proposal. The work described in the third objective, infrastructure strengthening, was originally included in the proposal, but as activities were completed before the proposal was submitted, it was not included in the final proposal. It is included here is it *did* constitute an important component of the overall project. Indicators and targets are listed in the respective section where each objective is discussed.

Overall objective

Morbidity and mortality among women of childbearing age and children under five years of age affected by the conflict in Angola in the Municipality of Bocoio, Province of Benguela reduced.

Intermediate results:

1. Access, use and coverage of essential MCH and basic curative services by target population increased (est. 30% of output)
   a. coverage for immunizations, vitamin A, de-worming increased.
   b. consults for diarrhea, malaria and respiratory infection in children increased.
   c. Ante-natal care consults increased.
   d. number of institutional deliveries and deliveries by trained personnel increased.
   e. number of pediatric and adult consults for other pathologies increased.
   f. health teams providing support to satellite health posts, supplementing basic fixed services to vulnerable groups in newly accessible communes.
   g. Essential medicine support throughout the project.
2. Nutritional status of children under five improved (est. 30% of output)
   a. supplemental nutrition program for 1200 children in place
   b. therapeutic feeding program with 10-12 beds functioning
   c. number of children requiring supplemental and therapeutic feeding reduced

d. regular nutrition surveillance of children under five in place in Passe, Monte Belo, Cubal do Lumbo and possibly Chila.

3. Infrastructure improved to facilitate the delivery of primary health care services[1]
   a. pediatric ward functioning
   b. therapeutic nutrition center functioning (20 beds)
   c. expansion and improvement of maternity facilities (10 beds, capacity for 3 deliveries per day, transfusion and oxygen therapy)
   d. health posts open and functioning in Passe, Monte Belo, Fasil and Cateque. Temporary facilities in Cubal do Lumbo and Chila
   e. improvement in laboratory facilities in the municipal hospital (equipment and training support, no construction, safe transfusions prioritized)
   f. essential medications available throughout the life of the project (fewer stock-out days)
4. Quality of services at health facilities strengthened (est. 20% of output)
   a. protocols for standard case management of diarrhea, malaria, respiratory infection, prenatal care and delivery introduced and being followed in hospital and in comuna Passe
   b. logistics and monitoring systems in place and in regular use for essential medications, vaccines, MCH programs and curative health care
   c. regular systematic supervision of quality of care and management systems in hospital and health posts in Passe, Monte Belo, Cateque.
   d. Support and facilitation for regular supervision and monitoring by the Benguela Provincial Health Delegation.
5. Caretakers knowledge of basic child care improved (est. 20% of output)
   a. caretakers' recognition of danger signs in a child requiring immediate care at a health facility increased.
   b. percent of children with recent diarrhea, fever or difficult breathing who were taken for care at a health facility increased
   c. percent of children with a road-to-health card increased
   d. number of pregnant mothers using impregnated mosquito nets increased.

Financial overview

The total contribution by each agency supporting the project is summarized as follows:

Source	Period	Amount
OCHA	June 2002 – June 2003	$82,420
OFDA	September 2003 – November 2004	$287,944
BP-Amoco	September 2002 – July 2003	$150,000
BP-Amoco	July 2003 – November 2004	$118,967
WHO	June 2003 - December 2003	$9000
CCF Match	June 2002 – November 2004	$36,317
WFP	Throughout	In-kind (food)
TOTAL (cash)		**$684,648**

Source: CCF accounting

[1] Note: this objective was not included in the OFDA proposal, as all of the investments in infrastructure were completed during the first half of 2003, before the OFDA proposal was approved.

This evaluation focuses on the period from January 2003 through October 2004. This roughly encompasses the period beginning from the closing of the resettlement camps and the period that the populations returned to their homes in rural villages. It begins in the middle of the OCHA-funded emergency health and nutrition project, which lasted from June 1, 2002 to May 31, 2003, and continues through the one-year OFDA-funded project which began in September 2003.

The evaluation seeks to assess achievement of the above objectives, discuss constraints and lessons learned, and to make suggestions for further interventions in Bocoio. Data were analyzed from both the MOH health information system (original data were used where available), nutrition program reports, activist activity reports and CCF activity reports. In addition, the team carried out a rapid coverage and knowledge sample survey using LQAS sampling the week prior to the evaluation. For this survey, the 95% confidence interval for most indicators is plus or minus about ten percentage points. The results of this survey are included where they are relevant, and the full report of the full survey report is included as an appendix. The lessons and conclusions discussed were those arrived at by the participatory evaluation team which included the CCF health team together with the local representative of the MOH. The evaluation methodology is explained in the appendix. Included in the evaluation is an attempt to assess the cost-benefit of infrastructure-strengthening and training of health care personnel as interventions. An appendix at the end of this report outlines the methodology used in the evaluation.

B. Results and discussion by objective

1. Access, use and coverage of services increased

Access, use and coverage of essential MCH and basic curative services increased
Although it is listed as only thirty percent of output, this is the most complex aspect of the project to evaluate and will be perhaps the longest and most detailed section of this report. Activities for this objective included training of MOH nursing staff in immunization, nutrition, child health, and maternal health. This training will be discussed in detail in a specific section later in this report. All the planned training was carried out on schedule.

a. Immunization

i). Results

- **coverage for immunizations, vitamin A, deworming increased**

Indicators with targets and results are summarized as follows:

Indicator	Baseline	Target	Coverage (HIS statistics)	Coverage (survey) (±10%)
Impact indicators				
No. of cases of measles and measles deaths	Many cases	Same as	(anecdotal)	n/a

Indicator	Baseline	Target	Coverage (HIS statistics)	Coverage (survey) (±10%)
in children under 5 in municipality by quarter	reported	baseline or declining	few cases reported	
Process/output indicators				
% of children 12-23m immunized:	Unknown			
Polio 1		90%		78%
DPT 1		60%		41%
DPT 3		40%		0%
Measles		60%		41%
BCG		Not set		34%
Completely immunized		40%		0%
No. of doses and est. percent of children 0-12m receiving:	Unknown			
Polio 1 routine		90%	34%	
Polio 1 campaign			>100%	
DTP 1		60%	54%	
DPT 3		40%	11%	
Measles routine (9m -1 year)		60%	58%	
Measles campaign (9m-5y)			56% (2003)	
BCG		Not set	77%	
% of children 12-23m with vitamin A in previous 6 months	Unknown	60%		57%
No. of doses of vitamin A distributed to children 6-59 months and % coverage		90%	80%	
% of children 12-23m with albendazol in previous 6 months	Unknown	90%		32%
No. of doses of albendazol distributed to children 12-59 months and % coverage		90%	44% (1-7y of age, extrapolated. from 6-month data 4-9/04)	

In addition to the above the final sample survey found the following differences between regions:

Vitamin A	no important differences between areas
Deworming	Chila and Monte Belo significantly below the average for other areas
BCG	Monte Belo below the average for other areas
Polio 1	Chila significantly below the other areas
Polio 3, DTP 1 and DTP 3:	All areas similar
Measles	All areas similar
Possession of an immunization card:	Bocoio and Passe below other areas

Notes on the data:
In all cases above, the target population used for calculation of coverage based on HIS statistics was that from the proposal. This population may be somewhat inaccurate and

may thus not yield a completely accurate estimate of coverage. The results of the survey, however, do not suffer from this distortion.

Routine immunization coverage in the 0-1 year age group was extrapolated from data from the most recent period of data available, April-September 2004. Monthly data were not available from the first quarter of 2004. Doses applied during the six months were then doubled to estimate coverage. Vitamin A coverage is actually higher than indicated in the table, as the data available to the evaluation team came only from national campaigns. The number of doses administered specifically by mobile teams, nutrition teams or during routine consults was recorded together with routine doses. These data were not available during the evaluation, as routine Vitamin A doses were not included in the routine monthly DMS HIS reporting or CCF routine reports, and the original Vitamin A data could not be located to be collated during the evaluation.

The estimate for deworming of 44% is a rough estimate, but represents the best coverage estimate based on "doses administered" that were available to the evaluation team. The MOH health information system does not collect this information routinely, as routing deworming has not been implemented as MOH policy. CCF was maintaining rosters of individual children, but not tabulating the data for reporting. The estimate reported here was extrapolated from six months April-September 2004 among doses administered to children one to seven years of age according to the rosters. It is likely that a disproportionate number of these children were in the younger age groups, so coverage among under-fives is probably somewhat higher.

ii). Activities

The project aimed to improve immunization coverage through a series of activities. These included:

- Training nurses in health facilities in immunization (completed, see training section below)
- Acquisition of cold chain equipment for fixed facilities and mobile teams (in tandem with infrastructure improvements in health posts)

The following table describes the current state of fixed post immunization:

Site	Cold Chain	Immunization services
Hospital Bocoio	Has had refrigerators throughout the project	Immunization daily initially at the DMS, not the hospital. Now immunization is at the hospital.
Passe	Gas vaccine refrigerator and gas since April 2004. Refrigerator came from existing municipal stores.	Could immunize daily but does not do so due to low demand. Concentrate immunization on days with prenatal care and/or nutrition screening, about 1 day / week.
Fasil (comuna Bocoio)	No cold chain now. Will have gas vaccine refrigerator from DMS in November 2004. CCF will buy gas bottles.	Immunize regularly when post director, who lives in Bocoio, takes vaccine in vaccine transporter. Several times per month due to limited demand.
Monte Belo	Gas vaccine refrigerator and freezer for transport coolers (donated by UNICEF/CRS) since Jan 2004. Has 3 industrial gas bottles (CCF).	Daily immunization. Health post team does occasional mobile vaccination in the area, but cannot reach all areas of comuna. Serves as base for mobile teams to Chila, Saraiva and Cavimbi.

Site	Cold Chain	Immunization services
Cateque (comuna Bocoio)	No cold chain now. According to DMS, "will get vaccine refrigerator in the near future" (no date set).	Immunize regularly when post director, who lives in Bocoio, takes vaccine in vaccine transporter. Several times per month due to limited demand.
Cubal do Lumbo	No permanent cold chain now. Temporary adobe health post without door. No firm plans for improvement.	Immunize only when CCF or Bocoio immunization supervisor goes to post (about 3 times per month)
Chila	No permanent cold chain now. No health post. No firm plans for one.	Only CCF/DMS mobile teams about every 2 weeks with nutrition screening when possible.

- **Support to national immunization campaigns**

From the beginning CCF provided logistical support and manpower for all national immunization campaigns. During the life of the project the following doses were applied (estimated target population children 9 months-5 years: 18,198.

Measles	9m – 5y	5y – 15y	Total
April 2003	N/A	N/A	8611
June 2003	1329	2355	3684
June-July 2003	4620	4207	8827
Total 2003			**21122**

Source: DMS immunization campaign data. (There is a slight discrepancy of about 10% between these data and CCF reports. The team thought this was probably due to post-campaign corrections made to the data.)

No measles campaign has yet been carried out in 2004. It is scheduled for November. Estimated target population children 0-5 years: 21,410

Polio 0-5 years	Dose "0" (first ever in child's life)	Subsequent doses	Total
July 2003	10,423	17,820	28,243
2nd phase 2003	n/a	n/a	32,780
Total 2003			**61,023**
July 2004	4402	18,256	22,658
2nd phase 2004	4656	23,160	27,816
Total 2004			**50,474**

Source: DMS immunization campaign data. (There is some discrepancy between these data and CCF reports)

Estimated population 6 months – 1 year: 2301. 1 year – 4 years 16,799

Vitamin A 2003 with measles 2004 with polio	6m – 1y	1y-4y	Total
April 2003	None	None	0
June 2003	833	1336	2169
June-July 2003	1398	3624	5022
TOTAL 2003	**2231**	**4960**	**7191**
July 2004	**4788**	**9814**	**14602**

Source: DMS immunization campaign data. (There is some discrepancy between these data and CCF reports)

It is clear from the last table that there were almost certainly errors in recording by age bracket, as coverage in the younger age group is well over 200%, but in the older group much lower. It must be kept in mind that this was in the earlier stages of the project before most training was done, and the campaigns also drew on volunteer labor.

These campaigns drew heavily on human and physical resources. Although coverage for polio is especially good due to the huge effort made to mobilize communities and seek out children in remote villages, the evaluation team notes that the effort has a negative effect on routine facility-based coverage for several reasons. First, for example, during the third quarter of 2004, it was not possible to organize routine mobile multi-vaccination and treatment teams to remote areas as had been practiced during the first quarter of the year, as resources were limited by the MOH immunization campaign (and intensive nutrition activities). Campaigns also give caretakers the false impression that their children are fully protected, so they may not seek out other necessary immunizations at health facilities. Also, although there were fully four polio campaigns during the two years, coverage for polio 3 in children 12-23 months of age was found to be only 15%. This is because few children actually were reached during three of the four campaigns, and few of these received polio 3 from fixed health facilities during routine immunizations (estimated at 15% for polio 3).

The fact that during campaigns records are kept only distinguishing "first" from "subsequent" doses of polio makes calculation of coverage difficult. However, it is very encouraging to note that during 2003, the number of "initial" (polio 0) doses applied was similar to that of subsequent doses. However, in 2004, the number of subsequent doses outstripped initial doses 4.5 to 1, indicating that coverage is improving from a very low baseline.

- **Support for mobile immunization teams**

CCF's proposal also describes support for mobile immunization teams to support regular immunization in areas where fixed facilities are unavailable. CCF mobile teams began immunizing children whenever they went out, intensifying in the second half of 2003 after the training of the health activists.

After the arrival of CCF's second vehicle in April 2004, CCF further intensified mobile teams. These consisted of multi-vaccination teams also equipped to administer vitamin A, albendazol and to carry out nutrition screening and supplemental food distribution. They did not include curative care. These teams were scheduled regularly from April through June and counted heavily on coordination with activists to mobilize communities to participate. Teams consisted of up to ten people, including CCF plus DMS personnel, or in many cases, only DMS personnel plus a CCF driver. These would stay in remote areas for up to several days until work was complete. Data were recorded and incorporated into the health information system as routine immunization, rather than as in national campaigns.

These teams reportedly contributed significantly to increase in immunization coverage and expansion of nutrition screening (see next section). However, due to national campaigns and other intensive training activities, mobile teams were suspended from July-September 2004.

- **Purchase albendazol for deworming as necessary**

CCF purchased albendazol for deworming, as MOH kits include only limited amounts of mebendazol, which is far less effective during campaigns. The cost of albendazol is approximately US$20 per 1000 tablets, or about US$1000 to cover all of the 25,000 children in the target age group twice each year.

- **Train activists to mobilize communities and encourage caretakers to immunize their children**

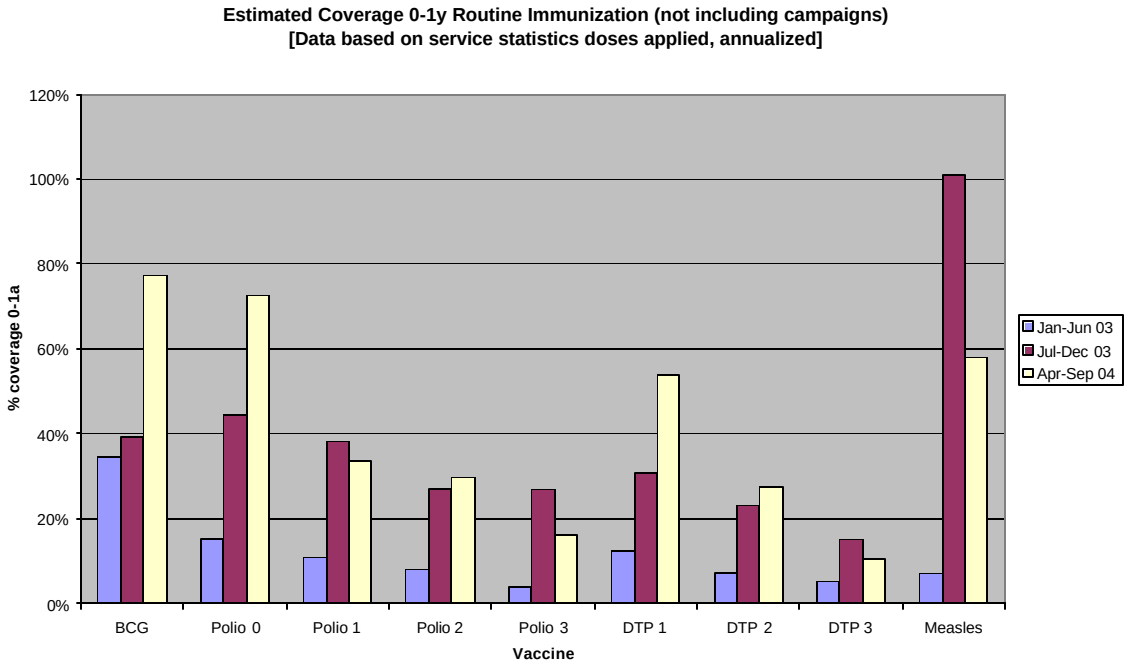
The activists will be discussed in a specific section later in this report. Immunization was included in the activist training. The evaluation team cited numerous examples of the success of this strategy in improving immunization coverage, especially in remote areas. They were reportedly particularly effective in encouraging families in inaccessible villages to walk to more accessible sites where immunization campaign workers or mobile teams could reach them. In more than one instance, families were found sleeping at a site awaiting teams when they arrived.

Other activities and strategies

In addition to the aforementioned strategies and activities, CCF worked with the DMS to remove some of the barriers to immunization. The maternity unit incorporated routine administration of tetanus toxoid to pregnant women (see section on maternal care for coverage), as well as routine polio and BCG immunization for newborns in the hospital. The DMS was also encouraged to move the vaccination site from the public health office (far from the hospital) to the hospital itself, and to coordinate immunization services with the nutritional screening and growth monitoring activities. Finally, all children enrolled in the nutrition program (therapeutic and supplemental) routinely receive immunizations (with emphasis on measles), vitamin A and albendazol at all sites. Immunization has not yet been incorporated into routine pediatric curative care, however.

CCF also attempted to improve immunization coverage by working with school children to teach them to encourage their parents to have their younger siblings immunized. The evaluation team was enthusiastic about this approach, but documentation of its success was entirely anecdotal.

The following graph outlines the estimated immunization coverage for various vaccines in children 0-1 years of age throughout the life of the project based on doses applied and excluding national immunization campaigns:



Data for January-March 2004 were not available during the evaluation (the original forms were not in the DMS files), so were not included. The huge spike in measles coverage in the second half of 2003 was attributed to a huge short-term effort by CCF/DMS mobile teams that first entered into remote areas, including Chila, Saraiva and Cavimbi, in response to reports of cases of measles. It appears that there was an error in the recording of some data as many children in the 1-5 year age range had their doses recorded in the 9 month-1 year box, thus artificially elevating the coverage estimate. .

iii). Lessons learned

Mobile teams consisting almost completely of DMS personnel can effectively supplement fixed immunization facilities, especially if they coordinate with community volunteers and provide services on a scheduled basis. There are at least two DMS nurses in each fixed facility who are able to immunize without supervision, and the quality of the information system has improved markedly.

iv). Constraints

The infrastructure improvements promised by various partners, including the government's Public Investment Program (PIP), the EU's Program for Rural Support (PAR) and FAS that could have expanded the peripheral network of health facilities have not been forthcoming. Only FAS is building a health center, but adjacent to the existing one in Monte Belo (see below in the section on "infrastructure"). PAR no longer plans any health posts in Bocoio, and PIP construction for health has been postponed indefinitely. Likewise, road and bridge improvements have been slower than promised, hampering access. Limited road access and a failure to invest in rural health posts has hampered efforts to sustainably raise immunization coverage. Mobile, campaign coverage is not sustainable in the medium to long term.

Stock-outs of vaccine were infrequent. There were stockouts of tetanus toxoid, BCG and DTP in the first quarter of 2003, and a stockout of tetanus toxoid and BCG in February to March 2004. Both were province-wide and were corrected quickly.

National immunization campaigns present a two-edged sword, focusing attention on a single task to rapidly increase coverage for measles and polio, but to the detriment of other important activities and in a manner that is not sustainable long-term. Furthermore, the campaign system is very susceptible to break through cases where many children are not completely immunized, where a significant number of children are malnourished and where there continuing population movements across borders and from remote areas. Routine immunization must be emphasized if coverage is to be sustainably improved with campaigns. There is reportedly discussion in the MOH about discontinuing national campaigns in the near future.

Vertical health programs continue to present a barrier to improved coverage. There are still many missed opportunities for immunization and vitamin A administration, especially during routine curative care, though some of these have been overcome, as cited above in the examples of the ante-natal care and the nutrition programs.

MOH policy does not include deworming with albendazol, and albendazol is not provided during campaigns or included in essential medicine kits. Without external supplies, deworming is not sustainable, in spite of its low cost.

CCF's second vehicle for the health program and equipment to support mobile teams arrived only in April 2004, hampering intensive support for mobile teams before that time. This reflects more on the short time-frame of the emergency-oriented funding sources than on anything CCF could have done (the vehicles arrived in the zone within six months of the first disbursement of OFDA funds, which is not an unreasonable timeframe in Angola).

The low population density in most of the rural comunas leads to a peculiar "catch-22" problem in improving immunization coverage. Recently, Monte Belo and Passe health posts have been seeing an average of only three children under 5 years every day for pediatric consults, and Cateque an average of only seven. It may not seem justifiable to open vials of vaccine for so few children. Yet, the low population density also means that that many children come from great distances, and are thus unlikely to return another day for immunization. According to MOH policy, vials should be opened regardless, unless stockouts are imminent.

v). Conclusions

Before reaching any conclusions, it must be emphasized that at baseline, the immunization and vitamin A coverage were nearly zero, as there was almost no access for children outside the municipal capital. At the outset, immunization was possible only at the hospital and by mobile teams near the town.

