

VillageReach

**Vaccine Coverage and
Vaccine and Rapid
Diagnosis Tests
Logistics Study
Cabo Delgado**

Baseline Survey. April 2010

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Acronyms and Glossary of Terms

DPS	Provincial Health Department
DTP	Diphtheria-tetanus-pertussis
EPI	Expanded Immunization Programme
FDC	Fundação para o Desenvolvimento da Comunidade
HepB	Hepatitis B
MISAU	Ministry of Health
Polio	Oral vaccine against poliomyelitis
RDT	Rapid Diagnostic Tests
VAS	Vacina Anti-Sarampo (Measles)
VAT	Vacina Anti-Tétano (Tetanus)
VR	VillageReach
WHO	World Health Organization

Executive Summary

The report presents the results of the Vaccine Coverage Survey carried out in April 2010 in Cabo Delgado. The data presented is obtained from three survey tools, namely; the household survey for children 12 months – 23 months using the WHO 7 questionnaires x 30 cluster sampling framework (211 interviews); interviews with health staff (29 interviews); interviews with community leaders (30 interviews).

The objective of the study is to provide baseline data to measure the impact of the second phase of the programme to implement the Dedicated Logistics System for EPI in the province of Cabo Delgado. The programme is the result of collaboration between the Ministry of Health, VillageReach and the Elizabeth Glazier Foundation for Pediatric AIDS. In the second phase, in addition to EPI cold chain management, the programme aims to improve the logistic system for the delivery of key Rapid Diagnostic Tests (Malaria, HIV and Syphilis).

The average household size in the sample is 6 (6.5) with 1.6 children under the age of two. A high proportion of mothers/guardians involved in the survey have no formal education (40.3%) or only a few years of primary schooling (36%). The majority of the families involved in the survey are farmers as evidenced by the number of households with farmland (88.6%).

The vaccine coverage rate was 89.1%¹ for all children in the survey. The proportion of children fully immunized including children immunized children >12 months, is estimated to be 57.9%. Only 40.8%² of children meet the strict criteria for fully immunized below the age of 12 months.

Results for both of the full immunization rates are extremely low, standing at less than 50% of all children.

The vaccine coverage is only slightly lower than the high level of 92.6% in 2008 (end-line survey for the phase of the 2002-2007 programme) and is above pre 2002 levels. This indicates that although the actions of the previous programme appear to have introduced some lasting change in the province, there are worrying trends in terms of late vaccination of children and/or lack of rigour in the use of health cards for registration. This may be partially due to the low coverage of institutional births (45.5%) in the province that would delay the sequence of vaccinations. It is important to carry out more detailed work on the late vaccine schedule to identify all the reasons and find solutions. Additional reasons for lower than expected vaccine rates may include; the 40.5% of mothers that present at the health centres and cannot vaccinate the children due to a lack of vaccines in the health facility (lost opportunities); distance from the health centres that discourages repeat visits to health facilities as the majority of people walk to the health facilities, and almost half of the people have a two hour walk; or misunderstanding about the importance of the vaccine schedule.

¹ Fully vaccinated: all children vaccinated, including children vaccinated after 12 months of age, and mothers reporting of vaccination.

² Fully immunized (1): Including only children with complete data recorded on health cards. All vaccines under 12 months, measles > 9 months, and BCG within 28 days.

The majority of respondents knew about childhood immunizations. However, only half of the respondents were able to explain why vaccines were important. The majority of people received information from health workers, and a significant proportion from community leaders. Investment in sensitization campaigns with community leaders could pay dividends in terms of adherence to the vaccine programme.

There are indications that people feel that the health services have improved over the last five years. The major limitations in the health service identified by community leaders are; the lack of health staff, medicine and the distance to the health facilities.