Several principal conclusions can be drawn immediately from the results of the evaluation:

- There has been steady improvement in immunization coverage, though it is still unacceptably low.
- Except for vitamin A and polio 1, the targets set in the proposal were impossibly high for such a short project starting from such a low baseline.
- Children are not being offered enough opportunities to complete their immunization schedule before completing two years of age.
- Facility-based immunizations, including BCG and DPT have very low coverage as compared with those for campaign-based coverage. This is consistent with findings elsewhere in Angola.
- The DMS has progressively assumed more responsibility for immunization, requiring less support from CCF. This support could now be reduced to only transportation to more remote areas without significantly reducing immunization coverage.
- Given the limited number of contacts with health personnel, multi-pronged educational efforts are considered important. This includes the community-based volunteer health activists, working through schools to encourage children to push for their siblings to be vaccinated and working through church groups.

It is clear that for almost all indicators, the coverage indicated by the sample survey is lower than that for the service statistics. This is not unexpected, as the population estimate (denominator) is probably lower than the real population, as discussed earlier. Data for immunization indicate that coverage for all immunization is near 50% for measles, DTP 1 and vitamin A. The LQAS survey found that polio 3 in children 12-23 months was only 15%, in spite of four polio campaigns in the past two years.

vi). Recommendations

Continue logistical support for regularly scheduled mobile immunization teams until adequate fixed infrastructure is in place if at all possible. This would include support for a vehicle and driver about 30%-40% of the time.

Discontinue regular routine deworming with albendazol unless it can be incorporated as a low-cost activity for community activists. In the absence of MOH policy support, routine deworming is not sustainable.

Vitamin A coverage should receive continued substantial attention. It is now thought to be the most cost-effective of all the MCH interventions, even more-so than measles immunization or food distribution, yet it is often neglected. The fear of "overdosing" an occasional child with vitamin A is overblown, and the consequences of the contrary are far more serious. Caretakers almost always know when their child last received a vitamin A pill. If they can't remember, the child probably should receive one. Finally, during immunization/vitamin A campaigns, vitamin A should be given to mothers of children under six months of age who did not receive a dose post-partum.

Support intensive supervision of immunization activities through logistical support and support for the joint CCF/DMS team for data analysis. This committee should be encouraged to continue, as it will identify problems and help in determining where scarce resources may be focused.

Reduce missed opportunities for immunization and vitamin A administration to a minimum, as opportunities are already too few. This implies making certain that vaccines are transported in coolers to health posts without refrigerators as often as humanly possible taking advantage of all means of transportation available. Whenever possible, *all* children's immunization status should be routinely examined, and appropriate vaccines applied, even at the risk of "wasting" a vial. This should apply to ill children, children seeking care for curative consults, children in nutrition screening, and all other contacts. Even children accompanying their mothers to prenatal care consults or adult consults for illness should be immunized and given vitamin A if they need it.

Introduction of IMCI should help reduce missed opportunities for immunization, although it is reported that Benguela Province is not yet ready to implement IMCI. CCF should remain attentive to this policy and encourage and support IMCI in Bocoio when the Province is ready to implement it.

b. Curative care

i). Results

The intermediate results for the curative care objective are as follows:

- **consults for diarrhea, malaria and respiratory infection in children increased.**
- **number of pediatric and adult consults for other pathologies increased.**
- **health teams providing support to satellite health posts, supplementing basic fixed services to vulnerable groups in newly accessible communes.**
- **essential medicine support throughout the project.**

The above three objectives are interrelated and will be treated together in this section. The proposal set targets of consults for diarrhea, malaria and respiratory infection in children at 2500 per month, and for adults and older children (all diseases) at 3000 per month.

The following table summarizes information on curative consults in children and adults during the life of the project:

Monthly Average Consults (all pathologies)	0y-4y	5y-14y	>=15y	TOTAL
Jan-Jun 2003	654	591	1080	2325
Jun-Ago 2003	597	522	852	1971

Monthly Average Consults (all pathologies)	0y-4y	5y-14y	>=15y	TOTAL
Sep-Nov 2003	772	671	1284	2727
Dec 03-Mar 04	990	780	1709	3478
Apr-Jun 2004	860	774	1556	3190
Jul-Sep 2004	1038	690	1422	3151

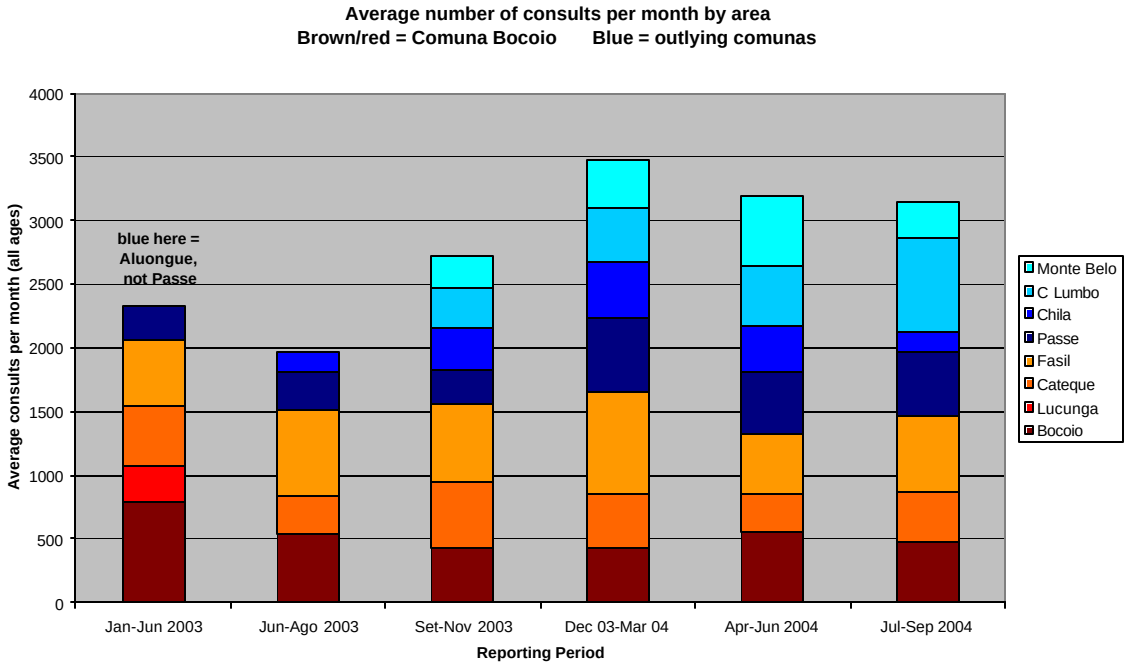
Source: DMS statistics as reported in CCF quarterly reports.

Notes on the data

Reports by diagnosis are not available from the DMS health information system disaggregated by age-group, so the degree of achievement of the objectives as stated is not possible. In addition, the CCF activity reports through August 2003 report respiratory disease, but subsequent reports do not.

During the most recent quarter the entire health system performed 9,453 curative consults on patients of all ages. This corresponds to only 0.35 consults per inhabitant per year, well below the estimated need for at least one consult per person per year. Coverage is still below the desired level.

In addition to the above data, each health facility reports its data, which are graphed as follows:



The conclusion that can be drawn from the above graph is that services are more readily available now than at the beginning of the project, and that they have expanded outward. At the outset of the project, all the consults were being performed in and around the

Municipal capital, with little available outside that area. More recently, a larger proportion of is being performed in the outlying comunas than in the Comuna of Bocoio.

Analysis of the data by key diagnosis yielded information that was too complex to graph and showed no clear trends. In all periods in all localities malaria continues to be the most common diagnosis, accounting from anywhere from 20% to over 85% of all diagnoses.

However, an analysis of malaria diagnoses as a percent of total diagnoses for any period over the life of the project yielded the following trends:

- Malaria was most consistently diagnosed in between 40% and 55% of cases overall
- There is no clear seasonal trend in this percentage, with the periods of September to November and April to June the highest, and December to March the lowest. This is the *opposite* of what should be expected based on the weather, but perhaps indicates lower health care utilization during the period that people are working in the fields and higher utilization when they are idle. It is difficult to interpret definitively.
- The percentage of cases diagnosed as malaria in the hospital is consistently above the average for all health facilities, and rises continuously from a baseline of about 40% early in the project to over 65% now. Again, this is the *opposite* of what one may expect if the hospital is better equipped than health posts to diagnose malaria accurately (and therefore exclude other similar diseases), that diagnostic accuracy should have improved slowly over the life of the project as quality improved, and that the hospital should see a wider variety of pathologies than a typical health post.

These three points lead us to question the accuracy of the diagnoses and the quality of care overall.

ii). Activities

Activities outlined in the proposal included the following:

- **Training health personnel in common diseases and use of MOH protocols.**

This training was completed, but not for all health workers (see section on "training" below for a broader discussion) There are also 15 of the ex-UNITA health workers attending a one-year formal MOH-sponsored nursing course in Balombo to provide them with qualification as basic level nurses, as well as five basic level nurses studying to become mid-level nurses. On their return, these should also be up-to-date in MOH diagnosis and management protocols. A second group of 15 ex-UNITA nurses will enter the one-year course in Balombo next year.

- **Expand the physical health network and hospital services, equipment (see section on "infrastructure" below for dates, details and costs)**

All of the infrastructure projects expanding the geographic scope and quality of services offered that were originally planned by CCF in the proposals were completed, and a few

additional ones added. Unfortunately, as mentioned earlier, other agencies did not fulfill promoses made at the outset and infrastructure investments made by FAS will not contribute to expanding access to health services, since the health units they are building are near existing health services.

At the outset of the project, health services were available only at the hospital, and in very precarious conditions in Fasil, Cateque and the Lucunga resettlement camp. Even the hospital was extremely limited, providing services of little more complexity than a typical health post and in precarious conditions. All outlying municipalities were inaccessible.and had no infrastructure for consults. Through the project, CCF has rehabilitated the health posts in Monte Belo, Passe and Fasil, which are now fully functional. CCF also did minor rehabilitation work on Cateque health post. All of the health posts rehabilitated were equipped. The DMS built the maternity ward with its own funds and CCF paid for the equipment. CCF also provided support allowing the hospital to open a modest pediatric ward, a therapeutic nutrition center, improve electricity and improve the laboratory allowing addition of safe transfusion services.

- **Provide essential medicines throughout the life of the project**

CCF initially purchased essential medicine kits and received donations of emergency hospital kits from IMC and essential medicines from UNICEF. These were supplied to health posts and the hospital as needed and were the primary source of medicines during all of 2003. From January 2004 onward, the MOH essential medicines deliveries have been adequate for the needs of the health posts. The content of the essential medicine kits has also been improved, and now contains amodiaquine, pyrimethamine-sulfadoxine and condoms.

With funds from BP-Amoco, CCF purchased a stock of critical medicines essential for MCH programs and the project. Some of these arrived immediately, others were delayed by about three months. CCF is the sole supplier of albendazol for deworming. CCF is also currently supplying the therapeutic feeding center with specialized medicines, particularly antibiotics as the hospital's stocks are low.

Hospital medicines proved to be more of a problem, however. In theory the municipal hospital is an independent budgetary unit and at the outset of the project received its own funds directly from the federal government with which it can purchase its medicines. With decentralization, in theory procurement should be made on the basis of projections from the DMS. In practice, budget management is pooled at the level of the planning unit in the provincial government, which interferes in the process. The province reportedly makes purchases for the hospital without DMS approval, then deducts the expenditure from the account. In this way, the hospital has received large stores of medicines it did not want, and has no stocks of other essential hospital medicines not included in the essential medicine program. At the time of the evaluation, the hospital reported it had not received medicines since August 2003 and was completely out of injectable chloramphenicol and ampicillin. This problem was not foreseen in the project and hampered the hospital's role as a referral center.

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- **Train activists to encourage the population to appropriately seek services (see "community mobilization" section below)**

Activists were trained as planned and, according to the evaluation team, had a positive effect on care-seeking. See the specific section below.

iii). Lessons learned

One important conclusion of this project is the importance of developing all levels of the health care system together. People in remote areas need easy access to basic curative services for malaria, common infections and injuries incurred while working in the fields. Otherwise, they delay seeking treatment.

A basic capacity to respond to simple referrals is also essential. This includes skilled midwifery in the municipal hospital, safe transfusions and basic laboratory services, therapeutic feeding program and an ability to treat acutely ill children from common diseases such as malaria, diarrhea and respiratory infection. But, without adequate community mobilization and health education to create demand, it will not be possible to increase coverage for the essential prevention services.

Conversely, creation of demand through community mobilization before quality services are in place to respond to that demand leads to disappointment and a loss of credibility in the health system from which it is difficult to recover. Thus, the team came to the conclusion that the pace and design of the current project were appropriate, with simultaneous strengthening of all levels of the health system.

Although a quantitative increase in access to services for diarrhea could not be specifically assessed, it was observed that oral rehydration equipment is available in all fixed facilities and is reportedly in use now that health staff in every facilility have received training in the management of dehydration.

Not only has geographic access to services improved, the breadth and quality of services on offer improved as well. Quality maternity services, including deliveries, are available at Monte Belo and Passe. ORT (plans "B" and "C") are now reportedly available at many facilities as well. The hospital is now able to offer quality non-surgical obstetrical services including oxygen and soon, transfusion. The therapeutic feeding center and expanded pediatric ward now serve to reduce the need to transfer patients to Catumbela, Parents in the past refused to transfer children to Catumbela.

Staffing levels are much better than before, though there continue to be serious variations in quality (see section on quality of services below). There is now a better balance between staffing at the central level and peripheral levels, and staff at peripheral health posts do not appear to be overloaded.

iv). Constraints

There continue to be multiple constraints to the improvement in the quality and coverage of primary health care services. Many of these are outside the control of CCF or the DMS.

According to recent studies, just over 60% of malaria is reported to be resistant to chloroquine in Angola. Although the MOH has provisionally adopted a policy changing first line malaria treatment in children to amodiaquine and introducing intermittent presumptive treatment of pregnant women with pyrimethamine-sulfdoxine. However, inadequate amounts of both are supplied in essential medicine kits, so health workers continue to use chloroquine, although it is largely ineffective.

Diagnosis of malaria is also problematic, as only the municipal hospital in Bocoio has laboratory facilities. Malaria diagnosis is largely clinical, and a quick review of patient records shows that malaria is grossly over-diagnosed. CCF was unable to locate rapid test kits in-country to use in monitoring the accuracy of diagnosis in peripheral sites.

Large populations in Cubal do Lumbo, Chila and areas of Monte Belo continue to live significant distances from primary health care services. It was not within the scope of this project to solve these problems, but promises by other entities (PIP, FAS, PAR) led to the expectation that these actors would extend the coverage of health posts, especially to Cubal do Lumbo and Chila. Likewise, road repair has been slow, with no secondary roads in the municipality having been rehabilitated. Demining is being carried out by Santa Barbara, a European agency and is gradually advancing. Most main and secondary roads are now free of mines.

The budget for municipal health sections is managed in a pool in the central planning office, in the office of the provincial governor. To-date, no checks and balances are in place to ensure that provincial budgets are spent according to national policies and priorities. The implications for Bocoio are that medicines procured are often inappropriate and money released does not conform to any overall plan.

The MOH implemented a co-participation policy in March 2004, allowing provinces and municipalities to institute payments for some services. The following charges were instituted:

Pediatric outpatient visit	$0.35	Hospitalization	$1.20
Adult outpatient visit	$0.60	Hospital delivery	$1.80
Obstetric visit	$0.60	Pharmacy	$0.03 / pill

Charges only applied to the hospital, not outlying health posts which are still free of charge. No one was refused services (except at the pharmacy) if they were unable to pay. The number of patients seen for curative services at the hospital actually rose slightly thereafter, but the number of women delivering in the hospital dropped precipitously. The following table illustrates the average number of monthly consults and deliveries at the hospital by quarter:

Average number of monthly consults per period

Bocoio Hospital	Curative consults per month				Prenatal care consults per month		Hospital Deliveries per month
	0-4y	5-14y	>=15y	TOTAL	New	Return	
Sep-Nov 03	90	100	237	427	87	232	23
Dec 03-Mar 04	144	78	204	426	89	173	18
Apr-Jun 04	**147**	**98**	**308**	**552**	**107**	**242**	**10**
Jul-Sep 04	132	112	231	475	90	294	21

Source: CCF quarterly activity reports based on data from the DMS health information system.

As the number of consults for all other services did not drop with the initiation of the fees (at least the average over the quarter---month by month data were not available), it is not clear whether the drop in deliveries was due to the charges or simply a statistical fluke. In addition, the number of deliveries recovered to its previous levels *before* the charges were revoked in September.

v). Conclusions

The overall conclusions for improvement of access to basic MCH and curative care services are the following:

- CCF carried out all the activities planned in the project
- Services are more widely available than before and are sustainable without outside support, but access is still inadequate. The project targets of 2500 pediatric consults and 3000 adult consults per month were not reached, and were unrealistically high given the fact that extending services to all five comunas was not foreseen in the project. Currently, the health system is performing about one-third the number of consults that would be needed to provide a minimum-acceptable level of coverage to the entire municipality. This would require the extension of infrastructure and curative services to all five comunas as well as other outlying areas such as Cavimbi and Saraiva in the commune of Monte Belo.
- Services expanded from the center to the periphery and access improved in spite of the fact that the population moved into less-accessible areas. However, access continues poor or non-existent in many rural areas. More manpower is now available, though quality is highly variable.
- The increase in access can be sustained by the MoH in Bocoio. This includes non-surgical obstetric care, therapeutic feeding, and primary health care services in four health posts in three communes. Management of malaria and diarrhea appear to have improved (see section on quality for further discussion).
- The health workers in Chila, where no permanent facilities are present, were encouraged to shift their emphasis from struggling to provide poor quality curative services in inadequate surroundings toward a greater emphasis on prevention and services that they are able to provide, including patient education. This is a reasonable approach.

- It appears that the institution of the "co-participation plan" charging for services at the Bocoio hospital did not have a significant negative effect on access to and utilization of services, with the possible exception of a temporary drop in hospital deliveries.

vi). Recommendations

- The details of the co-participation policy should be widely disseminated to eliminate misunderstandings. This includes educating the public about the fact that no one is refused services even if they cannot pay, and that health post services continue free of charge.
- Priority should be given to the rehabilitation of health posts in Chila, Cubal do Lumbo and other priority sites over further efforts to improve the hospital or other existing health posts.
- Future projects should focus on improving the quality services and improving caretakers' knowledge and appropriate care-seeking, as well as community mobilization to promote increased and appropriate uptake of primary health care services.
- Quality of services continues to be an important problem. The MoH should sustain supervision by ensuring that all supervisors have motorbikes. Acute staffing shortages have mostly been overcome but there is an on going need to invest in training. The cheapest way to do this is within the structure of the municipal services. This consultant proposes rotating nursing staff in health posts back to the hospital periodically for periods of up to a few weeks to work under close supervision of more experienced staff in order to upgrade their skills and prevent staff developing sloppy practices because of inadequate supportive supervision. This need not interfere with normal functioning of the health posts now that each has at least four nurses.

c. Maternal care

i). Results

The objectives, targets and results for this area are outlined in the following tables:

Prenatal care consults increased

Indicator	Baseline	Target	Jul-Sep 2004
Process/output indicators			
No. of first, second, fourth and total prenatal care consults; % of mothers of children under 2 with at least 1, 2, and 4 prenatal care consults during previous pregnancy	About 120 / mo. total	400 / month total 1st: 60% 2nd: 50% 4th: 25%	721 / month total 182 / month new 43% Approx 43% Approx 43%

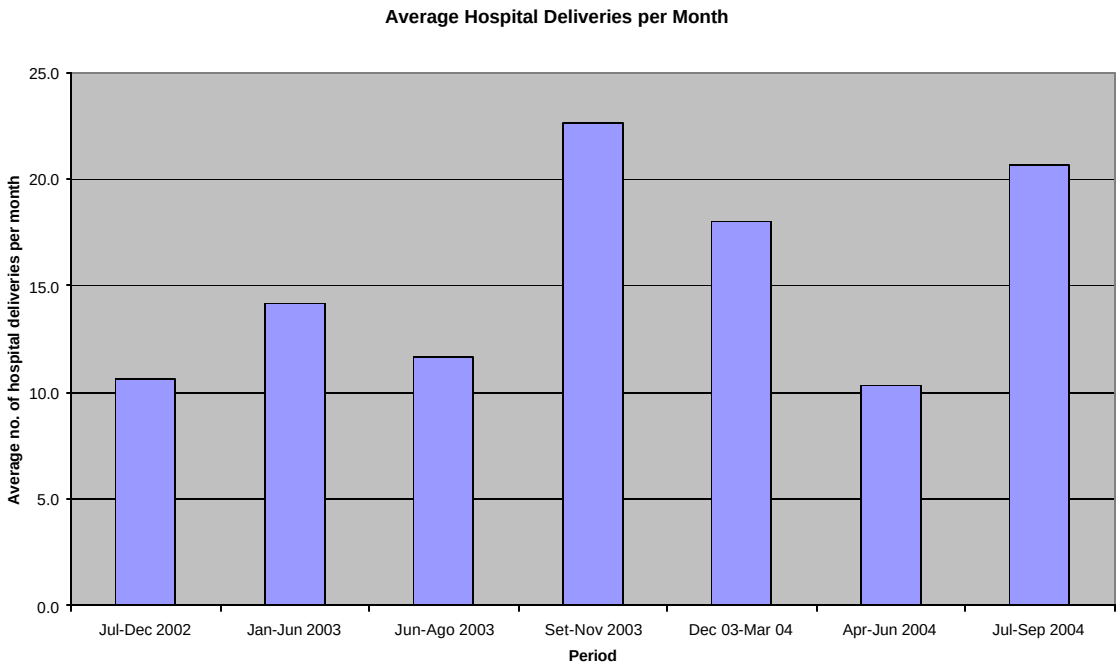
Source: CCF quarterly activity reports, extracted from DMS health information system.

Number of institutional deliveries and deliveries by trained personnel increased

Indicator	Baseline	Target	Jul-Sep 2004
Process/output indicators			
No. of deliveries in hospital per month	About 7 / mo.	25 / month	21 / month
No. of deliveries in community by trained personnel	Unknown	25 / month	Varies: 5-21 / month year 2004

Source: CCF quarterly activity reports, extracted from DMS health information system.

The following graph illustrates the trend of average number of monthly hospital deliveries since the beginning of the project:



In addition, the community mobilization component includes an objective to increase the percentage of pregnant mothers using impregnated mosquito nets. No target was set

Baseline: Estimated at approximately zero

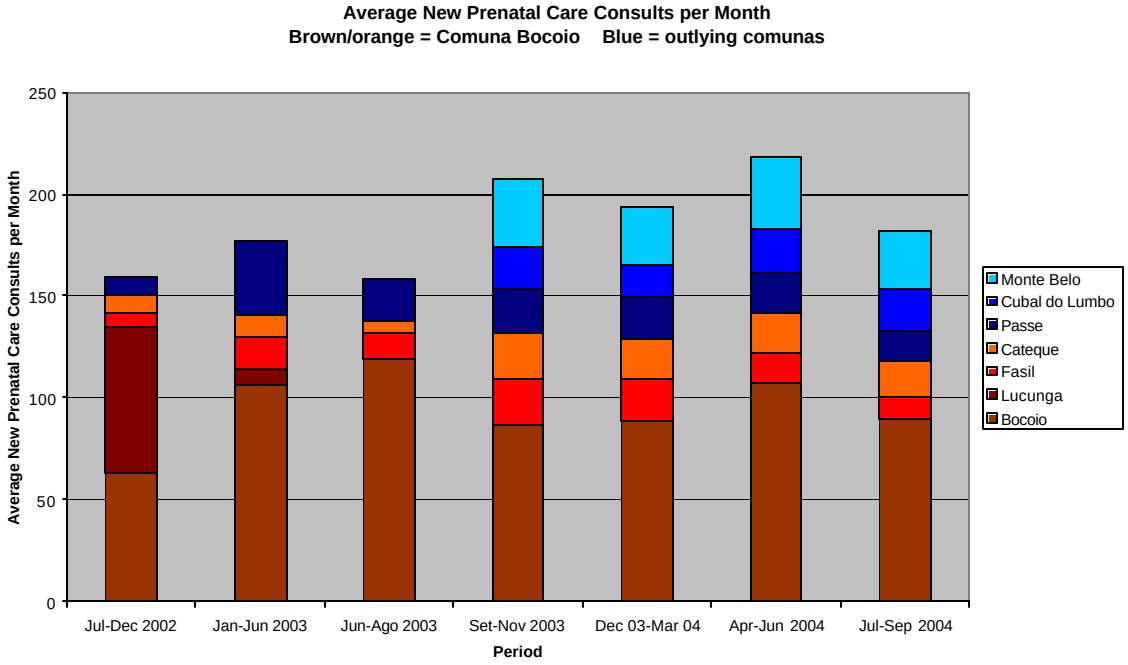
Final: 19% of children 12-12m were said to have slept under a net the night before (unknown if impregnated or not, but assumed to be impregnated as all nets distributed were impregnated) .

It is important to understand that the surprisingly high percentage of children sleeping under nets found in the survey is *not* due to directly project intervention, as children surveyed were in the 12-23 month age range, whereas mosquito nets were only distributed to mothers during the past year. It is likely that mosquito net usage in younger children is higher than that measured in the survey.

It should be noted that prenatal care coverage was not included in the final sample survey. The estimates for prenatal care coverage come from DMS service statistics divided by standard denominators. This may overestimate coverage, as discussed above.

There was an average of three return visits for every first visit giving an average of four visits per woman. This is why the estimate of the percentage coverage of two or four visits is listed as the same for one visit. True coverage for four visits may be somewhat lower, as a few women had more than four visits, so some had fewer. An exact breakdown was not available from the health information system.

The following graph illustrates the number of new prenatal care consults by site per period:



It is clear that initially, prenatal care services were concentrated in and around the municipal capital, but have since expanded to the rural comunas as well. No prenatal care services were registered for Chila, as there is no facility where the consults can be done and no appropriate equipment. A relatively large number consults were done in the first quarter in Lucunga. This was a quartering area for demobilized Unita troops housing around 8,000 people in a small area. The most basic health services were offered by CCF and ex-Unita health workers. The camp was completely disbanded in late 2002, and families dispersed to other areas of Bocoio as well as to other municipalities.

The following table illustrates some other interesting trends in prenatal care and tetanus toxoid administration:

	Jul-Dec 2002	Jan-Jun 2003	Jun-Ago 2003	Sep-Nov 2003	Dec 03-Mar 04	Apr-Jun 2004	Jul-Sep 2004
Average new prenatal care consults per month	159	177	158	207	194	218	182
Average return consults per month	356	508	448	342	347	484	539
Average doses of tetanus toxoid 1 per month	159	40	63	192	153	247	240
Average doses of tetanus toxoid 2 or more per month	120	62	120	60	80	212	222
Average hospital deliveries per month	10.7	14.2	11.7	22.7	18.0	10.3	20.7
New consults est. % coverage	38%	42%	38%	49%	46%	52%	43%
TT2 / new consults (= coverage of TT2 among women seeking care)	75%	35%	76%	29%	41%	97%	122%
Return visits per new visit	2.2	2.9	2.8	1.6	1.8	2.2	3.0

Source: CCF activity reports, data from DMS health information system

Ante-natal care coverage is relatively high, considering that it requires a sophisticated facility-based intervention. Satisfaction with the service is indicated by the high number of return visits per initial visit. Each woman enrolling in ante-natal care returned on average another three times during her pregnancy in the most recent quarter. Quality of service can be roughly judged by the percentage of women receiving at least two tetanus toxoid immunizations, now estimated at over 100%.

Ante-natal care can now be performed in a number of health facilities:

Site	Physical infrastructure	Services
Bocoio hospital	Fully equipped. Can manage non-surgical delivery emergencies.	Human resources trained. 12 full-time nurses work in the maternity unit. They are able to provide quality prenatal and delivery services but require occasional supervision by CCF.
Cateque	Equipped for prenatal care. Performs occasional normal deliveries (quality?)	Two nurses trained, able to perform ante-enatal care for two months now without CCF's presence. Require occasional supervision.
Fasil	Equipped for prenatal care. Performs occasional normal deliveries (quality?)	Two nurses trained and able to perform ante-natal care without CCF. Require occasional supervision.

Monte Belo	Fully equipped for prenatal care. Performs occasional normal deliveries (quality?)	Two female nurses trained and performing ante-natal care without CCF for many months now. Require only occasional supervision.
Passe	Fully equipped for prenatal care. Performs occasional normal deliveries (quality?)	One nurse trained and able to perform ante-natal care without CCF's presence for three months now. CCF still providing regular in-service support.
Cubal do Lumbo	Precarious temporary adobe health post. No examining table. Unable to perform prenatal care except when CCF takes equipment for sessions.	CCF performing ante-natal care sessions monthly (2 consecutive days). Many women enrolled. One nurse with theoretical training, still unable to reliably provide quality prenatal care without supervision.
Chila	No health post.	One nurse with theoretical training. No experience under supervision. No services being offered due to lack of infrastructure.

ii). Activities

The activities outlined in the proposal for this objective include the following:

- **Establishment of a functioning maternity ward at the Bocoio hospital**

At the project's outset, the maternity wards at the hospital functioned in two small basement rooms. It was poorly equipped, and the hospital had electricity for only a few hours each day in the evening. There was no provision for oxygen therapy or transfusion. Nursing staff had not received supervision or refresher training in years.

The maternity unit was built by the DMS using hospital funds when funds were directly managed by the DMS. It is a freestanding unit behind the hospital. When CCF first arrived, construction had been suspended. CCF pledged to equip the ward if the municipality could finish the construction, which it did in a short time. CCF then donated the necessary equipment, and the unit was inaugurated in July 2003. In 2004, the PIP installed electricity in the center of the town providing electricity during working hours until midnight. CCF donated a generator to the hospital which was installed in the second quarter of 2004. It provides emergency back-up electricity for late night.

Water for the hospital and maternity unit still come from a distant river. Oxfam attempted to dig a borehole, but was unsuccessful due to rocky terrain. The PIP is currently rehabilitating the water system in Bocoio, and the hospital and maternity unit should soon have treated running water.

Although it was not specifically included as an objective, the project also aimed to extend the provision of ante-natal care to health posts outside Bocoio The physical and technical capacity to provide prenatal care was already described in the table above. All the activities planned in the proposal were accomplished.

- **Training nursing personnel to perform prenatal care and institutional deliveries**

This will be discussed at length more in the section on "training". The training in ante-natal care and screening and basic obstetrics skills was carried out for 20 nurses from all

health posts, all comunas and the hospital. CCF has also provided intensive in-service training and supervision in ante-natal care for nurses in all health posts and basic obstetric care for nurses in the hospital.

- **Train activists to mobilize the community to encourage women to seek ante-natal care and institutional deliveries**.

This activity was completed and will be discussed further in the section on community mobilization. The evaluation team cited the success of this strategy in encouraging pregnant women to attend prenatal care sessions.

- **Develop educational material for nurses and activists about maternal care**

This will be discussed further in the training and mobilization sections. New materials were not developed.

- **Distribute mosquito nets to pregnant mothers during prenatal care**

CCF purchased 2000 mosquito nets and obtained another 250 from WHO as part of the activist training project. Mosquito nets were donated to municipal hospital and pediatric ward for protection of inpatients, to activists as an incentive, to pregnant women who completed four prenatal care consults and to postpartum women gave birth in the hospital and didn't already have a net. CCF impregnated the nets with insecticide before distribution. A total of 1250 nets were distributed free of charge to pregnant and post-partum women. There are currently no concrete plans for re-treatment.

Mosquito nets distributed to pregnant/postpartum women by period:

December 2003-March 2004	395
April-June 2004	539
July-September 2004	316
Total	1250

Other activities:

Working with traditional birth attendants (TBAs) was not included in the OFDA proposal due to time constraints. The primary focus of the OFDA project was to extend and expand the health care service delivery network out from the hospital. It was felt that selection, training, equipping and supervision of a network of TBAs was not feasible in a one-year timeframe and would best be addressed in a follow-on project with a more community-wide focus.

Nonetheless, TBAs played a role during this project. Twenty-two TBAs had been identified and received training in 2002 under the OCHA-funded project. They received basic equipment through a donation from UNFPA. CCF continued to maintain contact with those TBAs who continued active throughout the project, and CCF encouraged health post staff to coordinate with them. Many TBAs continued to send activity reports to CCF, and in the first half of 2003, 88 deliveries were reported by TBAs and another 71 were reported in the following quarter (compared with 147 and 80 respectively in the Bocoio hospital in the same periods). CCF activity reports mention that nine TBA

equipment kits were distributed to active TBAs (UNICEF donation) in 2003, and a total of 350 clean delivery kits were distributed to pregnant mothers during prenatal care consults in 2003. No further mention is made in 2004 reports, though the team states that they continue to distribute kits (though the number was not available during the evaluation) and to coordinate with those TBAs who remain active. Some TBAs continue to file regular activity reports.

Quality(as measured in supervision visits) of ante-natal care consults and hospital-based delivery appears to have improved markedly from the project outset; there was an increased use of mosquito nets by pregnant mothers (follow-up by activists) and an increasing awareness on the importance of clean home births. Quality issues will be further addressed in a section on quality later in this report.

iii). Lessons learned

Ante-natal care coverage is relatively high given the fact that it requires a facility-based sophisticated service, and women return for follow-up care. Future projects may be able to take advantage of this to increase coverage for other interventions.

The evaluation team cited anecdotal evidence that mosquito nets proved to be a very popular incentive to prenatal care, though no increase in demand was noted after their introduction, and no fall was seen after they ran out. Still, the fact that in the final survey nearly 20% of mothers said that their child slept under a mosquito net the night before shows their general acceptance.

iv). Constraints

Treatment of mosquito nets with insecticide greatly increases their effectiveness at reducing morbidity and mortality due to malaria, yet no concrete plan for retreatment of mosquito nets has yet been made.

Dependence on CCF staff for prenatal care is still high in some areas, especially Cubal do Lumbo. Other areas will require ongoing regular supervision if access is to be maintained. The CMS maternal health supervisor is capable, but is a woman and cannot ride a motorcycle alone. She will coordinate to travel with other supervisors when they go to health posts.

MOH policy still officially relies on continued reliance on chloroquine for malaria prophylaxis in pregnancy in spite of the fact that over 60% of malaria is chloroquine resistant. This implies that many pregnant women will contract malaria in spite of seeking prenatal care and properly taking their prophylaxis. Pyrimethamine-sulfadoxine is supplied in essential medicine kits, though not in large quantities. Each pregnant woman would need only two doses (six tablets total) during her pregnancy. During the evaluation, a bottle containing 1000 Fansidar tablets was found in a box in the Cubal do Lumbo health post (the health worker was unaware he had it), although this stock probably was supplied by CCF. If quantities such as these are being supplied in medicine kits, it should be possible to change the policy locally. That single bottle would be enough to supply Cubal do Lumbo's pregnant women for two and a half months. The

cost of supplying pyrimethamine-sulfadoxine to all pregnant women in the Municipality of Bocoio at $13 per 1000 pills (from Caritas) would be about $375 per year.

Lack of cold chain in some health posts means that tetanus toxoid is not always available on prenatal care days at those health posts. This could theoretically reduce tetanus toxoid coverage, but judging from the high coverage in the past six months, this problem appears to have been largely overcome. Stockouts in the first quarters of 2003 and 2004 led to drops in tetanus toxoid coverage during both periods, but with rapid recovery in the quarter that followed.

v). Conclusions

Coverage for maternal health services has been extended to many rural areas but probably cannot increase significantly beyond this level without further extension of the physical infrastructure.

Mosquito nets are excellent adjunct to prenatal care and delivery services, and they appear to be used after they are taken home. Retreatment has not been addressed, but if it is not done, the effectiveness of the nets will be compromised. The cost of retreatment is substantial if one takes into account the cost of training and logistics. Although Permanets are a more expensive initial investment than conventional nets, the fact that they require no retreatment makes them more cost-effective. The Permanets should be introduced as soon as they become available.

Emphasis of institutional deliveries outside the hospital is probably not wise at this stage as quality of these services cannot be guaranteed. Supervision is difficult as demand is low, and conditions in health posts are not much better than at home. Appropriate referral for hospital deliveries is a more reasonable alternative.

vi). Recommendations

Extend physical infrastructure where possible to increase coverage, with Cubal do Lumbo and Chila being of highest priority. Where this is not possible, emphasis should be on other alternatives, including improvement of home deliveries through working with TBAs and activists, home delivery kits, increasing availability of treated mosquito nets, and possibly making malaria prophylaxis or intermittent presumptive treatment available through TBAs and/or activists. Community education in these areas should focus on detection of danger signs and appropriate timely referral.

In areas where prenatal care services are available, more advantage should be taken of the already high coverage. Emphasis should be placed on improving quality, especially the quality of patient education.

More advantage should be taken of the maternity center in Bocoio as a teaching facility. Difficulties in arranging regular on-site supervision of outlying health posts can be at least partly overcome by scheduling regular rotation of peripheral staff through the hospital where they can spend time in an intensive supervised situation. Now that acute

staffing shortages have been ameliorated and housing for nurses will soon be available in Bocoio, this option becomes more realistic.

Encouraging institutional delivery outside the hospital is probably not wise, as it will be of dubious quality. Improving the quality of home deliveries through community education, delivery kits and working with TBAs is probably better. Emphasis should be on timely detection and referral of obstetrical emergencies.

Post-partum care is probably best addressed through community interventions as well, as few women will deliver in facilities and post-partum women rarely seek care immediately. TBAs and activists could be given this task, including post-partum administration of vitamin A. Post-partum vitamin A could also be administered to mothers of children under six months of age during infant immunization (mentioned above).

Introduce Intermittent Presumptive Treatment for pregnant women using pyrimethamine-sulfadoxine if at all possible. It is less expensive than chloroquine and much more effective.

Find a mechanism to guarantee sustainable sale of treated mosquito nets. The team notes that demand is high, but there is no supply. In addition, a mechanism to facilitate regular retreatment should be introduced if possible, perhaps through activists. *Permanets* should be introduced as soon as they are available.

2. Nutritional status of children improved

This objective absorbed a disproportional amount of resources during the project. The nutrition emergency during the last half of 2002 was dire, with 23% of children assessed as acutely malnourished. This situation stabilized rapidly during that period with regular food distributions and with the extension of a dry ration supplemental feeding program. The malnutrition rate in the resettlement camps fell to below one percent. However, early in 2003, as the population moved to rural areas and began to plant, they had few resources and no reserves. Two successive seasons of poor rainfall have since left the area with ongoing precarious food security, and the rate of childhood malnutrition is subject to rapid swings as families' food stocks run out at the end of the agricultural year. As the team first entered each newly accessible area, large numbers of malnourished children were identified and enrolled in supplementary feeding. Later, the situation in each area appeared to level off at a moderately low level of malnutrition. The child malnutrition rate did not reach the level that was feared, and it is hoped that with better rain this year the situation will stabilize.

a. Results

As the sub-objectives (intermediate results) and activities are nearly identical for this objective, they will be discussed together rather than in separate sections.

The intermediate results for this objective are stated in the proposal as follows:

- **supplemental nutrition program for 1200 children in place**

- **therapeutic feeding program with 10-12 beds functioning**
- **number of children requiring supplemental and therapeutic feeding reduced**
- **regular nutrition surveillance of children under five in place in Passe, Monte Belo and Cubal de Lumbo.**

i). Nutritional status

CCF implemented regular nutrition screening and surveillance immediately as each new comuna became accessible. CCF performed its first assessment in Chila near the end of 2003, and entered more remote areas far from the capitals of the comunas, (beginning June 2003), Saraiva (beginning the end of 2003), and Cavimbi, among others. Children were screened, immunized and received vitamin A. Where a significant number malnourished children were identified and regular access could be maintained, regular bi-monthly dry-ration food distribution was initiated. The only exception to this is Chila, where poor access precluded setting up a regular supplemental feeding program in spite of a relatively large number of malnourished children identified. Eligible mothers were encouraged to take their children to Bocoio, though few did so.

Nutrition surveillance was carried out primarily by the CCF team itself, with gradually increasing participation by DMS staff as they received theoretical and in-service training. Weight-for-height and mid-arm circumference measurements were taken using specialized equipment.

The following table illustrates the number of children screened in each period since the beginning of 2003, malnourished children

	Jan-Jun 2003	Jul-Aug 2003	Sep-Nov 2003	Dec-Mar 2003	Apr-Jun 2003	Jul-Sep 2003
Children screened	1536	223	922	999	389	2102
Severe malnut	1	2	11	15	19	29
Moderate malnutrition	46	10	73	151	111	55
At risk children	81	14	52	31		50
Average number screened per month	256	112	307	250	130	701
Global malnutrition rate (severe + moderate)	3.1%	5.4%	9.1%	16.6%	n/a	4.0%
Comments	Additional 237 children presented spontaneously			First assessment in Chila	No random screening done, all spontaneous	Best estimate of current malnutrition rate

Source: CCF quarterly activity reports

Each column in the above table must be interpreted in light of the specific circumstances and how the screening was carried out and interpreted. In spite of its weaknesses, it represents the best estimate of the nutritional status of children in the area, as no formal randomized nutrition surveys have ever been carried out in Bocoio. In general, the more children screened, the more accurate the picture of overall nutritional status.

During the period January-June 2003, aside from the 1536 children randomly screened, an additional 256 children presented spontaneously, many to the pediatric ward of the hospital. Of these, 44 were severely malnourished, 50 were moderately malnourished and another 40 considered at risk. If these children who presented "non-randomly" are included in the statistics, the global malnutrition rate rises to 8.0% for that period.

The two-month period of July-August 2003 had little screening because it fell between the end of the OCHA-funded project and the beginning of the OFDA-funded period. There were changes in the CCF team, and the team was engaged in the design and planning for the next phase.

The period of September to November 2003 corresponds to the period that planting has begun, but there is as yet no harvest. Higher rates of malnutrition are expected, as families' food reserves from the previous year have been exhausted.

During the quarter December 2003 to March 2004, CCF performed its first nutritional assessment in Chila. Large numbers of malnourished children were identified and enrolled. Since then, the situation has stabilized in that area.

During the quarter April to June 2004, CCF did no random screening. Only children presenting spontaneously to the hospital and during food distribution were included. No screening was performed during this period as CCF and the DMS were busy with national polio immunization campaigns as well as intensive training in nutrition screening for health post and hospital staff. It also corresponds to the period that the therapeutic feeding center was opened in the hospital. As would be expected, the percentage of children found to be malnourished among those spontaneously presenting to the hospital, health posts and those hoping to be enrolled in food distribution would be expected to be higher than that in the random population. In addition, health workers recently trained in nutrition surveillance and management of malnutrition were highly sensitized to malnutrition and more likely to identify malnourished children. In addition, children with moderate malnutrition and those "at-risk" were reported together. Calculating the global malnutrition rate during this period would be meaningless.