In terms of cold chain management there was a universal shortages of "*Pentavalente*" (protection against Diphtheria, tetanus, hepatitis B, type B influenza, *ferina* cough); the vaccines had been recalled by the manufacturer the month before the survey. Other than the lack of *Pentavalente*, only 20% of health facilities stated that they had stock problems at the time of the survey. The majority of health workers (71.4%) stated that when there are stock outs they would go and fetch the necessary vaccines, and a further (17.9%) said that they would communicate with the head of the department. This demonstrates a proactive attitude to solving problems. There are a low proportion of expired vaccines in the health facilities. However, it was noted that the time to expiry of the vaccines in the health posts is three times lower than in the hospital, and although vaccines in the health posts still have 12 months to expiry, the difference between the health facilities are indicative of key issues in the logistics management. Safe disposal of the vaccines is generally well understood but there is still a small percentage (3.6%) of health workers that stated that expired vaccines were left in the warehouses and a further 14.3% said they were disposed of in the normal rubbish disposal.

The second phase of the Village-Reach DPS programme in collaboration with Elizabeth Glazer Foundation, aims to improve the logistics and management of Rapid Diagnostic Tests (RDTs). The health facility questionnaire covered the stock management of the RDTs. The lowest usage of RDTs was registered for syphilis where 17.2% of health workers stated that this test was not used in the health facility, 96.5% of health workers stated that they used HIV Determine, 93.1% had used Uni-Gold, and 96.5% had used the rapid malaria test. Approximately three quarters of the health workers stated that the RDTs were stocked on a monthly basis with syphilis tests less frequently stocked. This finding indicates that in a quarter of the health centres stocking of the RDTs is not carried out on a monthly basis and is reflected in the stock-outs registered for RDTs. The malaria rapid tests had frequent stock outs with 82.7% of respondents saying that they had needed more than was available. For the other RDTs approximately half had needed additional tests. In terms of stock management; the survey showed that in addition to stock outs of the RDTs just under a fifth of the RDTs (17.8%) had expired. A further tenth of the RDTs (10.3%) were damaged and not usable. Part of stock control problems of the RDTs could be explained by the lack of stock control cards for the RDTs. Nearly one-third (31%) of respondents said that there were no stock control cards and 17.2% said they did not know if there were stock cards or not. The use of this fundamental (and simple instrument) for stock management should be part of the capacity building programme for stock management.

Two thirds of the respondents stated that the unusable tests were returned to the district warehouse (66.7%). However, a third (33.3%) stated that the unusable RDTs were kept in storage in the health facility. Health workers were less proactive in re stocking of RDTs than with vaccines with only a third (37.9%) stating that they would go to the district or province to get additional stock and just under a third stated that they would inform the head of the department/health facility about the situation.

Although the majority of the health workers (79.3%) feel that their work is important as they help to prevent illness, a full fifth of the health workers did not feel that their work was important (20.3%). This finding needs to be taken into consideration as the second phase of the programme is rolled out as the health workers represent the most important link in the cold chain.

The majority of the health centres (96.6%) had functional fridges and the majority of the fridges are gas run fridges (89.3%). With the exception of three health workers, the respondents stated that it was possible to maintain the correct temperature for the vaccines and the RDTs. There were five cases where the temperature was outside of the acceptable range (2 to 8 degrees) in the twenty nine health facilities and 20% of the facilities did not have fridge operation instructions or temperature control forms; and 12% did not have the correct temperature on the day of observation. Approximately a quarter of the fridges did not have a form to register twice daily temperature (24.1%) or instructions on fridge management (21.7%). Only three of the twenty nine fridges (6.9%) were not functional at the time of the survey, and four fridges had had problems in the last month (13.8%). The vast majority of health facilities had cool boxes, ice packs, rubbish pits and incinerators. All of the health facilities (100%) have disposable gloves. All health facilities had access to vehicles.

In terms of key observations the following aspects were highlighted in the report:

- There is a need to ensure that adequate attention is given to the health post level of the cold chain as this continues to be the weakest part of the chain, but represents an essential access point for households in remote rural areas
- It is important to carry out further analysis of the lost opportunities for vaccination or testing. Working to reduce failures in the service offered is essential for improving coverage.
- Consider mother to mother education techniques. Use older women's familiarity with the health system to improve vaccine calendar compliance among younger mothers;
- Develop specific IEC material targeting male heads of households and community leaders around sensitization on the importance of infant immunization programmes .
- There are serious stock management issues relating to the RDTs. Learning from the experience of improving the vaccine cold chain, the Dedicated Logistics Systems is well positioned to make similar improvements for RDTs.
- In addition to working on the "hardware" of the system (fridges, vaccine stocks etc), it is important to work on staff morale as the implementation of a quality service requires

dedication of health service staff, and there are clear indications that a significant proportion of the staff do not feel that their work is making a valuable contribution.