The final period, July to September 2004 represents the best estimate of the global malnutrition rate. The CCF/DMS team screened a record number of children from sites in the comunas of Bocoio, Cubal do Lumbo and Monte Belo, including remote rural areas where screening had never taken place before. The relatively low global malnutrition rate of 4.0% is probably reasonably accurate. This rate is roughly in line with the 6% global malnutrition rate reported from a very recent random nutrition survey in the Municipality of Ganda.

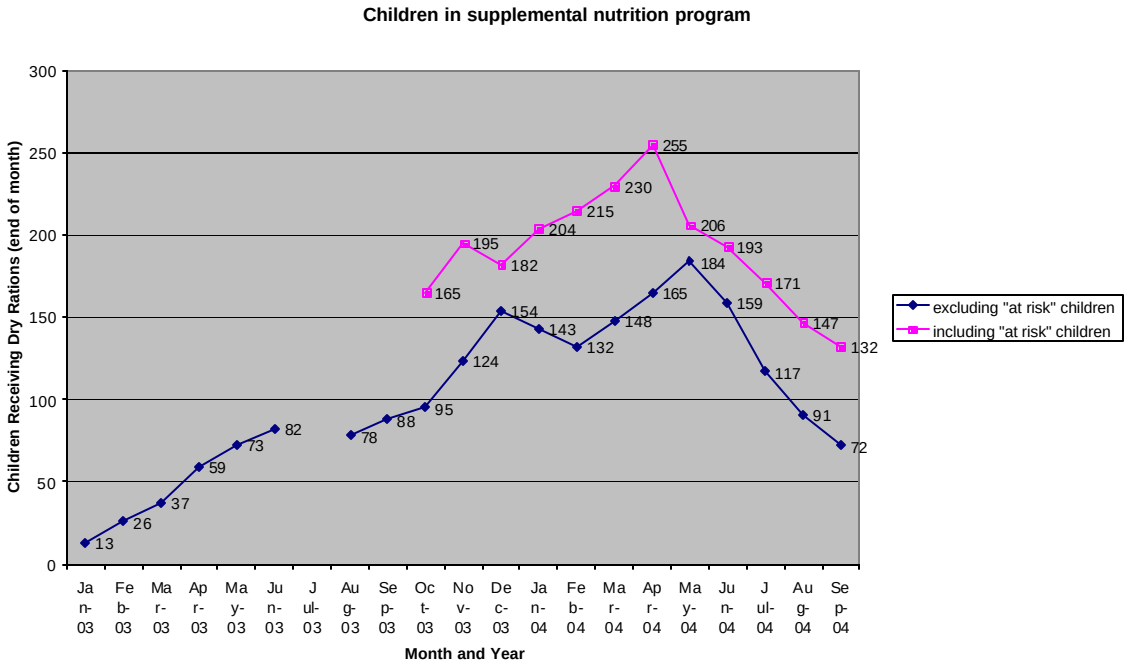
ii). Supplemental feeding program

From CCF's first entry into Bocoio in 2002, CCF negotiated with WFP for supply of rations for a supplemental feeding program. CCF also took over the running of the community kitchens from German Agro Action during that semester, and later closed them as the nutrition situation improved and no longer justified the effort. The supplemental feeding program continued, providing supplementary dry rations (maize meal, oil, sugar and soja) calculated at 1200 Kcal per day every 15 days for children identified as moderately malnourished (weight for height between 70-79%) and children "at risk" (weight for height 80-84%). Those severely malnourished (weight for height < 70%) were initially referred for hospitalization at the therapeutic feeding center in Catumbela and, more recently, in Bocoio. The average length of patient stay in Bocoio is shorter than the admission stay in Catumbela and staff feel that this is because children present or are now diagnosed earlier for admission. All children enrolled are immunized (with emphasis on measles), and receive mebendazol (or albendazol), vitamin A and ferrous sulfate with folic acid.

As new areas became accessible, CCF performed assessments and set up supplemental feeding in strategic sites where there was a sufficient number of malnourished children to justify it. The only major exception was the comuna of Chila where, although a large number of children were initially identified as malnourished, it was simply not logistically feasible to maintain a program there due to the extremely difficult access.

At the time of the evaluation , CCF and the DMS (with rations from WFP) are supporting regular bi-monthly food distribution for a total of 132 children in Bocoio, Cateque, Fasil, Cubal do Lumbo, Saraiva (in Monte Belo), and Passe.

The following graph follows the monthly progression of the children enrolled in the supplemental feeding program each month (total receiving supplements at the end of each month):



The reason for the two curves is that WFP reports include children "at risk" for malnutrition, as WFP is interested in the amount of food they need to supply. The Provincial Nutrition Program is only interested in the number of children that are malnourished, not those considered "at-risk" and receiving supplements. The Provincial Nutrition Program therefore receives a different report from that sent to WFP. Data including "at-risk" children was available to the evaluation team from October 2003 onward. Data for July 2003 were missing.

It can be seen that the more recent trend is downward, in spite of a huge effort to screen for malnutrition in recent months. However, the period between October and February is a critical time. It is the planting season, and families have few food reserves from the year before. Already in October, the CCF team has reported an upswing in the number of children enrolled. The same was been reported by the nutrition program from Balombo at the monthly Provincial Nutrition meeting the first week in November 2004.

At the present time, the CCF team reports that the nurses in the hospital, Monte Belo, Passe and Cateque are able to perform nutrition screening and manage all the steps of a supplementary program, including mixing the rations and reporting, without CCF or DMS supervision. However, nurses in Fasil still have some weaknesses, and Balança and Cubal do Lumbo rely entirely on staff from CCF and/or the DMS. The health posts at Monte Belo, Passe, Cateque and Fasil are fully equipped. Cubal do Lumbo still has no scale (but has a height board). Balança (in Cubal do Lumbo) has no equipment of its own.

According to WFP policy, rations are justified only where there are at least 50 children enrolled. Bocoio is still well above this cut-off, if one includes the at-risk children as well. CCF and the DMS have negotiated with WFP to transfer the responsibility of the

supplemental feeding program from CCF to the DMS at the end of the year. Although four of the external sites may be technically able to continue their programs, as CCF withdraws its support for transportation, outlying screening and food distribution will probably not be sustainable It is likely that the supplemental feeding program will continue only at the hospital, supporting children from the capital and surrounding area, those children whose caretakers agree to come to Bocoio, and those children discharged from the therapeutic feeding center.

In May 2004 the community activists received training in measuring mid-arm circumference and all received measuring tapes. It was not possible to evaluate the impact of this training or whether it has led to an in increase in referrals and enrollments in the nutrition program, and the team could cite no specific examples. The approach may hold promise as a means to at least continue some degree of nutrition surveillance in outlying areas.

iii). Therapeutic feeding program

From the project's outset the only recourse for severely malnourished children was to refer them to the therapeutic feeding center in Catumbela for hospitalization. Catumbela is a three hour journey from Bocoio, depending on the state of the road. Transportation has been difficult to arrange at times, and many parents refused the referral. During the first half of 2003, of the 45 children identified as severely malnourished (plus another unspecified number that deteriorated while in the supplemental nutrition program), only 28 agreed to be transferred to Catumbela. Many of those who refused almost certainly did not survive.

CCF proposed to support the opening of a therapeutic nutrition center in Bocoio to increase the percentage of severely malnourished children who are treated and recover. However, there were many obstacles to overcome before this could be accomplished. The Bocoio hospital did not even have a pediatric ward at the beginning of 2003. A therapeutic nutrition center would require physical space and equipment, personnel trained in therapeutic feeding and management of very ill children, more specialized medicines, more sophisticated laboratory support and transfusion therapy and oxygen. In addition, the establishment of therapeutic feeding would require approval from the National and Provincial Nutrition Programs if it were to be sustainable.

The DMS initially was counting on the government's PIP for addition of a pediatric unit and a freestanding feeding center. When that was not forthcoming, CCF negotiated with the DMS for space in the existing hospital, and a covered garage between the two main buildings was selected. CCF sponsored the building of walls and doors and more bathroom facilities and lighting. CCF purchased equipment and negotiated the donation of used pediatric beds from the government hospital in Catumbela. The pediatric unit opened in August 2003 with 16 beds and is now staffed by 11 nurses.

Therapeutic feeding centers in Angola have long stood as independent units, apart from their respective Municipal Health Departments, most often under the supervision of an international NGO and the Provincial Nutrition Program. Their budgets, supplies and

personnel are separate from those of the MOH units in their areas. CCF negotiated with the Provincial Nutrition Program for approval to move ahead to establish the capacity for therapeutic feeding in the context of the Municipal Hospital in Bocoio, a concept that had been debated in Angola, but had not become policy and had never been tried.

It was originally planned to arrange for one nurse from Bocoio to spend time at the therapeutic nutrition center in Catumbela to learn how to manage a center and the patients. Instead, the CCF made alterations in the technical team and hired one of the experienced nurses from the Catumbela therapeutic nutrition unit to join the CCF team in Bocoio and oversee the establishment of the center. Meanwhile, CCF and the DMS arranged for one of the DMS's laboratory technicians to spend time in the blood bank in Lobito to learn how to manage blood banking and transfusion. CCF purchased outstanding equipment for the laboratory to allow transfusion, negotiated the donation of a used blood storage refrigerator from the Catumbela blood bank as well as the donation of more used pediatric beds. CCF purchased mosquito nets and blankets as well. The newly recruited CCF nutrition supervisor provided training for fifteen DMS nurses in Bocoio.

The therapeutic nutrition center was inaugurated in May 2004 as an extension of the pediatric unit. Ten DMS nurses staff the therapeutic feeding program, which is recognized by the National Nutrition Program and is included in their operational plan. In the initial phase, CCF is purchasing the specialist medicines, therapeutic milk, blankets, mosquito nets and soap, and the CNS nutrition supervisor has provided intensive oversight. It is now planned to reduce this oversight, as well as pass the responsibility for financial support (except for nursing staff) over to the Provincial Nutrition Program as CCF's program winds down. The evaluation team and DMS felt that the DMS and staff are adequately prepared to assume this responsibility.

The unit was initially small, with capacity for only about 12 children. Thirty nine children were admitted in the first month, and another fourteen in the second month. This influx quickly overcame the unit's capacity, and overflow was housed in a hastily-erected tent. Since then admissions have stabilized, and the tent has no longer been necessary.

The following table outlines activity for the therapeutic nutrition program:

	Transferred to Catumbela	Average per month transferred to Catumbela	Average per month enrolling in supplemental program due to moderate malnutrition (excludes "at risk")
Jan-Jun 2003	28	4.7	16.6
Jul-Aug 2003	13	6.5	4
Sep-Nov 2003	11	3.7	29.6
Dec 03-Mar 04	15	3.8	37.8
Apr-Jun 04	1	n/a	
	Entering therapeutic nutrition center, Bocoio	Average per month entering therapeutic nutrition center, Bocoio	
Apr-Jun 04	53	17.7	37.3
Jul-Set 04	28	9.3	24.3

Source: Monthly nutrition program reports and CCF activity reports

It is clear that, while the number of children identified as moderately malnourished and entering the supplemental nutrition program has remained roughly constant since mid-2003, the number of children entering the therapeutic nutrition center in Bocoio is *far* greater than the number being sent for treatment in Catumbela. This would seem to corroborate the qualitative impression by the team as stated in the January-July 2003 report that fewer than half of the severely malnourished children agreed to be transferred to Catumbela. The feeding center in Bocoio has likely saved many lives.

The following table details the admissions and evolution of children in the therapeutic center in Bocoio.

	2004	May	Jun	Jul	Aug	Sep	Total to date
	Beginning of period	0	18	9	9	3	
Entered	Masramus	11	3	5	5	2	26
	Kwashior	26	11	7	1	6	51
	Unimproved	0	0	0	1	0	1
	Others	2	0	0	0	1	3
	TOTAL	39	14	12	7	9	81+2 in ped ward
Left	Cured	14	17	8	10	3	52
	Deceased	2	1	3	1	3	10
	Abandoned	4	3	1	2	1	11
	Medical transfer	1	2	0	0	1	4
	TOTAL	21	23	12	13	8	77
	End of period	18	9	9	3	4	
	Other reasons for leaving	1	1	0	0	1	

Source: Therapeutic nutrition program monthly reports

As of the end of October 2004, there were six children in the center, and there appears to be an upward trend, as with the supplemental feeding program. A total of 12% have died since the center was inaugurated, safely under the Catumbela therapeutic center's "alert" cut-off of 15%. This is all the more remarkable given that nearly two-thirds of the admissions are for kwashiorkor, a diagnosis with a more guarded prognosis than marasmus. Furthermore, all the children died within 24 hours of admission. Consistent data on the outcomes of children transferred to Catumbela were not available during the evaluation. A total of 14% of children left the Bocoio feeding center before being discharged, but according to the team, most were recovering already.

b. Lessons learned

In mid-2004, CCF moved the dry nutrition supplementation program and screening in Bocoio from the CCF office to the municipal hospital. This proved to be very beneficial in various ways. It invited more active participation by DMS nurses in nutrition screening, and led to greater integration between the nutrition program and other maternal/child health services. In retrospect, it would have been best to perform the nutrition screening in the hospital from the outset.

Approval from the Provincial Nutrition Program to establish CNT in the Bocoio hospital as an extension of the pediatric ward has been an unqualified success. From an outsider's perspective it may seem like a logical model, but represents a radical deviation from the way things are done elsewhere in Angola, where therapeutic nutrition services are operate as separate specialty programs, depending largely on external donor assistance. Shutting down specialty programs is very difficult due to vested interests and entrenched ways of operating. The fact that Bocoio had no other reasonable option due to lack of physical space for a separate nutrition center proved to be a blessing in disguise. It is the first nutrition unit to operate in this fashion in Angola, and, according to the director of the Provincial Nutrition Program, was cited recently as a positive example in a recent meeting of the National Nutrition Program in Luanda..

Evidence of the importance of having the therapeutic nutrition unit in Bocoio rather than Catumbela is demonstrated by the fact that mothers preferred to stay in the unsatisfactory conditions in the tent rather than be transferred to Catumbela. More malnourished children are now receiving treatment compared to earlier. Quality of treatment appears to be acceptable, as outcomes for those receiving treatment are within accepted standards. For the 50% of severely malnourished children who would have refused transfer to Catumbela, the outcomes are undoubtedly much better in Bocoio

Integrating a nurse from the Catumbela CNT into the CCF health team was a better solution than simply sending a nurse from Bocoio to train in Catumbela. It allowed the rapid establishment of the therapeutic center as well as improving the quality and sustainability of the supplemental feeding program in only a few months. It also proved more cost-effective and sustainable than the original plan to hire an expatriate nutritionist short-term.

The steady downward trend in severely malnourished children admitted to the therapeutic nutrition center indicates that the initial wave of admissions may have had a cause other than "repressed demand" from families that would otherwise not have agreed to be transferred to Catumbela. At the time of its opening, mass random nutrition screening had been temporarily suspended, and the children that were identified were discovered "spontaneously". Opening the therapeutic nutrition center coincided with the completion of nutrition training for nursing staff. It is likely that the identification of large numbers of malnourished children was in part due to increased vigilance on the part of recently-trained nursing staff. The subsequent steady downward trend may well represent a "relaxation" of that vigilance. CCF staff still commonly "discover" severely malnourished children in the pediatric ward that were hospitalized for other reasons, but that nursing staff did recognize as also being severely malnourished. If this is occurring in the hospital, where nurses are relatively well-trained, it is surely occurring in the health posts as well. The nursing staff at all facilities should receive periodic refresher training to encourage them to screen *all* children seen for any reason using graphs or charts and at least weight-for-age or mid-arm circumference.

c. Constraints

The target of 1200 children in a supplemental feeding program assumed as a "worst case scenario", where the baseline situation would continue or worsen. Fortunately that did not happen, and the program did not enroll nearly as many children as was originally feared. However, it is noteworthy that a total of 771 children passed through the supplemental nutrition program during the nearly two years under review in this evaluation. Without the nutritional supplementation, many of these would have died. These 771 children represent about 4% of the total number of children in the Municipality of Bocoio under five years of age.

The dispersion of the population from resettlement camps to rural comunas has made the maintenance of a widespread supplemental nutrition program logistically very burdensome. If the malnutrition rate is around 5% as screening indicates, then over 1000 children under five *should* be eligible for supplemental feeding. Yet, there are only around 100 currently enrolled. This is not a failure of the team, but rather an admission that widespread screening and supplementation under these circumstances is simply not feasible. The population-wide benefit of this large and rather expensive effort is questionable, as around 90% of the eligible moderately malnourished children are probably being missed.

Moreover, the relatively technical nature of nutrition screening and food supplementation plus the logistical burden mean that it would be difficult to sustain without external (e.g. CCF) support. The DMS does not have the technical, physical or financial resources to sustain a widespread decentralized supplemental feeding program on its own.

d. Conclusions

The supplemental nutrition program was a success and probably averted many child deaths, especially in the early months of the project. However, under the current circumstances its usefulness and cost-effectiveness are waning. Only around 10% of the

children eligible for supplemental feeding are actually receiving food, so the impact of this relatively expensive decentralized intervention on child mortality is not great. The rate of malnutrition among children in the region is around 4%, which is below the level that would normally warrant a supplemental feeding program. Nonetheless, food security is still precarious so the situation still warrants careful vigilance, as it could deteriorate rapidly.

Giving the hospital in Bocoio the ability to properly manage cases of severe malnutrition in the context of its pediatric unit was an effective, cost-effective and sustainable strategy. CCF support and supervision of the unit will not be needed much longer, and in the event the WFP withdraws from Angola, the hospital will retain the ability to manage these cases far into the future.

e. Recommendations

The peripheral supplemental feeding sites should probably be closed down, but a central supplemental program may continue in Bocoio for referred children and those discharged from the therapeutic unit. The DMS has the capacity to manage such a program.

Active surveillance for malnutrition should continue, however, because the food security situation is precarious and could deteriorate rapidly:

- Establish one to three sentinel sites for regular nutrition surveillance. The Bocoio hospital plus Monte Belo and Passe would provide good coverage to a wide population of the municipality and already have trained staff and equipment.
- Well children, such as all children reporting for immunization, should be weighed and measured and their weight-for-height recorded on a standard form. Well children being immunized are used as a substitute for random screening. This surveillance screening should not focus on *sick* children, as they do not represent the general population and would overestimate the prevalence of malnutrition.
- These forms should be sent monthly to the DMS where they are tabulated, plotted and *analyzed* every month by the Data Analysis Committee. Any rise in global malnutrition to levels approaching 10% should prompt an immediate contact with the Provincial Nutrition Program for an emergency nutrition assessment and possible intervention with supplemental feeding.
- The primary purpose of this surveillance screening is to monitor the nutrition situation in the municipality, not to identify malnourished children for treatment. However, any children identified as malnourished in this way should immediately receive immunizations, vitamin A, iron and folic acid, mebendazol, counseling and then be referred to the Bocoio nutrition program.

In addition to surveillance as described above, nursing staff at *all* sites should be vigilant to identify malnourished children. *All* children under five presenting for pediatric consultation should be weighed (or at least the mid-arm circumference measured). The staff need not bother with height measurements, as it is cumbersome and technically difficult. The weight-for-age must *plotted* or compared with reference values on a chart. Children below the appropriate cut-off should immediately receive immunizations, vitamin A, iron and folic acid, mebendazol, counseling and then be referred to Bocoio. If

each child cannot be issued a growth chart of his own, the health post should at least keep a reference card (male and female) or chart for plotting weight-for-age. *Simply weighing and writing down the weight is not enough*. Without plotting the weight on a reference curve or comparing with a chart, the nurse cannot know whether the child is malnourished or not.

In light of the previous recommendation, it should be noted that large scale longitudinal growth monitoring ("puericultura" in Portuguese) is probably not feasible at this time. For growth monitoring to be effective, it requires high coverage and continuity of care as well as excellent counseling skills. The health system still lacks the quality and coverage to make such an effort worthwhile. Other MCH interventions will have a wider impact at a lower cost.

3. Infrastructure improved

Most of the infrastructure improvements occurred during the first half of 2003, before the beginning of the OFDA project. They were mostly financed by the grant from BP-Amoco, and no infrastructure improvements were included in the OFDA proposal. All planned improvements were completed on schedule. As the infrastructure improvements did not appear in the OFDA proposal, there are no specific objectives or targets associated with this objective.

a. Results

The following table outlines the various infrastructure projects supported by CCF between January 2003 and October 2004.

Project	Description	Date of completion and/or inauguration	Fund and cost	Impact
Bocoio hospital maternity ward	CCF: All equipment, Generator DMS: constructed	Inaugurated July 2003. Generator installed June 2004. [Equipment completed October 2003]	Generator $500	Prenatal care consults 5598 / year Deliveries 215 / year
Bocoio hospital pediatric ward	CCF: front and rear walls, doors, windows, plumbing, equipment, mosquito nets Catumbela hospital: beds (used—CCF negotiated)	Inaugurated July 2003.	$2,158	Est. 770 / year hospitalizations (average. stay 5 days, 66% occupancy)
Bocoio hospital therapeutic nutrition unit	CCF: minor rehabilitation. Equipment Mosquito nets. CCF supplying ongoing milk, specialized medicines, soap. DMS: beds	Completed construction May 6, 2003. Inaugurated May 2004.	No new construction. Only small amount of equipment.	Est. 200 / children year (at current rate)
Bocoio hospital laboratory improvements	CCF: equipment: centrifuge, hemoglobinometer. Test kits and transfusion bags. Catumbela: blood refrigerator	August 2004	No new construction. Equipment $3334	Approx 150 /year transfusions (3 X / week est. by hospital director)
Monte Belo health post	CCF: Complete rehabilitation (roof, windows, doors, etc.). All equipment. CRS/UNICEF: cold chain	Construction completed May 6, 2003 Inaugurated October 24, 2003 after equipped	$15,034	Curative consults: 4394 / year Prental consults: 801 / year Deliveries 36 / year
Passe health post	CCF: Complete rehabilitation (roof, windows, doors, etc.). All equipment DMS: vaccine refrigerator	Completed March 31, 2003 Inaugurated April 4, 2003	$15,034	Curative consults: 5631 / year Prenatal consults: 693 / year Deliveries: 54 / year
Cateque health post	CCF: minor rehabilitation: doors, windows, security, paint. Equipment.		$2,336	Curative consults: 4969 / year Prenatal consults: 670 / year Deliveries: 39 / year
Fasil health post	CCF: major rehabilitation: doors, windows, paint, roof, security CCF: equipment	June 2004 Equipment will be donated November 2004	$14,614	Curative consults: 7581 / year Prenatal consults: 773 / year Deliveries: 45 / year

With the exception of the Fasil health post rehabilitation and equipping the laboratory, all of the infrastructure improvements were completed in the first half of 2003, before the beginning of the OFDA project.

The equipment cost for Monte Belo, Fasil and Passe are difficult to estimate, as CCF made a single purchase and then divided the contents of the purchase in the most appropriate and equitable manner possible. In the table above, the investment is simply divided evenly between the three facilities. The equipment for the Fasil health post has not yet been purchased. Due to the temporary and insecure situation of the Cubal do Lumbo health post, only an insignificant amount of equipment was donated.

Each of the three health posts that was rehabilitated (Passe, Fasil, and Monte Belo) cost in the range of $15,000. If this is depreciated over 20 years, as suggested by WHO, the value of the investment is only US$750 / year, or around US$0.12 per beneficiary. The following table more accurately estimates marginal cost per beneficiary of the infrastructure investments:

	Capital investment	**Annual cost Building depreciated over 20 years Equipment depreciated over 3 years**	**Beneficiaries / year (conservative estimates at current utilization rate)**	**Marginal cost / beneficiary / year**
Pediatric and therapeutic nutrition unit Bocoio	$2,158	$108	770 + 200	$0.11
Monte Belo	Rehab $15,034 Equip $2000	Rehab: $752 Equip: $667	5231	Rehab: $0.14 Equip: $0.13
Passe	Rehab $15,034 Equip $2000	Rehab: $752 Equip: $667	6378	Rehab: $0.12 Equip: $0.10
Fasil	$14,614	$731	8399	$0.09
Laboratory (transfusion only)	$3334.39	$1111	150	$7.40
Maternity	Generator $500 Equip $2000	Generator + equipment $833	5813	$0.14

Source: Accounting records for individual projects plus CCF activity records from DMS health information system.

Note that these are gross estimates, and do not take into account future present value of investments (not insignificant, considering Angola's high interest rates). Also noteworthy is that marginal recurrent costs, such as the cost of service provision in each facility, are not included in the above table. These costs would include medicines and consumable

supplies, maintenance, logistics, supervision and administration, and are borne mostly by the DMS. However, it must be remembered that human resources (salaries) in these facilities can be treated as "fixed costs", that is, the number of human resources assigned to the Municipality of Bocoio would probably be the same regardless of whether they are used effectively or not. Therefore, there is no significant marginal cost for personnel. Only the cost of extra essential medicine kits, consumable supplies, supervision, and administration represent additional recurrent costs to the health system.

Likewise, the relative cost and consequences to patients of not having access to these new services are difficult to quantify. What percentage of children and adults without access to these new services would have been significantly worse off? For example, those seeking consults for colds, mild self-limited diarrhea and joint pains would probably have been no worse off with or without care. In these cases, for example, perhaps the time lost from work to seek unnecessary care is costlier than any consequence of not seeking care if the services had not been made available. Even so, one must assume that provision of health services is generally "better" than having none available.

With the exception of the laboratory, estimates of cost per beneficiary are negligible. The laboratory is more expensive, as the number of transfusions that the facility is expected to perform is small. Still, the alternative, sending all transfusion patients to a reference hospital in Lobito or Catumbela not only is very costly in terms of services and transportation, it has high household and opportunity costs for the family as well. Providing transfusion services in Bocoio is certainly cost-effective if one considers the cost of the alternative.

CCF's efforts were to have complemented the following infrastructure projects planned by other organizations:

Programa de Apoio à Reconstrução (PAR)
PAR is an a large initiative funded by the European Union for rebuilding essential infrastructure in Angola. The project is focusing on health, education and roads. For the last of these, the Angolan government decided to concentrate all funds on the central plain (Huambo and Bie). In Benguela PAR operations were subcontracted to an Italian NGO, Alisei, which sponsored a detailed planning process for prioritizing infrastructure projects in each municipality. This process began with a series of meetings involving a wide range of entities representing the municipal administration, health, education, and citizens' groups. The resulted in a detailed report which includes a census and description of the needs of the municipality, prioritizing needed infrastructure especially in health and education.

As of late 2003, PAR, through Alisei, had settled on a plan to build six schools and two health centers in Bocoio. The health centers were to be built in remote areas where the needs were greatest. However, problems in the program's administration have led to a reduction in the available budget, and, as of the end of 2004, there remain only plans for two schools. The bidding for these construction sub-contracts has not yet begun, and

Alisei has mentioned that funding for even these two schools is doubtful. Original budgets estimated the construction cost of a health post at about $100,000.

Fundo de Apoio Social (FAS)
This autonomous governmental organization has funded infrastructure projects in six provinces. However, FAS has a policy of prioritizing investments where they are most likely to attract other private investment in the future, namely, along major highways. They do not prioritize least-served areas. The FAS planning process in Bocoio began with a planning seminar in March 2003, directly with the municipal administration, with little involvement by the DMS and completely bypassing the Provincial Health Directorate. FAS used planning data from the PAR planning process.

FAS has approved eleven projects in Bocoio, one health post, a residence for nurses (in Monte Belo) and nine schools. Currently six schools and the health post are under construction. The FAS health post is located in Monte Belo, adjacent to the health post recently rehabilitated by CCF. The site selection occurred in spite of repeated attempts by the DMS and municipal administration to locate the health center in a more needy place, such as Chila or Cubal do Lumbo. FAS insisted on building near the highway. There are possibly plans for a second FAS health center, somewhere near the existing Cateque health post also along the highway. FAS health centers are large (though not much larger than the existing Monte Belo health post) and built to a standard plan. Each costs around $100,000 to build.

Public Investment Plan (PIP)
This is the Angolan government's response to the reconstruction of infrastructure. The plan is published in the book "Programas Provinciais de Melhoramento e Aumento da Oferta de Serviços Básicos às Populações Biênio 2003-2004." January 2003. Governo de Unidade e Reconciliação Nacional. In this reference, the Province of Benguela lays out its plans for reconstruction in all sectors, including health, education, water, energy, transportation, agriculture, telecommunications, and television.

PIP funds have thus far been used to finance the installation of a larger generator in Bocoio town, and PIP is currently rehabilitating the water system and building a house for nursing staff in Bocoio. In addition, they installed a generator in Monte Belo. No other projects have been forthcoming, and, according to the District Administrator, he has been told not to expect anything until late 2005.

The Benguela PIP outlines plans to construct health posts in every comuna and rehabilitate the municipal hospitals by the end of 2004. The budget for each health post is $52,000, and $19,400 is allocated for each nursing residence. It also allows $225,000 for rehabilitation of each of the rural municipal hospitals. According to the DMS in Bocoio, the current priorities are health posts in Chila and Cubal do Lumbo, and an expanded pediatric ward for the hospital.

b. Constraints

- The lack of water in the hospital presented a serious problem for hygiene. This problem should be overcome shortly with the installation of the new Bocoio water system.
- Complementary infrastructure projects that were promised by other agencies have not materialized. Vertical uncoordinated planning by various agencies, including FAS and PAR have led to large sums being wasted or poorly spent, as in the case of a second health center being built by FAS in Monte Belo.

c. Lessons learned

- The design of the project which integrates restoration of services simultaneously with inexpensive, focused rehabilitation as necessary is an effective strategy in a post-emergency phase. The infrastructure improvements in the CCF project were planned and implemented step by step together with the local DMS and local administration. They were done at a much lower cost than comparable large-scale infrastructure projects like FAS, and have been completed more rapidly and have had an immediate positive impact on restoration of essential services. This is very important, as rapid restoration of essential services is vital if lives are to be saved in the immediate post-emergency period when the population's health and nutritional status is already quite precarious.
- Integration between support for training, supervision, supplies and construction can maximize resources. This can best be done by having a multi-purpose team constantly in the area and through close coordination with the local authorities, in this case, the DMS.

d. Conclusions and recommendations

The small-scale and very focused infrastructure investments made through CCF's emergency program have produced immediate tangible results in getting the health system up and running again at a very modest cost. This is in contrast to the other much larger centralized vertical projects that have been promising results for nearly two years now, but have not yet produced any results. Even the one health center being built by FAS will have little impact, as it sits next to an existing and functioning new health facility built with CCF support over a year ago. This is an unfortunate waste of resources, as the acute need is still to expand access to basic services out to rural areas, and not to increase the complexity of services available in areas where they already exist. Many FAS health facilities lie underutilized in other parts of Angola due to lack of properly trained nursing personnel, supervision, and other support necessary for the health system to function effectively. The coordinated, integrated and local approach to developing the health sector taken by CCF seems to be a more effective model, developing human, management and physical resources simultaneously and according to local priorities and capacities.

Only the PIP has shown any level of meaningful coordination at the local level, but execution has been seriously delayed. However, whereas the investments including electricity and water are most welcome, they are not enough.

If resources are available in the future, building health posts in Chila and Cubal do Lumbo should receive highest priority, followed by health posts in secondary inaccessible sites such as Saraiva and Cavimbi.

4. Quality of services strengthened

a. Results

The objectives and indicators for this intermediate result were described in the original proposal as follows. A brief description of the results obtained follows in each table.

Quality of services at health facilities strengthened

- Protocols for standard case management (SCM) of diarrhea, malaria, respiratory infection, prenatal care and delivery introduced and being followed in hospital and in comuna Passe.

Indicator	Baseline	Target	Results
Process/output indicators			
# and % of health workers trained in standard case management	Not trained	100% of all workers trained	About 20 nurses (at least 2 from each health facility) trained
Effect indicators			
% of consults observed where SCM protocols are satisfactorily used	No standardized supervision Fewer than 10% of cases using SCM (according to baseline survey)	80% of consults supervised applied SCM correctly	Greatly improved over baseline. Greatest improvement in prenatal care, nutrition and malaria. Still needs improvement in diarrhea and respiratory infection.

- Logistics and monitoring systems in place and in regular use for essential medications, vaccines, MCH programs and curative health care

Indicator	Baseline	Target	Results
Effect indicators			
% of forms correctly completed	Systems partially in place	80% of forms correctly completed	Essential medicines, prenatal care and immunizations improved greatly. General improvements in health information system.

- Regular systematic supervision of quality of care and management systems in hospital and health post in Passe in place and functioning

Indicator	Baseline	Target	Results
Process indicators			
Number of supervisory visits to Bocoio / Passe staff by Municipal Delegation and Project Staff	None that are systematic	By-monthly visits to selected sites.	At least monthly visits to Passe, Monte Belo and Cubal do Lumbo for nutrition and maternal health; but not all other programs every month.

- Regular supervision and monitoring by the Benguela Provincial Health Delegation in place and functioning

Indicator	Baseline	Target	Results
Effect			
Frequency of regular systematic supervision of quality of care and management systems by Provincial Authorities	None	>= 4 times per year	Essential medicines 2X, nutrition 2X, immunization 2X. Maternal health could not go. Other programs did not supervise.

i). Training

Improving the capacity of the DMS to provide services involves many different components as described above, including infrastructure, equipment, supplies, management, and the quantity and quality of human resources. All of these must be addressed simultaneously in order to improve the quality of services. The influx of new nursing staff has greatly relieved the acute shortage in the number of nurses, but poor quality remains a significant hurdle to improving health. Training constituted a major component of this project, both as formal classroom training and on-going in-service training.

The following table outlines the formal training that was sponsored by the project for nurses in Bocoio along with evidence of impact obtained.

Month and year	Subject	Days, place	Participants	Who taught	Content, material used	Evidence of impact
December 2003	Obstetrics and maternal care	5 days, Bocoio	20 nurses from hospital, Chila, Passe, Cubal do Lumbo, Cateque, Fasil, Monte Belo	CCF x 2	Prenatal care, delivery, obstetrical pathology, filling out card, partogram, newborn care. Used National MOH manual	Quality improved, registration improved, began using partogram in maternity ward (not health posts)
September 2004	Therapeutic feeding program	5 days, Bocoio	13 nurses frm hospital pediatrics unit	Provincial supervisor + CCF x 1	Criteria for hospitalization, treatment, complications. Used National Nutrition Program manual.	Quality improved: NOTE: supplemental feeding program still has weaknesses in some areas

Month and year	Subject	Days, place	Participants	Who taught	Content, material used	Evidence of impact
April 2004	Supplemental feeding program	5 days Bocoio	15 nurses from all health posts	Provincial nutrition supervisor + CCF x 1	Weighing and measuring technique, use of the percentile table, criteria for admission and discharge, registration	Now some health posts can do screening alone. . Chila, Cubal Lumbo, Fasil still have problems. Cateque half-way. Passe, Monte Belo good.
February 2004	Essential medications and management of common diseases	5 days Bocoio	22 nurses, most from health posts	Provincial essential medicine program supervisor and his assistant	Treatment of common diseases, use of medines, registration, stock control and management	Management of stocks improved. Reports improved. Doses and coherence between diagnoses and medicines prescribed improved.
March 2003	Immunization	4 days Bocoio	10 nurses from Cubal do Lumbo, Monte Belo, Cateque, Fasil, Passe	CRS x 1 CCF x 1	Indications and contraindications of immunization, technique, management and handling of vaccines, cold chain, registration and reporting. Maintenance of cold chain equipment	Reports improved markedly. All health posts able to immunize without supervision now.

All subjects planned in the original proposal were covered, but it is clear that only a small percentage of the over 100 municipal nurses were able to received training. At least two nurses from each health facility received training in each subject (except therapeutic nutrition, which was restricted to hospital nurses). In most cases, the two nurses selected for training were those with the greatest experience and seniority. In the cases of nutrition and essential medicines, the Bocoio provincial supervisors provided the training. In immunization, Catholic Relief Services coordinated the training through a grant from the CORE polio initiative. In spite of CCF's efforts, it proved impossible to arrange for the provincial maternal health supervisor to teach or supervise maternal health, and the CCF

team assumed this responsibility using MOH materials. The quality or teaching methodology used were not assessed during the evaluation.

The direct cost to the project for the formal training are estimated by the evaluation team as follows:

Food and snacks for trainees: $9 / person per day
Materials: $12.50 / trainee
Trainers: Provincial supervisor: $100 / training (2 trainings)
CCF: salary for teacher full time during the week of the training
Vehicle: Full-time support during the week of training (see next section for the way vehicle costs are calculated. Includes depreciation).

Note that this does not include the cost to the DPS for the trainer's salary, nor does it include indirect costs to the project (housing for staff, administration, logistics). The direct cost for each training session are then estimated as follows:

	Materials and Food	**Teachers**	**Vehicle (one week full-time for each training)**	**Total**
Maternal care	$1150	$400	$320	$1,870
Supplemental nutrition	$862	$850	$320	$2,032
Therapeutic nutrition	$748	$279	$320	$1,347
Immunization	$485	$750	$320	$1,555
Essential medicines	$1265	$300	$320	$1,885
Total	**$4510**	**$2579**	**$1600**	**$8,689**

It can be seen that the overall direct costs for formal training were modest in the context of the overall project, and that the majority of the cost was in food and materials (especially food for the trainees). The average cost per participant was $109 for each training session.

In addition to the formal training given above, the CCF team provided ongoing in-service training to municipal staff, especially in maternal health and nutritional surveillance and management of malnutrition. This in-service training was actually one of the greater investments during the life of the project, but was also probably the most important contributing factor to improvement in the quality of services. It should be noted that whereas only about 20% of nurses received formal classroom training, the majority benefited from in-service training and supervision.

Estimates by CCF staff of the percentage of time spent on in-service training and supervision are as follows:

- Obstetrics/maternal care: one nurse. 70% of time, split half and half between health posts and hospital. The former occupies a full-time car and driver.

- Nutrition: two nurses. 85% of time (100% of time during distribution weeks, 70% during non-distribution weeks) The former occupy a car and driver full-time.
- Pediatrics and general medicine: Doctor x 1. 30% of time. Vehicle for in-service training about 10% of time (most in-service is at hospital).

To estimate direct cost of the in-service training, the following assumptions are made:

- Vehicle: original cost $20,000. Depreciation over 3 years (per Angolan MOH policy). Fuel and maintenance $350/month (per CCF accounting). Driver: salary. Total direct cost and depreciation to operate a vehicle is estimated at $1280/month.
- Salary of each CCF supervisor at the percentage of time give above.

Estimated direct costs for in-service training

	Salary	Transportation	Monthly Total
Nutrition	$1220	$1280	$2500
Maternal care	$560	$640	$1200
Pediatrics / general medicine	$1000	$128	$1128
Total	**$2780**	**$2048**	**$4828**

Note: add an additional $1900 per month to the total for team housing and indirect costs

Note that specific in-service training in other MCH programs, including immunization and child health programs is included in the training for the other three, as it occurs simultaneously during the other in-service training and cannot easily be separated out. According to the team, these other programs represent about 20% of the total.

It should be noted that none of the above includes the indirect support costs to the project, including local housing for staff (about $700 per month including rent, utilities, maintenance, service staff and guards). It also does not include other project indirect costs, including logistics and administration (about 30% of total). These together would add a total of an additional $1900 per month. An interesting point to note is that in the case of in-service training, transportation costs are significant. Also of note is the fact that nutrition consumed the largest proportion of resources. This is due to the fact that the program began as an emergency project with a high priority on nutrition supplementation, and only later moved toward development activities.

During one year, the evaluation team estimates that about nine-months of in-service training occurred, as there is time for vacations, holidays, formal training, planning and evaluation and immunization campaigns. This provides an estimate of approximately $43,452 total direct cost plus another $17,000 in indirect costs for in-service training for nurses. This is nearly five times the amount of the direct cost of formal training that occurred.

ii). Standard case management

Use of Standard Case Management (SCM) and Improved Health Information System

The use of SCM is a cornerstone of primary health care. The use of standard protocols was assessed at baseline through observation of pediatric and prenatal consults using standard checklists at the hospital and several different health facilities. In general, although diagnosis and dispensing medicines were average, there were almost no instances of consults where the nurse consistently asked about danger signs, performed a complete physical examination, or properly educated the patient after the consult.

A formal final quality assessment was not performed, and supervision checklists are not consistently in use, so it was not possible to objectively assess the use of SCM protocols during consults. The CCF supervisors and the DMS agreed, however, that the situation has improved markedly, especially for prenatal care consults in the maternity ward, nutritional assessment, and the dispensing of medicines. All health facilities have oral rehydration equipment, and health workers claimed they are being used to rehydrate dehydrated children in the health post, but in health post visits during the evaluation none were directly observed to be doing so and equipment did not look as though it had been used recently.

It is clear that there is room for further improvement, especially in child health. Angola is in the initial stages of implementing Integrated Management of Childhood Illness. The first group of trainers has completed their training, and Benguela reportedly has trained trainers, although the province has not yet begun training or implementation, even in the capital. In the evaluator's experience, until this program is in place, consistent use of protocols in childhood illness will be difficult to achieve. Still, the concrete improvements cited in medicine dispensing are heartening. However, even this leaves much to be desired, as during a review at a health posts during the evaluation, one registration book listed a two-month-old baby with a diagnosis of "parasites" and given a full adult dose of mebendazol. At least it was properly registered.

The CCF team observed early in the project that filling out forms, including immunization, nutrition and prenatal care forms was haphazard and inaccurate. Also, information was not used in any way to make management decisions or to improve the health system. Forms were being sent from the health posts to the DMS, and there collated and sent to the province without analysis.

In addition to the formal and in-service training already described, the project endeavored to improve the quality and usefulness of information by establishing a municipal data-analysis committee. This committee consisted of the CCF coordinator (Dr. Gimi) plus the DMS, the head of each heath post plus the municipal supervisors of the essential medicines, immunization and epidemiologic surveillance progams. The first meeting was held in April 2004, and there have been a total of three held. Meetings were originally to be held monthly, but this has not proved possible due to scheduling conflicts. During the meetings, the group analyzed information from health posts, with particular attention to the consistency between the amount of medicines dispensed and the number of diagnoses made. They also focused on immunization data.

The DMS cited improvements in data collection and internal consistency, although supervision by the essential medicines program was also cited as a cause for this improvement. In addition, it was during one of these meetings that the abrupt fall in the number of hospital deliveries was noticed, coinciding with the institution of hospital fees. This led to a complaint from the Bocoio DMS to the province about the fees, in spite of the fact that other services did not experience a simultaneous decline. This is one firm example of increased use of data for decision-making. The number of deliveries has since recovered, and, later, the maternity fees were lifted.

Improvement of other aspects of local management of the health care system, including supplies and finances, proved to be more frustrating. Although on paper the municipal hospital is a budgetary cost-center in itself, in fact the DMS has almost no control over how funds are spent. Unneeded supplies and medicines are often purchased and sent without being ordered and then charged to the account, reportedly at inflated prices. In addition, the DMS does not have control over its human resources (except as to their distribution within the municipality). Although the PIP, PAR and FAS consulted with the local authorities, the primary contact is with the municipal administrator, who at times has other priorities. CCF could expect to have little chance to improve resource management under these circumstances.

iii). Supervision

Improving frequency and quality of supervision is another mechanism to improve the quality of services. CCF provides ongoing oversight in the nutrition center, and maternity ward and episodic supervision in the pediatric and general medicine wards. This supervision is not systematic, but rather, takes the form of in-service training.

Supervision by the DMS was essentially not occurring at the outset of the project. CCF donated two motorcycles for use by program supervisors, and these are being regularly used for supervision of the health posts. The current state of supervision by the DMS by program is as follows:

Supervision by program in the DMS

Program	Situation
Immunization	Immunization supervisor well-trained, uses standardized supervision instrument, regularly and systematically visits sites that have cold-chain. Supervises condition of vaccines, temperature, technique and reporting. Quality has reportedly improved markedly since the beginning of 2004. Sites such as Cubal do Lumbo and Cateque that do not have cold chain equipment do not yet receive regular supervision.
Essential medicines	Supervisor well-trained. Regularly visits health posts in Passe, Monte Belo, Cateque, Fasil, and Cubal do Lumbo. Visits two posts each month, each post about 3 times per year. Will soon begin visiting Balança. Uses standard supervision forms to monitor stock control, and prescriptions (and coherence between medicines and diagnoses). Uses the motorcycle donated by CCF.
Nutrition	Recently trained and is competent. Beginning to assume more

Program	Situation
	responsibility in health post supervision during supplemental feeding sessions. Spends most time overseeing the therapeutic center in Bocoio. Does not have standardized supervision forms.
Epidemiologic surveillance	This is supported primarily for the polio eradication initiative, but also monitors other diseases. Used to be effective and performed systematic health post visits and used systematic supervision forms. The person has changed, and the new supervisor is being trained. She cannot ride a motorcycle and will have to coordinate with supervisors from other programs.
Maternal health	Maternal health supervisor has received classroom and in-service by CCF and is relatively competent in maternal health. Still, has not received training in supervision and has not assumed this responsibility. She has a systematic supervision form but does not yet use it. She cannot ride a motorcycle and would require coordination for transportation.
Respiratory infection, diarrhea and growth monitoring	Each has a person named, but not trained in supervision and none have assumed the responsibility. The province currently has no standardized supervision form for child health.
Malaria	There previously was an inactive supervisor. Now there is no one.
Health education	There is a very active "agent" who regularly travels with the immunization supervisor. However, he gives talks in schools and other sites, especially on HIV/AIDS, and is active in community mobilization for campaigns. He has not been trained in supervision and is formally the dental nurse but he prefers doing health education and there are two dental nurses and no patients.
Tuberculosis and leprosy	There are supervisors named. They have no supervision instruments and have not been trained in supervision. They only provide services in the hospital. There is no TB or leprosy treatment in health posts.

Source: verbal report by DMS with comments from CCF team

The provincial level also has program supervisors. They have visited as described in the following table:

Benguela Province supervision of Bocoio Municipality

Program	Situation
Essential medicines	2 visits in 2004. The first to give the seminar. The second to accompany restocking. Only supervises the hospital—has not traveled to health posts. CCF provided transportation and per diem.
Nutrition	3 visits in 2004, all with CCF travel and per diem support. One visit for therapeutic nutrition seminar and certification of the therapeutic nutrition center. The other two for supervision in Bocoio.
Maternal health (TBA	2 visits in 2004 to get a list of TBAs (is trying to reestablish a TBA program). Not with CCF intervention.

Program	Situation
program)	
Maternal child health	CCF attempted to negotiate participation in the training seminar. It was not possible to negotiate due to differences over payment.
Tuberculosos and leprosy	Monthly visits without CCF intervention. Supervise only the hospital as there are no services in outlying sites.

Source: Verbal report by DMS with comments from CCF team.

It is clear that supervision is irregular and focuses more on forms than on quality of actual patient care. Nevertheless, there are systems in place, although supervisors need training in how to supervise and how to use supervision instruments. A small investment in training for municipal supervisors and assistance with coordination of transportation could have a sustained impact on the quality of services. Transportation to the health posts is a limiting factor, especially for female supervisors who cannot ride motorcycles.

b. Constraints

- New personnel came on board during the project period, so not all received the same amount of training. In addition, many staff, especially the new ones, had little or no training at all. In fact, according to the DMS, two of the new nurses (both decommissioned UNITA troops) are completely illiterate. This is a very low base from which to train. All the nurses are unaccustomed to sitting in a classroom or using reading materials, so formal training must be brief and very participatory.
- Some health facilities, including Cubal do Lumbo and Chila, have little or no equipment, so nurses cannot implement what they learn in classroom training, and it is impossible to offer all but the most basic services, hampering in-service training. Without being able to practice what they have learned, skills are rapidly lost.
- It is impossible to close health facilities to train everyone simultaneously.
- In-service training is not effective if the patient load is low or key staff absent. This problem was observed one day at Cubal do Lumbo, when the day that the CCF nurse was there coincided with the absence of the health post supervisor, the most experienced nurse. The other three nurses were little more than assistants. During the baseline survey, supervisors visiting some health posts to observe pediatric consults found that not a single sick child presented during an entire morning. This situation would make in-service training useless.
- If the patient load is too high, there is a tendency for the trainer/supervisor to provide services himself instead of supervising the health-post nurse in order to meet the demand quickly. Lack of interest on the part of the health post staff can also get in the way.
- The lack of financial independence at the level of the DMS made it difficult to strengthen management and planning capabilities at this level. The DMS in fact does not really control its budget for construction, equipment, supplies, medicines or salaries. Therefore, improving the planning and management of resources is not possible.

c. Lessons learned

- Timing of training is important. Trainees need to have the opportunity to practice what they learned immediately after theoretical teaching. Proper equipment and procedures as well as supervision need to be in place in order to take advantage of classroom training.
- In-service training most effective if coupled with formal training and vice-versa. In-service training can be quite costly, but is essential in order for ingrained behaviors to change over time.
- Highly experienced and confident CCF trainers were needed for effective in-service training and supervision. Less-experienced staff can perform classroom training. It was necessary to change some of the CCF trainers in early 2004 because those selected earlier lacked the experience and skills to be effective in-service trainers.

i). Recommendations

- As was described above for supervision, costs for ongoing in-service training could be significantly lowered by periodically rotating health post nursing staff into the municipal hospital for in-service training and supervision. This reduces the burden on transportation and guarantees patient volume sufficient to make in-service training worthwhile. It also provides a more convenient venue for "supervising the supervisors".
- If possible, regular follow-up classroom training for key nursing staff that could not participate during the first round should be arranged. Costs could be reduced by having first-round nurses participate as trainers. This would also serve to reinforce their own knowledge as well as provide a means to evaluate their understanding.
- Support the early implementation of IMCI should it be introduced in Benguela province, as it will greatly improve the use of SCM protocols in child illness.

5. Caretakers' knowledge of basic child care improved

a. Objectives and activities

Changing knowledge and behaviors of caretakers did not receive great emphasis in this project for several reasons. This project was an emergency and transition project, and, as such, it was premature to work intensively at the community level. In addition, the short timeframe of the project made large changes difficult to achieve in such a short time. Finally, the target population began as concentrated and small, and later shifted to very dispersed and large. New areas were gradually becoming accessible during the life of the project, so achieving measurable improvements in knowledge and practice in the general population was not feasible.

For these reasons, no baseline survey was performed. However, a final sample survey was performed to measure key indicators and lay the groundwork for future community-based activities.

The objectives were as follows:

- **caretakers' recognition of danger signs in a child requiring immediate care at a health facility increased**
- **percent of children with recent diarrhea, fever or difficult breathing who were taken for care at a health facility increased**
- **percent of children with a road-to-health card increased**

An objective relating to increasing the percentage of children sleeping under mosquito nets was discussed under maternal health above. In addition to the above objectives, CCF worked specifically to educate the population about HIV/AIDS, emphasizing its transmission and prevention, and to make condoms more available to selected groups. No indicators or targets for this effort were set, and the impact was not specifically measured.

In order to achieve these results, the project proposed the following activities:

- acquire incentives for activists (mosquito nets, caps, shirts, carrying bags, umbrellas, raincoats, oral rehydration kits, etc.)
- train activists to mobilize the community
- develop IEC materials for use in the community and in consults
- train nurses in interpersonal skills and communication of key messages
- activists and nurses educate patients during consults, home visits, educational talks using materials developed
- monthly supervision of activists and nurses includes supervision of communications (include communication in supervision form)
- develop and implement an instrument for measuring and monitoring the achievement of this objective (using LQAS) and train the team in its use.

The OFDA proposal did not specify the number of activists to be trained. The WHO proposal was funded for six months from May 1 – November 1, 2003 for a total of $9000. It specified that CCF would train 30 volunteer activists. Their goal was to educate and mobilize the population to increase prenatal care consults, immunization coverage and to promote the use of impregnated mosquito nets. Of the total grant approved, $7823 has been disbursed and spent to date. WHO also donated 250 mosquito nets, and CCF purchased another 2000 nets with other funds. In addition, CCF received another donation for bicycles for activists, and OFDA/BP-Amoco funds supported the cost of ongoing supervision of activists.

A total of 30 volunteer community activists were selected representing various areas in Bocoio. Selection criteria included being at least 18 years of age, live in their community and have the confidence of the community, and the ability to speak Umbundo. They also must have the recommendation of the soba, and literacy was considered an advantage, but not a requirement. No preference was given to men or women. About four of those chosen had prior training and experience with other organizations. There were at least

three from each comuna, and a larger number (over ten) from Bocoio. Training occurred in Bocoio during five days in October 2003. Many training methods were used, including theater, role-playing, practice and films. As part of their training, they were required to give demonstration educational talks under supervision. Topics covered included nutrition (and identification of malnutrition), pregnancy and prenatal care, danger signs, immunization, malaria (including recognizing seizures), mosquito nets, personal and community hygiene, latrines, and HIV/AIDS. They later received additional training in measuring mid-arm circumference and received the colored measuring tapes. Training materials used included a WHO guide for the community mobilizer and a comic book about treating and using mosquito nets.

WHO originally intended to coordinate the production of a "training packet" of materials for use in training activists and then for their use in the communities. The NGOs receiving grants were to develop the material together with the MOH. This process never occurred, and most of the funds not yet spent by CCF were designated for the purchase of these materials. The activists are not using any specific educational materials in the communities.

Activists received no salaries, but have been given regular non-monetary incentives at their monthly meetings. Incentives have included bicycles, carrying bags, caps, t-shirts, soap, cooking oil, sugar, and a mosquito net. Each area is organized under an area supervisor (also an activist) and supervision occurs in a centralized meeting in Bocoio monthly. These meetings are attended by one or more of the CCF team members together with the DMS head of public health who acts as the official coordinator of the activist program. During these meetings the activists file narrative reports, discuss problems and receive continuing education.

The specific training for nurses in communications, patient education and human relations did not occur, as the technical level was so low that almost all training focused on basic skills and administration. No special educational materials were developed during this short project, but CCF acquired a variety of materials which were distributed.

b. Results

The indicators, targets and results as measured by the final sample survey are as follows:

Indicator	Baseline	Target	Results (population-weighted results, 95% confidence intervals)
% of caretakers of children under two who can name two danger signs requiring immediate care at a health facility	Unknown	70% can name 2 or more signs	76% 67% - 84%
% of children under 2 with fever or diarrhea in the past 2 weeks whose caretakers state they were treated at a health facility	Unknown	70% were taken to a health facility	Sought help anywhere: 83% (74% - 92%) Sought help at health facility: 17% (8% - 25%)
% of caretakers of children	Unknown (probably	60% of	26% show card

Indicator	Baseline	Target	Results (population-weighted results, 95% confidence intervals)
under 2 who can show a road-to-health and /or vaccination card for the child	very low, under 10%)	caretakers can show a card	(18% - 35%) Another 32% said they had one, but could not show it at the time of the interview.

Source: final sample survey of caretakers of children 12-23 months of age

According to their narrative reports, the activists' primary activities included mobilization and encouraging communities to use health services appropriately and identification of pregnant women and malnourished children. In addition, they mobilized communities for immunization campaigns and mobile teams. They also sold about 200 mosquito nets obtained from the MOH and CCF and visited the homes of pregnant women to encourage them to use their mosquito nets properly. Finally, they carried out educational talks in their respective communities.

Activists proved invaluable during the final sample survey, riding along with the survey teams to guide the drivers to the villages. It was clear that those observed were enthusiastic and were well-known to villagers over large areas in various villages visited. Numerous examples of the impact of the activists were cited during the evaluation. The team told stories of villagers and their children led by activists who traveled out of the mountains on small paths to reach a spot where they camped out in order to meet a mobile health team or immunization team. Their help was reportedly instrumental in the mass immunization, vitamin A and deworming campaign in November 2003 carried out in Chila, Canjoia, Chimba, Cubal do Lumbo, Saraiva and Goa. The team and various health post nurses said that, through the efforts of the activists, prenatal care and immunizations increased. One CCF team member working in the maternity unit at the hospital said that women clients said that "we came because there are men going around to our houses telling us to go for prenatal care".

The results of the survey showed that a surprisingly high percentage of caretakers could spontaneously name two or more danger signs needing attention at a health facility. The lower percentage seeking care at a health facility and children with health/immunization cards reflects more the continuing low (but increasing) coverage of facility-based health care. The relatively high coverage of prenatal care is encouraging, however. In addition, the relatively high percentage of children sleeping under mosquito nets (19% according to the survey) was also encouraging. The stock of mosquito nets has run out, and the activists note that there is continuing demand to buy mosquito nets in their communities.

In addition to the activities laid out in the proposal, activists gave educational talks about HIV/AIDS and distributed condoms. CCF received condom donations from various sources, including UNFPA, WHO and the MOH. Each activist was given 300 condoms each month to distribute, and, according to their reports and interviews, they had no difficulty distributing them. Activists distributed a total of 40,000 condoms in the last year. The CCF team also distributed condoms during educational talks, especially to military and police.

i). Constraints

- The WHO education materials did not materialize as expected, so activists were without the demonstration materials that would have made them more effective at educating their communities.
- Whereas 30 activists may be adequate to provide meaningful community-wide education in a dense area like Bocoio or in resettlement camps, there are not enough of them for the highly dispersed rural area of today.
- The poor ability of nurses to perform education led to many missed opportunities for education and behavior change. Each year nurses perform about 48,000 curative consults, over 50,000 children immunized in campaigns and another 20,000 children receive routine immunizations. Each of these contacts with the health care system is an opportunity for a nurse, with a relatively high level of credibility, to educate patients and encourage them to adopt desired behaviors.
- Future sustainability of the activists will be more difficult without outside support. One person pointed out "the MOH doesn't have the biscuits to give them during meetings". CCF attempted to strengthen the activists' ties with the DMS by involving the DMS head of public health from the beginning of the project and always calling him the activist coordinator. He was present in every training session and in every monthly meeting. Nevertheless, the activists ended up identifying strongly with CCF rather than the DMS, which will also hamper sustainability.

c. Lessons learned

- The ongoing cost of supervision and support for activists was not included in the WHO budget, but proved instrumental in keeping the activists active and enthusiastic. The non-monetary incentives proved to be effective, but drop-out was still a minor problem. Only Bocoio itself had no drop-outs, though the total of dropouts did not pass five.
- Linking activists to a larger infrastructure-strengthening and capacity-building health project was crucial to continued impact. Reportedly according to WHO and the provincial head of public health, a number of other organizations had received similar grants to train activists but those that did not have health programming experienced high drop-out rates. One organization, Odelac, visited CCF to learn CCF's "secret" of how to continue to encourage volunteer activists.
- Volunteer activists would need to be trained and supervised in very large numbers if they are to be the primary strategy for community education and behavior change. In a widely dispersed rural population such as Bocoio the number of activists needed is approximately one per 10-30 families. This would require at least 500 activists to cover the population at the ratio of 1:30. Clearly the training and management burden for this many activists would prohibitive, and other strategies for behavior change and education may be more effective.
- Mosquito nets are a popular item in the communities. WHO created the false expectation of having a huge supply. Running out of mosquito nets has harmed the credibility of the MOH and CCF.

- The evaluation team found that in general, older activists are more effective than younger ones, as they garner more respect in their communities.
- Giving the activists concrete tasks to perform and materials to do so, such as immunizing, measuring children and deworming not only keep them enthusiastic, but enhance their status in the community.

d. Recommendations

- If communication for behavior change is to be widely effective in a dispersed rural setting such as Bocoio, but without access to local mass media such as radio, a combination of media must be utilized, with emphasis on existing networks and organizations. This would include churches, cooperatives, schools, markets, and others.
- If possible, improving the quality of communication by staff from the health care system would lead to over 100,000 one-on-one education sessions every year at almost *no extra cost*. Nurses and vaccinators should receive training in patient education and receive concrete materials to use in doing that education. Taking advantage of the relatively high coverage for prenatal care could be especially effective, as pregnant women are willing to learn and are a high-priority target audience.
- In the current setting, activists are most effective at communication of coordination messages, case-finding, encouragement to seek appropriate care, and community mobilization. Their effectiveness in mass education and behavior change is probably less in such a dispersed setting where they cannot reasonably be expected to repeatedly reach the entire population. Training must include plans for replacement for abandonment, and creative incentives appear to be effective.
- The evaluation team recommended training about 15 activists per comuna in the future. If more activists are trained, some way should be sought to minimize their identification with the NGO and increase their identification with their community, municipality, comuna or the DMS. This will help maintain sustainability. The DMS will attempt to continue to support the activists through the comuna administrators. It remains to be seen how effective this will be.

Attachment A: Team members and their titles

-Dr. José Gimi N'hunga, CCF, Program Coordenator
-Teresa Joaquina, CCF, nurse, maternal child care.
-Albuquerque Abel Chivinda, CCF, logistician.
-Maria Odeth Bento, CCF, nurse nutritionist
-Adolfo &&&, CCF, nurse trainer, nutritionist.
-Félix &&& Municipal Health Officer.
-Donald T.Whitson, MD, MPH; evaluator

Attachment B: Assessment methodology

The evaluation was carried out over a period of two weeks between October 19-29, 2004. After a review of relevant documents and reports, the CCF evaluation team undertook a rapid sample survey to measure coverage of key indicators and caretakers' knowledge. The survey was done using simple random sampling using LQAS sampling methodology which allows the calculation of overall coverage and allows comparisons among sub-districts as well. After initial training of the team, the CCF team interviewed a sample of 95 caretakers of children 12-23 months of age between October 20-22 and analyzed the data October 23-25.

The team then returned to Bocoio and, using a discussion guide, divided into two groups of three to gather data and analyze various aspects of the project presented in this report. Whenever possible, data were gathered from original monthly DMS reports rather than from summary reports. Each group then presented its findings to the entire group for discussion, conclusions and recommendations. Participation from the Municipal Health Officer throughout the entire process was crucial as it brought an outside viewpoint to the discussions. The discussions were moderated by the evaluator. As a participatory methodology was used, the conclusions and recommendations presented in this report represent those of the team rather than the evaluator.

Attachment C: LQAS Sample Survey Report

OFDA Grant No: **DFG-G-00-03-00079-00**

Program Title: Emergency health and nutrition program in Bocoio, Benguela, Angola
Country / Region: Municipality of Bocoio, Province of Benguela, Angola
Disaster / Hazard: Poor food security and lack of basic health services
Project dates: September 11, 2003-September 10, 2004

REPORT: **Annex to final evaluation; sample survey of coverage, attitudes and practices. October 2004**

Executive summary

CCF Angola launched an Emergency Heath and Nutrition Project in June 2002 in an effort to address the health and nutrition emergency and acute lack of health services that immediately followed the cessation of hostilities and the return of the population to their homes. Through this project CCF aimed to provide immediate emergency nutrition services while helping the Municipal Delegation of Health in Bocoio re-establish primary health care services with a particular emphasis on maternal and child care.

In October 2004 CCF sponsored an impact evaluation of this project to assess its progress and to lay the groundwork for future activities. To that end, the evaluation team conducted a rapid survey to measure coverage of key indicators including child immunization, vitamin A and deworming and use of treated mosquito nets. In addition, the survey sought to measure caretakers' knowledge about danger signs and care-seeking behavior.

The survey was conducted using a simple random sampling method called Lot Quality Assurance Sampling. This method, using a total sample of about 95 interviews, allows calculation of overall coverage for interventions with a confidence interval of about ten percentage points. It also allows comparisons of coverage between sub-regions as well as monitoring by sub-region over time. Data was collected by the CCF team in interviews between October 20-22 2004 from 95 homes in villages selected using a population-weighted random sampling technique. Caretakers of children 12-23 months of age were the targets for the interviews. The data were tabulated manually over two days to yield the results in this report.

The key findings include the following:
Immunzation/vitamin A/deworming

Indicator	Result	95% confidence interval
Polio 1	79%	71%-87%
Polio 3	16%	8%-22%
DTP 1	40%	30%-50%
DTP 3	0%	n/a
Measles	43%	33%-53%
Every immunized	83%	76%-90%

Vitamin A (last 6 months)	57%	47%-68%
Deworming (last 12 months)	30%	21%-39%
Immunization card	26%	18%-35%
Can name 2 danger signs in child illness	76%	67%-84%
Knows that mosquito transmits malaria	6%	1%-11%
Has a mosquito net	24%	15%-33%
Child slept under it last night	19%	11%-28%

The results show that campaign-based interventions have reasonable coverage, but facility-based ones have poor coverage and that children have too few opportunities for immunization. Mosquito-net ownership and use are surprisingly high, and that knowledge of danger signs in childhood illness is good. Use of a health facility when ill, however, was very low, indicating the poor state of the health facility network.

LQAS proved to be an agile methodology for rapidly measuring coverage. It will be able to be used in the future for monitoring and evaluation of other CCF projects.

Background

The cessation of hostilities in early 2002 and the subsequent rapid resettlement of demobilized troops and displaced created an emergency of its own. Large numbers of people, many already undernourished and in poor health began returning to their homes in the municipalities. In Bocoio as in most other areas, the health infrastructure was largely destroyed, human resources were scarce and of poor quality, and in areas outside the municipal capital there were no services whatsoever.

In response to this emergency, CCF launched the Emergency Health and Nutrition Program in Bocoio with the aim of reducing the morbidity and mortality of women of childbearing age and children under five by supporting the establishment of essential curative and preventive health services in the municipality. The project aimed to rehabilitate essential infrastructure and provide basic equipment and supplies in the hospital and in a selected number of health posts, improve the capacity of health workers to provide services, establish nutritional screening and dry ration supplementary feeding programs, improve the capacity of the municipal health team to manage the health system, and raise community awareness on the prevention of illness and the appropriate use of the newly set up health services.

In the period from January 2003 to October 2004, CCF rehabilitated four health posts, in Passe, Monte Belo, Fasil and in Cateque. In addition, CCF supported minor refurbishing of a maternity unit, a pediatric ward and a therapeutic nutrition center in Bocoio and provided equipment, training and supervision for staff to operate these facilities.

At the same time, CCF trained 30 volunteer health activists with the support of a grant from WHO. These volunteers provided health education with the aim of prevention of illness in the target population, recognition of danger signs of illness and encouraging

appropriate health-seeking behavior. In addition, they mobilized communities for immunization campaigns and other health-related activities.

Objectives of project and of survey

The objectives as stated in the project are as follows:

1. Access, use and coverage of essential MCH and basic curative services by target population increased
   - **a. Coverage for immunizations, vitamin A, deworming increased.**
   - b. Consults for diarrhea, malaria and respiratory infection in children increased.
   - c. Ante-natal care consults increased.
   - d. Number of institutional deliveries and deliveries by trained personnel increased.
   - e. Number of pediatric and adult consults for other pathologies increased.
   - f. Health teams providing support to satellite health posts, supplementing basic fixed services to vulnerable groups in newly accessible communes.
   - g. Essential medicine support throughout the project.
2. Nutritional status of children under five improved: this includes establishment of successful dry ration supplemental and therapeutic feeding programs in Bocoio
3. Quality of services at health facilities strengthened: including improved monitoring, supervision, management and quality of care
4. Caretakers knowledge of basic child care improved
   - **a. Caretakers' recognition of danger signs in a child requiring immediate care at a health facility increased.**
   - **b. Percent of children with recent diarrhea, fever or difficult breathing who were taken for care at a health facility increased**
   - **c. Percent of children with a road-to-health card increased**
   - d. **Number of pregnant mothers using impregnated mosquito nets increased**

Many of the objectives above are best assessed through service statistics, focus groups, direct observation or reports. Those in **bold face**, however, are best assessed through survey-based methods. The aim of the present survey is to assess the success of the project in achieving these objectives, in preparation for a broader final evaluation of the project.

In February 2004 the CCF team participated in training in carrying out sample surveys using the Lot Quality Assurance Sampling (LQAS) method. At that time, the team analyzed data that had been collected using the same form as in the current survey, though the total sample contained only 58 forms, and the sampling was more of a convenience sample that a random one. Nevertheless, questionnaires were completed representing mothers of children 12-23 months of age from all parts of the municipality, which permitted a basic analysis of the situation at that time. Whenever possible, the results of that survey will be compared with those of the current survey, which was collected using a more rigorous sampling methodology and included a random sample from each of the municipality's five comunas.

Methodology

Survey form

The survey form was designed based on the objectives and indicators listed in bold above. Whenever possible, questions were modeled after those used in other well-tested surveys, especially the USAID Child Survival KPC surveys. The age group (12-23 months) was selected as the target group as it conforms to the target age group for standard indicators assessing immunization coverage, and guarantees that all children were alive during some part of the project. Children are young enough that caretakers can usually provide relatively accurate information as to the child's age, immunization status and other aspects of child health.

Sampling and data collection

The team interviewed a random sample of 95 mothers or primary caretakers of children between 12 and 23 months of age drawn from each of the five comunas in the municipality, Chila, Cubal do Lumbo, Bocoio, Monte Belo and Passe. The sample was selected using standard Lot Quality Assurance Sampling method as described in the manual: Valadez, Joseph J, *et al; "Using LQAS for Assessing Field Programs in Community Health in Developing Countries"*, NGO Networks for Health, December 2001, available at www.ngonetworks.org.

Data was collected between October 20-22, 2004 (with the exception of a small number collected during August 2004—see below for an explanation). A simple random sample of 19 communities was selected in each of the five comunas in the municipality using standard population-weighted random selection as described in the above manual. Within each community, a household was selected at random and used as a starting point. If there was no child in the target age group in the household, the interviewer was instructed to continue the house with the nearest front door and try there. The interviewer then passed successively from front door to front door until he completed an interview with a caretaker of a child 12-23 months of age. In this way, a total of 19 interviews were completed for each comuna, giving a total of 95 interviews randomly selected in the municipality.

The team then proceeded to manually tabulate the results using LQAS tabulation tables as described in the LQAS manual. The results are presented below. When possible, comparisons are made with the smaller LQAS survey performed in 2003 and with the baseline situation as estimated by the team.

Deviations from the ideal sampling frame and likely effect on results

There were some deviations from the "textbook" sampling technique that will be noted here for the sake of completeness. The team had collected a population-weighted random sample of 19 interviews from among the entire municipality in August, though not dividing the municipalities into comunas. This sample was considered technically valid, and the team then proceeded to "complete" the random sample to complete 19 interviews in each comuna using the same technique applied to each comuna. In this way, a complete sample of 19 was completed using population-weighted random sampling

technique for each comuna. This small deviation would not be expected to introduce any bias.

Some of the selected villages were not accessible by car, motorcycle, or on foot within a reasonable distance (considered about 40 minutes each way). Due to time constraints (the four-person team only had three days to complete data collection), it was decided that the team would substitute the nearest accessible village for that which was inaccessible. This was considered reasonable, as these inaccessible populations were generally small, and were unlikely to be part of the true "catchment area" of the project. It was necessary to substitute no more than about 10% of the total sample. This bias might be expected to introduce a small "positive" bias to the results of the survey.

Finally, the survey was conducted at the end of project, which coincidentally fell at the beginning of the planting season, when entire families typically spend long days in their distant fields away from their villages. As it was not logistically possible to conduct all interviews before 6:00am or after 6:00pm when families were at home, many villages had few children in the narrow target age group from which to randomly choose an interview. It is uncertain what kind of bias this "lack of choice" might introduce.

Data were tabulated manually in a two-stage process as described in the LQAS manual. During the first stage, survey forms were tabulated for each of the five comunas, and in the second stage, coverage was calculated for each question by combining comunas. Then, the LQAS decision rules were determioned using the LQAS table, and each respective comuna was evaluated for each question to determine whether it was below the cut-off for the median value and project goal. Finally, the results were typed into a spreadsheet for calculation of confidence intervals and to correct the values by weighting for population.

Results and discussion

The results of the survey are summarized in the following table:

Indicator	Project target	Population weighted mean (Bold=below target)	95% confidence interval	Bocoio	Chila	Cubal do Lumbo	Monte Belo	Passe
				?=below target ? = below mean * = at or above target				
Vitamin A: % children receiving Vitamin A in the last 6 months	90%	**57%**	47% - 68%	?	?	?	?	?
Deworming: % of children dewormed in the last year?	90%	**30%**	21% - 39%	?	??	?	??	?
Immunized ever: % of children ever immunized	90%	83%	76% - 90%	*	??	*	*	*
BCG by report: % of children 12-23m whose caretaker says received BCG vaccine	na (75%*)	**35%**	26% - 44%	?	?	?	?	?
Polio 1 coverage by report: % of children 12-23m whose caretaker says received any dose of polio	90%	**79%**	71% - 87%	*	??	*	?	*
Polio 3 coverage by report: % of children 12-23m whose caretaker says received 3 or more doses of polio	60%	**16%**	8% - 23%	?	?	?	?	?
DTP 1 coverage by report: % of children 12-23m whose caretaker says received at least 1 dose DTP	90%	**40%**	30% - 50%	?	?	?	?	?
DTP 3 coverage by report:% of children 12-23m whose caretaker says received 3 or more doses of DTP	60%	**0%**	0% - 0%	?	?	?	?	?

Indicator	Project target	Population weighted mean (Bold=below target)	95% confidence interval	Bocoio	Chila	Cubal do Lumbo	Monte Belo	Passe
				?=below target ? = below mean * = at or above target				
Measles coverage by report % of children 12-23m whose caretaker says received measles vaccine	75%	**43%**	33% - 53%	?	?	?	?	?
Vaccine card coverage: % of children 12-23m whose caretaker can show child's immunization card	60%	**26%**	18% - 35%	??	?	?	*	??
Sought help when ill: % of children ill in past 2 week with cough, fever or diarrhea whose caretaker sought help	None set	83%	74% - 92%					
Sought help at a health facility when ill: % of children ill in past 2 week with cough, fever or diarrhea whose caretaker sought help at a hospital or health post	70%	17%	8% - 25%	?	?	?	??	?
Knowledge of danger signs in illness: % of caretakers of children 12-23m that can correctly name 2 or more danger signs in childhood illness.	70%	76%	67% - 84%	? *	*	*	*	*
Knowledge of mosquito as carrier of malaria: % of caretakers of children 12-23m that know that mosquitos transmit malaria.	None set	6%	1% - 11%					

Indicator	Project target	Population weighted mean (Bold=below target)	95% confidence interval	Bocoio	Chila	Cubal do Lumbo	Monte Belo	Passe
				?=below target ? = below mean * = at or above target				
Possession of a **mosquito net**: % of caretakers of children 12-23m that say they have a mosquito net	None set	24%	15% - 33%					
Possession of a **mosquito net treated** with insecticide in the last 12 months: % of caretakers of children 12-23m who say they have a mosquito net treated in the last 12 months	None set	8%	3% - 13%					
Children sleeping under mosquito nets: % of caretakers of children 12-23m who say the child slept under the mosquito net the night before.	None set	19%	11% - 28%					

In some ways the results of the survey were disappointing as most indicators did not reach their desired targets. On further discussion, however, the team felt that the targets were too ambitious for a project of such a short duration (only two years if one counts both phases), especially given the very poor state of the municipal health network at the outset of the project and the need to extend services quickly out to remote rural villages.

Comments by indicator.

Vitamin A

Vitamin A is almost exclusively distributed twice each year during polio immunization campaigns, with only a small number of doses administered during nutrition screening and supplementary food distribution sessions. Health workers do not routinely provide vitamin A during consults, though this would be recommended. Coverage of 57% was considered good by the team, and there were no specific deficits in individual comunas.

Deworming

Coverage of 30% was considerably below the target of 90%. All five comunas were below target, and two, Chila and Monte Belo, were below the mean for the municipality. Deworming is sometimes carried out during campaigns, but the work has been less intensive than vitamin A.

Immunizaiton

The percentage of children ever vaccinated reached the 90% target, and that for polio 1 reached it in three of the comunas, Bocoio, Cubal do Lumbo and Passe. Once again, Chila was below the mean for the municipality. The mean for polio 1 for the municipality very nearly reached the target (79% ± 8%). Polio 3, however, was disappointing at only 16%, which probably reflects the rapid population movements and new emergence of accessible populations that have not had access to services long enough for children to have accumulated three doses of polio vaccine, irrespective of polio campaigns.

Measles vaccine is also applied during campaigns, though less frequently than polio. Mean coverage of 43% was well below the target, and again, reflects newly-accessible populations and those who have only recently returned.

BCG and DTP are applied only at health facilities, and therefore, reflect access to facilities rather than access via campaigns. BCG and DTP 1 coverage were similar, at 35% and 40% respectively. This is as expected. The extremely low DTP 3 coverage (0%) reflects the need that the child must have come to a health facility for immunization at least three times. Only one health facility outside the hospital (Monte Belo) has regular cold chain equipment and can vaccinate daily. Cateque and Fasil immunize most days, when someone carries vaccine to the health post, and Passe, Cubal do Lumbo and Chila immunize only rarely when someone from CCF visits the area with vaccine.

Immunization cards are not prevalent, at only 26%. However, another 32% claimed to have them but that they were not available at the time of the interview (many caretakers were interviewed in the fields as they worked or as they were going to or from the fields). Interestingly, Monte Belo was at or above the goal of 60%, and Bocoio and Passe were

below the mean. The team explained this as probably being due to the fact that in the more remote areas, children passed through resettlement camps before going home, where they were immunized and given cards. Most families in and around Bocoio were never in camps, and therefore, are immunized only during campaigns or when they go to the hospital. Cards are often not distributed during campaigns. Possession of a card but unable to show it was by far highest in Bocoio and Passe and significantly lower for Monte Belo. This probably reflects more the conditions of the interview than other factors. If one adds up all those who either can show a card, or say they have one but cannot show it, the total coverage is 58%, with no differences between different comunas.

Health seeking behavior
Whereas a high percentage of caretakers sought help when their child was ill (83%), only 17% went to a health facility. Monte Belo (0/14), Chila (2/14) and Cubal do Lumbo (2/14) and Passe (1/9) were all very low, though only Monte Belo had a sample size large enough to be statistically significant. This reflects the continuing very poor access to health services in the outlying comunas. Even where health posts exist, as in Monte Belo, many villages are more than an hour walk from the facility. Most families sought help from friends, family members or commercial outlets.

Knowledge of danger signs
A surprisingly high percentage of caretakers could properly name two or more danger signs indicating the need to seek care (76%). This level surpassed the target of 70%. Bocoio was lower than the other comunas, though it too met or surpassed the target. The lower knowledge in Bocoio may again reflect health education that those in other comunas received in resettlement camps before returning home.

Malaria
Curiously, very few caretakers associate mosquitoes with malaria (6%). This low level of understanding is similar to that found in other areas of Angola in other similar studies. An impressive 24% of caretakers say they have a mosquito net. This is even more impressive when one considers that CCF and the hospital only began distributing free treated nets during prenatal visits less than one year ago, so those mothers who received these nets would not have been interviewed as the target group was 12-23 months of age.

The low percentage that state they have a *treated* net (8%) probably reflects lack of knowledge that the nets are treated. It is also heartening to see that 19% of children were said to have slept under the net the night before, showing that almost all families that have nets use them to protect their children. There were no significant differences between comunas on questions regarding malaria.

Conclusions

Conclusions about methodology

LQAS sampling and analysis proved agile and effcient at measuring coverage and prioritizing specific geograpic areas for increased attention. Data collection took only three days, and manual tabulation and analysis less than a day.

It is interesting to compare the LQAS simple random sampling with 30-cluster sampling, another common sampling frame for rapid surveys.

	LQAS	**30-cluster sampling**
Total sample size	19 forms per supervision area Commonly 95 forms	7 forms X 30 clusters = 210. Commonly 300 forms are collected (30 X 10)
Precision (confidence intervals)	About ± 10%	About ± 10%
Logistics of data collection	Requires one vehicle or motorcycle per interviewer; commonly uses only 4 interviewers over 3 days	Requires one vehicle per team of 3 interviewers/supervisors. Commonly requires 20-30 people over 3 days to collect data
Tabulation	Manual tabulation requires about 3-4 hours (4-6 people)	Manual tabulation requires about 1 day (20 people ideal)
Analysis	Permits comparison between geographic areas	No comparisons---the entire area must be treated as homogeneous
Analysis	Proper statistical analysis can be done manually or on a simple spreadsheet	Proper analysis requires more sophisicated statistical software and data entry, especially if "design effect" is to be taken into account.
Cost and versatility	Lends itself well to ongoing monitoring and/or evaluation, as it is cheaper and faster	Most appropriate for evaluation. Hard to adapt for use for monitoring.

As LQAS requires simple random sampling of villages, more villages must be visited as compared to 30-cluster sampling (95 for LQAS vs. 30 for cluster-sampling). This increases the time necessary for each interview. LQAS might best be incorporated into a monitoring scheme where villages are selected at the beginning of a quarter or semester, and then one or a few forms are collected periodically (e.g. weekly) during routine supervision visits to the field during the period. In this way, the burden on transportation is lessened. Then, once the full sample of 95 forms has been collected over months, they can be rapidly analyzed. This process could easily be repeated quarterly or semi-annually and incorporated into the project workplan.

Conclusions about results

The coverage for most indicators was somewhat lower than what the team hoped to achieve. This reflects the progressive increasing access to populations previously without access to services. Now that the hospital is functioning more fully with a full complement of personnel, services are gradually being extended to the comunas, though at a relatively slow pace. This is reflected by the generally poorer coverage in Chila and Monte Belo, which are relatively unaccessible. CCF has helped rehabilitate and equip facilities in Monte Belo, Passe, Cateque and Fasil. Cubal do Lumbo still has only a provisional adobe health post staffed by four relatively inexperienced nurses with little equipment. Chila is even worse off, with no physical facility at all. CCF has provided the municipality with some motorcycles and bicycles, though lack of transportation continues as an important barrier to expansion of services.

Some indicators were surprisingly high, including knowledge of danger signs and possession of mosquito nets, possibly reflecting the impact of activists trained by CCF. Coverage for vitamin A, deworming and immunization will rise in the coming year as services are expanded.

CCF and the municipality should work to minimize missed opportunities for immunizaiton, vitamin A and deworming, perhaps the most important interventions of the project. These may be coupled with nutrition services and others. Efforts must also be made to increase mobile teams visiting villages far from health facilities, such as Saraiva. Finally, CCF should attempt to continue to make mosquito nets available wherever possible, even if they must be sold to recover costs.

PARTICIPANTS

Data collection (all members of the OFDA Emergency Health and Nutrition Project)

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-Teresa Joaquina
-Albuquerque Abel Chivinda
-Maria Odeth Bento

Data tabulation

All of those above plus:
Elavoko Lyomana, Benguela
-Victorino Hoke

Special thanks to our drivers:
-Sr. Alberto Jorge
-Sr. Inácio Salvador

COMMUNITIES SELECTED

Bocoio	**Chila**	**Cubal do Lumbo**	**Monte Belo**	**Passe**
Population: 37,934	21,895	17,826	30,680	19,857
Alenço	Bandeira	Balança	Balambi	Alto Pundo
Avula I	Cabaia	Balança	Brita	Binji
Bocoio Velho 2	Cambuta	Cassoco	Calupuca	Cahanha
Calionjola	Capoco	Catengue	Caluyua	Cipupa
Canjongui	Casseque I	Cavimbi I	Catanga	Dondo
Cavissamba	Catapi	Cavimbi I	Chicala	Embandi
Chivimbi	Chicacala	Chiluama	Coconga	Epinha
Cindure	Chindumbo	Chiluama	Edumba	Inhanha
Condeve	Dumba	Chimdundula	Etembo	Londengo
Epembe	Hote	Chiveu	Ginga Culai	Lonjumba
Hapa	Liava	Dumbo	Kalohombo	Luanga
Ungungue	Lonhim	Embombo	Lupondue	Lucunga
Sibol	Maneca	Lohondio	Mujomba	Luvale
	Posto Velho	Lomolo I	Nangongo	Ongombo
Fasil	Tutuvanji	Ngule	Santo António	Passe Sede
Sibol		Caponde	Ussoque	Umata
Alto Henrique	Cabaia			
Calanda	Cavango	Caponde	Balambi	Bulo Yelela
Cateque	Kuyu	Chihiama	Caponte	Etamba
Chindure	Utudo	Lemaco	Coconga	Ngoa

*communities after the line break were those selected and collected during the first round in August. The ones above the break were selected and collected in October.

DATA COLLECTION AND TABULATION FORM

Municipio BOCOIO	Comuna:	Local / Aldeia: Questionario #:
Data:		
Nome entrevistador:		

No	Perguntas	Respostas	Va para
IDENTIFICACAO			
1.a.	Nome da mãe		
1.b	Idade da mãe		
2.a.	Nome da criança com 12 a 23 meses de idade		
2.b.	Data de nascimento da criança com menos de 2 anos	___/___/___	
2.c.	Idade da criança 12 a 23 meses de idade (em meses)		

No	Perguntas	Respostas	Va Para
IMUNIZAÇÃO			
3	(NOME) tomou uma dose vitamina A como esta nos úmtimos 6 meses? MOSTRAR CÁPSULA	a. Sim b. Não c. Não sabe	
4	(NOME) tomou uma dose de medicamento para matar vermes, como esta, no último ano? MOSTRAR CÁPSULA	a. Sim b. Não c. Não sabe	
5	(NOME) alguma vez recebeu gotas ou injecções de vacina, inclusive vacinas recebidas durente as campanhas de vacina?	a. Sim b. Não c. Não sabe	
6 7	Favor diga-me se (NOME) recebeu algumas das seguintes vacinas? A vacina no braço que deixa uma ferida ou uma marca?	 a. Sim b. Não c. Não sabe	
8 9	Vacina contra paralisia infantil, ou seja, gotas na boca? Quantas vezes recebeu das gotas contra paralisia infantil?	a. Sim b. Não----------> c. Não sabe----------> Número de vezes _____	 10 10
10	A vacina DTP, ou seja, uma injecção aplicada na perna?	a. Sim b. Não---------->	 12

11	Quantas vezes?	c. Não sabe----------> Número de vezes _____	12
12	Uma injecção para prevenir o sarampo. Ou seja, uma injecção nas costas?	a. Sim b. Não c. Não sabe	
13	Você tem um cartão onde as vacinas de (NOME) estão anotados? SE FOR "SIM": Posso vê-lo por favor?	a. Sim, visto b. Não disponível/não visto c. Nunca teve cartão d. Não sabe	
14a	Sinais de perigo O/A (nome da crianca) teve diarrea, tosse ou febre nas últimas 2 semanas?	a. Sim b. Não----------> c. Não sabe---------->	 16 16
14b	Quando (NOME) estava doente, você procurou ajuda ou tratamento para ele/ela?	a. Sim b. Não	
15	Onde procurou ajuda para (NOME) quando estava doente?	a. Hospital b. posto ou centro de saude/clinica privada c.enfermeiro do bairro/parteira tradicional d.farmacia na praca e.curandero (kimbanda, ervanario, santo,…) f. familia ou amigos g.outros_____	
16	Quais os sintomas de doença que fazem você saber que deve procurar ajuda ou tratamento para (NOME) em seguida no posto de saúde ou hospital? RESPOSTAS MULTIPLAS NAO LEIA AS RESPOSTAS ANOTAR TODAS AS RESPOSTAS ("Mais alguma coisa?")	a. Letargia, sonolência, muito fraco b. Não come / mama c. Não pode beber d. Diarréia muito forte e. Diarréia com sangue f. Diarréia mais de 2 semanas g. Vomita tudo o que come h. Respiração rápida ou difícil i. Febre muito alta j. Convulsões k. Outros: x. Não responde ou não sabe	
17	Como (nome da crianca) pode apanhar o paludismo? RESPOSTAS MULTIPLAS NAO LEIA AS RESPOSTAS ("Mais alguma coisa?")	a.nao sabe b.das moscas c. se comer comida mal preparada d.dos mosquitos e. outros_____ Especificar	

18	A sua família tem rede mosquitiero para prevenir a malária?	a. Sim b. Não---------->	fim
19	Sabe se a rede foi tratada com insecticida no último ano?	a. Tratada b. Não tratada c. Não sabe	
20	Quem dormiu em baixo da rede mosquiteiro ontem à noite? NAO LEIA AS RESPOSTAS ANOTAR TODAS AS RESPOSTAS ("Mais alguem?")	a. Pai b. Mãe c. Criança d. Outros e. Ninguem	
21	Peso (kg) Altura (cm) Perímetro braquial (cm)	_____ _____ _____	

Tabela de Tabulação dos Resultados para uma Área de Supervisão: Dados de Base e Monitoria Regular																							
Área de Supervisão: ; Supervisor:																							
Correcto=C; Incorrecto=E; Saltar=S; Ausente=X																							
#	**Indicador**	**Chave de resposta correcta**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**Total Correcta na Área de Supervisão**	**Total da Amostra = os correctos + os incorrectos**
1	Vitamina A: % de crianças recebendo vitamina A nos últimos 6 meses	a. "Sim", a pergunta 3																						
2	Desparasitação: % de crianças desparasitadas no último ano?	a. "Sim", a pergunta 4																						
3	Imunização alguma vez: % de crianças vacinadas alguma vez	a. "Sim", a pergunta 5																						
4	BCG por reportagem: % de crianças 12-23m cujos responsáveis dizem que recebeu a vacina BCG	a. "Sim" a pergunta 7																						
5	Cobertura de pólio 1 por reportagem: % de crianças 12-23m cujos responsáveis dizem que recebeu alguma dose de pólio	a. "Sim" a pergunta 8																						

6	Cobertura de pólio 3 por reportagem: % de crianças 12-23m cujos responsáveis respondem que recebeu 3 ou mais doses de pólio.	"3" ou mais a pergunta 9.																						
7	Cobertura de DTP 1 por reportagem: % de crianças 12-23m cujos responsáveis dizem que recebeu pelo menos 1 dose de DTP	a. "Sim" a pergunta 10.																						
8	Cobertura de DTP 3 por reportagem: % de crianças 12-23m cujos responsáveis dizem que recebeu 3 ou mais doses de DTP.	"3" ou mais a pergunta 11																						
9	Cobertura de sarampo por reportagem: % de crianças 12-23m cujos responsáveis dizem que recebeu avacina sarampo.	a. "Sim" a pergunta 12																						
10	Cobertura de cartão de vacina: % de crianças 12-23m cujos responsáveis podem mostrar um cartão da criança ou de vacina.	a. "Sim, visto" a pergunta 13																						
11	Uso de serviço de saúde quando doente: % de crianças doentes nas últimas 2 semanas com tosse, febre ou diarréia cujos responsáveis procuraram ajuda.	a. "Sim" a pergunta 14b.																						
12	Uso de serviço de saúde quando doente.	a. ou b. a pergunta 15																						

13	Conhecimento de sinais de perigo na doença: % de responsáveis de crianças 12-23m que possam dar 2 our mais sinais de perigo da doença.	2 ou mais das respostas a.-j. a pergunta 16																						
14	Conhecimento do mosquito como transmissor da malária: % de responsáveis de crianças 12-23m que sabem que o mosquito transmite a malária.	d. "Mosquito" a pergunta 17.																						
15	Posse de rede mosquiteiro: % de responsáveis de crianças 12-23m que dizem ter uma rede mosquteiro.	a. "Sim" a pergunta 18.																						
16	Posse de rede mosquiteiro tratada nos úmtimos 12 meses: % de responsáveis de crianças 12-23m que dizem ter rede mosquiteiro que foi tratada nos últimos 12 meses	a. "Sim" a pergunta 18 e a. "Tratada" a pergunta 19.																						
17	Crianças dormindo com rede mosquiteiro: % de responsáveis 12-23m que dizem que a criança dormiu com rede mosquiteiro na noite anterior.	c. "Criança" a pergunta 20 e a. "Sim" a pergunta 18.																						

Resumo dos resultados de todas as áreas para o período																			
#	Indicador	Total Correcto em cada Área de Supervisão/ Regra de Decisão						Total Correcto	Tamanho de Amostra						Total de Tamanho	Cobertura Média e Intervalo de confiança (95%)	Meta de Cobertura Média no período
		Bocoio	Chila	C. Lumbo	M. Belo	Passe			Bocoio	Chila	C. Lumbo	M. Belo	Passe				
1	Vitamina A: % de crianças recebendo vitamina A nos últimos 6 meses	10	9	9	12	14		54	19	18	19	19	19		94	**57%**	**90%**
	Regra decição média	9	9	9	9	9									**IC inf**	47%	
	Regra decisão objectivo	15	14	15	15	15									**IC sup**	67%	
2	Desparasitação: % de crianças desparasitadas no último ano?	6	**2**	10	**3**	9		30	19	19	19	19	19		95	**32%**	**90%**
	Regra decição média	4	4	4	4	4									**IC inf**	22%	
	Regra decisão objectivo	15	15	15	15	15									**IC sup**	41%	
3	Imunização alguma vez: % de crianças vacinadas alguma vez	18	**11**	15	15	19		78	19	19	19	19	19		95	**82%**	**90%**
	Regra decição média	14	14	14	14	14									**IC inf**	74%	
	Regra decisão objectivo	15	15	15	15	15									**IC sup**	90%	

4	BCG por reportagem: % de crianças 12-23m cujos responsáveis dizem que recebeu a vacina BCG	10	5	8	**2**	7		32	18	19	19	19	19		94	**34%**	**na (75%*)**
	Regra decição média	3	4	4	4	4									**IC inf**	24%	
	Regra decisão objectivo	11	12	12	12	12									**IC sup**	44%	
5	Cobertura de pólio 1 por reportagem: % de crianças 12-23m cujos responsáveis dizem que recebeu alguma dose de pólio	17	**12**	16	14	15		74	19	19	19	19	19		95	**78%**	**90%**
	Regra decição média	13	13	13	13	13									**IC inf**	70%	
	Regra decisão objectivo	15	15	15	15	15									**IC sup**	86%	
6	Cobertura de pólio 3 por reportagem: % de crianças 12-23m cujos responsáveis respondem que recebeu 3 ou mais doses de pólio.	5	4	2	1	2		14	19	19	19	19	19		95	**15%**	**60%**
	Regra decição média	n/a	n/a	n/a	n/a	n/a									**IC inf**	8%	
	Regra decisão objectivo	9	9	9	9	9									**IC sup**	22%	
7	Cobertura de DTP 1 por reportagem: % de crianças 12-23m cujos responsáveis dizem que recebeu pelo menos 1 dose de DTP	6	8	7	8	10		39	19	19	19	19	19		95	**41%**	**90%**
	Regra decição média	6	6	6	6	6									**IC inf**	31%	
	Regra decisão objectivo	15	15	15	15	15									**IC sup**	51%	

8	Cobertura de DTP 3 por reportagem: % de crianças 12-23m cujos responsáveis dizem que recebeu 3 ou mais doses de DTP.	0	0	0	0	0		0	19	19	19	19	19		95	**0%**	**60%**
	Regra decição média	n/a	n/a	n/a	n/a	n/a									**IC inf**	0%	
	Regra decisão objectivo	9	9	9	9	9									**IC sup**	0%	
9	Cobertura de sarampo por reportagem: % de crianças 12-23m cujos responsáveis dizem que recebeu avacina sarampo.	9	7	5	10	8		39	19	19	19	19	19		95	**41%**	**75%**
	Regra decição média	6	6	6	6	6									**IC inf**	31%	
	Regra decisão objectivo	12	12	12	12	12									**IC sup**	51%	
10	Cobertura de cartão de vacina: % de crianças 12-23m cujos responsáveis podem mostrar um cartão da criança ou de vacina.	**2**	5	5	10	**2**		24	19	18	19	18	19		93	**26%**	**60%**
	Regra decição média	3	2	3	2	3									**IC inf**	17%	
	Regra decisão objectivo	9	9	9	9	9									**IC sup**	35%	
11	Uso de serviço de saúde quando doente: % de crianças doentes nas últimas 2 semanas com tosse, febre ou diarréia cujos responsáveis procuraram ajuda.	13	14	12	11	8		58	16	15	14	14	10		69	**84%**	**na**
	Regra decição média	12	11	11	11	n/a									**IC inf**	75%	
	Regra decisão objectivo	n/a	n/a	n/a	n/a	n/a									**IC sup**	93%	

12	Uso de serviço de saúde quando doente.	5	2	2	**0**	1		10	15	14	11	14	9		63	**16%**	**70%**
	Regra decição média	1	1	n/a	1	n/a									**CI inf**	**7%**	
	Regra decisão objectivo	9	8	n/a	8	n/a									**CI sup**	**25%**	
13	Conhecimento de sinais de perigo na doença: % de responsáveis de crianças 12-23m que possam dar 2 our mais sinais de perigo da doença.	16	**12**	18	13	13		72	19	19	19	19	19		95	**76%**	**70%**
	Regra decição média	13	13	13	13	13									**CI inf**	67%	
	Regra decisão objectivo	11	11	11	11	11									**CI sup**	84%	
14	Conhecimento do mosquito como transmissor da malária: % de responsáveis de crianças 12-23m que sabem que o mosquito transmite a malária.	1	1	1	1	2		6	19	19	19	19	19		95	**6%**	**na**
	Regra decição média	n/a	n/a	n/a	n/a	n/a									**CI inf**	1%	
	Regra decisão objectivo	n/a	n/a	n/a	n/a	n/a									**CI sup**	11%	
15	Posse de rede mosquiteiro: % de responsáveis de crianças 12-23m que dizem ter uma rede mosquteiro.	4	4	6	5	4		23	18	19	19	19	19		94	**24%**	**na**
	Regra decição média	2	2	2	2	2									**CI inf**	16%	
	Regra decisão objectivo	n/a	n/a	n/a	n/a	n/a									**CI sup**	33%	

16	Posse de rede mosquiteiro tratada nos úmtimos 12 meses: % de responsáveis de crianças 12-23m que dizem ter rede mosquiteiro que foi tratada nos últimos 12 meses	0	2	1	2	3		8	18	18	19	19	19		93	**9%**	**na**
	Regra decição média	n/a	n/a	n/a	n/a	n/a									**CI inf**	3%	
	Regra decisão objectivo	n/a	n/a	n/a	n/a	n/a									**CI sup**	14%	
17	Crianças dormindo com rede mosquiteiro: % de responsáveis 12-23m que dizem que a criança dormiu com rede mosquiteiro na noite anterior.	3	2	5	5	3		18	18	18	19	19	19		93	**19%**	**na**
	Regra decição média	1	1	1	1	1									**CI inf**	11%	
	Regra decisão objectivo	n/a	n/a	n/a	n/a	n/a									**CI sup**	27%	

Chave **Abaixo de regra decisão média**

Abaixo de regra decisao objectivo

Abaixo de regra decisão média e regra decisão objectivo

#	Indicador		Bocoio	Chila	C. Lumbo	M. Belo	Passe	TOT	Interv Conf 95% superior	Interv Conf 95% Inferior
		pop	37,934	21,895	17,826	30,680	19,857	128,192		
		Peso (wt)	0.30	0.17	0.14	0.24	0.15	1.00		
1	Vitamina A: % de crianças recebendo vitamina A nos últimos 6 meses	Cob.(p)	0.53	0.50	0.47	0.63	0.74	**Cobertura média corrigida pela população**	**Interv Conf 95% inferior**	**Interv Conf 95% superior**
	Regra decição média	wt*p	0.155745	0.0853992	0.0658691	0.1511548	0.1141372	**57%**	47%	68%
	Regra decisão objectivo	wt^2*p*q/n	0.001149	0.0004052	0.0002537	0.0007015	0.0002449	10%		
2	Desparasitação: % de crianças desparasitadas no último ano?	Cob.(p)	0.32	0.11	0.53	0.16	0.47			
	Regra decição média	wt*p	0.093447	0.0179788	0.0731879	0.0377887	0.0733739	**30%**	21%	39%
	Regra decisão objectivo	wt^2*p*q/n	0.0009958	0.0001446	0.0002537	0.0004008	0.0003148	9%		
3	Imunização alguma vez: % de crianças vacinadas alguma vez	Cob.(p)	0.95	0.58	0.79	0.79	1.00			
	Regra decição média	wt*p	0.280341	0.0988833	0.1097819	0.1889436	0.1549005	**83%**	76%	90%
	Regra decisão objectivo	wt^2*p*q/n	0.0002298	0.0003743	0.0001692	0.000501	0	7%		
4	BCG por reportagem: % de crianças 12-23m cujos responsáveis dizem que recebeu a vacina BCG	Cob.(p)	0.56	0.26	0.42	0.11	0.37			
	Regra decição média	wt*p	0.1643975	0.044947	0.0585503	0.0251925	0.0570686	**35%**	26%	44%

	Regra decisão objectivo	wt^2*p*q/n	0.0012012	0.0002977	0.0002481	0.0002839	0.0002938	9%		
5	Cobertura de pólio 1 por reportagem: % de crianças 12-23m cujos responsáveis dizem que recebeu alguma dose de pólio	Cob.(p)	0.89	0.63	0.84	0.74	0.79			
	Regra decição média	wt*p	0.2647665	0.1078727	0.1171007	0.1763473	0.1222898	**79%**	71%	87%
	Regra decisão objectivo	wt^2*p*q/n	0.0004341	0.0003573	0.0001353	0.0005846	0.0002099	8%		
6	Cobertura de pólio 3 por reportagem: % de crianças 12-23m cujos responsáveis respondem que recebeu 3 ou mais doses de pólio.	Cob.(p)	0.26	0.21	0.11	0.05	0.11			
	Regra decição média	wt*p	0.0778725	0.0359576	0.0146376	0.0125962	0.0163053	**16%**	8%	23%
	Regra decisão objectivo	wt^2*p*q/n	0.0008937	0.0002552	9.585E-05	0.0001503	0.0001189	8%		
7	Cobertura de DTP 1 por reportagem: % de crianças 12-23m cujos responsáveis dizem que recebeu pelo menos 1 dose de DTP	Cob.(p)	0.32	0.42	0.37	0.42	0.53			
	Regra decição média	wt*p	0.093447	0.0719152	0.0512315	0.1007699	0.0815266	**40%**	30%	50%
	Regra decisão objectivo	wt^2*p*q/n	0.0009958	0.0003743	0.0002368	0.0007349	0.0003148	10%		
8	Cobertura de DTP 3 por reportagem: % de crianças 12-23m cujos responsáveis dizem que recebeu 3 ou mais doses de DTP.	Cob.(p)	0.00	0.00	0.00	0.00	0.00			
	Regra decição média	wt*p	0	0	0	0	0	**0%**	0%	0%
	Regra decisão objectivo	wt^2*p*q/n	0	0	0	0	0	0%		

9	Cobertura de sarampo por reportagem: % de crianças 12-23m cujos responsáveis dizem que recebeu avacina sarampo.	Cob.(p)	0.47	0.37	0.26	0.53	0.42			
	Regra decição média	wt*p	0.1401705	0.0629258	0.036594	0.1259624	0.0652212	**43%**	33%	53%
	Regra decisão objectivo	wt^2*p*q/n	0.001149	0.0003573	0.0001973	0.0007516	0.0003078	10%		
10	Cobertura de cartão de vacina: % de crianças 12-23m cujos responsáveis podem mostrar um cartão da criança ou de vacina.	Cob.(p)	0.11	0.28	0.26	0.56	0.11			
	Regra decição média	wt*p	0.031149	0.047444	0.036594	0.1329603	0.0163053	**26%**	18%	35%
	Regra decisão objectivo	wt^2*p*q/n	0.0004341	0.0003251	0.0001973	0.0007857	0.0001189	8%		
11	Uso de serviço de saúde quando doente: % de crianças doentes nas últimas 2 semanas com tosse, febre ou diarréia cujos responsáveis procuraram ajuda.	Cob.(p)	0.81	0.93	0.86	0.79	0.80			
	Regra decição média	wt*p	0.2404313	0.1594119	0.1191917	0.1880438	0.1239204	**83%**	74%	92%
	Regra decisão objectivo	wt^2*p*q/n	0.0008338	0.000121	0.0001691	0.0006888	0.0003839	9%		
12	Uso de serviço de saúde quando doente.	Cob.(p)	0.33	0.14	0.18	0.00	0.11			
	Regra decição média	wt*p	0.0986385	0.0243998	0.0252831	0	0.0172112	**17%**	8%	25%
	Regra decisão objectivo	wt^2*p*q/n	0.0012973	0.0002551	0.0002615	0	0.0002633	9%		
13	Conhecimento de sinais de perigo na doença: % de responsáveis de crianças 12-23m que possam dar 2 our mais sinais de perigo da doença.	Cob.(p)	0.84	0.63	0.95	0.68	0.68			
	Regra decição média	wt*p	0.249192	0.1078727	0.1317382	0.1637511	0.1059845	**76%**	67%	84%
	Regra decisão objectivo	wt^2*p*q/n	0.0006128	0.0003573	5.075E-05	0.0006514	0.0002729	9%		

14	Conhecimento do mosquito como transmissor da malária: % de responsáveis de crianças 12-23m que sabem que o mosquito transmite a malária.	Cob.(p)	0.05	0.05	0.05	0.05	0.11			
	Regra decição média	wt*p	0.0155745	0.0089894	0.0073188	0.0125962	0.0163053	**6%**	1%	11%
	Regra decisão objectivo	wt^2*p*q/n	0.0002298	7.656E-05	5.075E-05	0.0001503	0.0001189	5%		
15	Posse de rede mosquiteiro: % de responsáveis de crianças 12-23m que dizem ter uma rede mosquteiro.	Cob.(p)	0.22	0.21	0.32	0.26	0.21			
	Regra decição média	wt*p	0.065759	0.0359576	0.0439127	0.0629812	0.0326106	**24%**	15%	33%
	Regra decisão objectivo	wt^2*p*q/n	0.0008408	0.0002552	0.0002199	0.0005846	0.0002099	9%		
16	Posse de rede mosquiteiro tratada nos úmtimos 12 meses: % de responsáveis de crianças 12-23m que dizem ter rede mosquiteiro que foi tratada nos últimos 12 meses	Cob.(p)	0.00	0.11	0.05	0.11	0.16			
	Regra decição média	wt*p	0	0.0189776	0.0073188	0.0251925	0.024458	**8%**	3%	13%
	Regra decisão objectivo	wt^2*p*q/n	0	0.0001601	5.075E-05	0.0002839	0.0001679	5%		
17	Crianças dormindo com rede mosquiteiro: % de responsáveis 12-23m que dizem que a criança dormiu com rede mosquiteiro na noite anterior.	Cob.(p)	0.17	0.11	0.26	0.26	0.16			
	Regra decição média		0.0493193	0.0189776	0.036594	0.0629812	0.024458	**19%**	11%	28%
	Regra decisão objectivo		0.0006757	0.0001601	0.0001973	0.0005846	0.0001679	8%		
	Chave						**Chave**	**0%**	Vermelho = abaixo do objectivo	