1. Introduction

In 2002-2007 VillageReach and FDC, in coordination with the Expanded Programme for Immunization (EPI) of the Provincial Directorate of Health (DPS) Cabo Delgado, implemented a support programme to improve the EPI services offered to the population in the province using a new vaccine logistics system. The programme was extended to Nampula in 2006. The project aimed to improve:

- Infrastructures for service delivery: information management; management of solid waste, communication, transport, energy and sanitation.
- Logistics: control and security of stocks, planning and budgeting, stock management, management of medical supplies
- Support to communities and health workers: supportive supervision, data analysis, training and social mobilization.

In November 2008 VillageReach published the results of a study that demonstrated considerable impact on the vaccination coverage rates in the province of Cabo Delgado, namely an increase from 68.9% in 2002 to a DPT-Hep B3 coverage rate of 92.8% in 2008. There were also encouraging results in terms of cold chain management, staff supervision and management of medical supplies. In addition to the cold chain and vaccine coverage survey presented in 2008, VillageReach also conducted a costing survey that showed cost savings and increased cost efficiency per vaccine delivered to the child with the new system. The logistics system, called the Dedicated Logistic System, established in Cabo Delgado was 17% more efficient than the system operated in Niassa (where there were no project activities) mainly due to the increased coverage and more efficient use of resources.

Due to the success of the previous programme, VillageReach intends to reestablish the Dedicated Logistics System in Cabo Delgado in partnership with the Ministry of Health and the Elizabeth Glazier Pediatric AIDS Foundation. The Dedicated Logistics System will continue to work on improving EPI but also include the logistics management of the Rapid Diagnostic Tests (RDTs) for HIV, Syphilis and Malaria that are now part of the national protocol for testing. The Dedicated Logistics System will concentrate on improving the vaccine distribution system and the distribution system for RDTs.

In order to measure the impact of the new initiative it is necessary to establish a baseline for the key indicators. The following report presents the results for the household vaccine coverage survey and results for the health facility and community leaders interviews.

2. Objective of the survey

The main objective of the survey is to provide baseline information to measure the impact of the Dedicated Logistics System in Cabo Delgado. The system will concentrate on improving

logistics for the EPI and services offering Rapid Diagnostic Tests for malaria, syphilis and HIV. Baseline data³ will be collected in 2010 and end-line data in 2013.

3. Methodology

3.1. Sample size and framework

The study used the methodology for conducting an immunization coverage cluster design study presented by the WHO in the Immunization Cluster Survey Reference Manual (WHO 2005). The sample size was calculated based on 70% immunization coverage, 10% type I error, and a cluster design effect of two. The sample, consisting of 30 clusters x 7 household interviews, was selected based on the probability proportional to size technique using population data per village. The sample is representative at the level of the province of the Cabo Delgado. The sample is not representative at district level. In each cluster, 7 households with children between the ages of 12-23 months were chosen. Only those households that had at least one living child of 12 to 23 month-old and a caretaker or other household member 14 years or older who was knowledgeable about the child's vaccine status were eligible for interview. The selected household's child was not required to be present for the household to be included in the study. If there was more than one eligible child, the youngest child within the 12-23 month age range was chosen. No more than one child between the ages of 12 and 23 months was selected per household. A total of 211 children between the ages of 12 and 23 months were included in the study.

At cluster level (village or *bairro*⁴) the households to be interviewed were selected in the following way:

- Step 1. The leader of the area was requested to take the team to the centre of the village/bairro
- Step 2. On reaching the centre of the village/bairro the team spun a bottle on the ground and noted the direction that the bottle neck was pointing
- Step 3. Then a note (money) was taken from a member of the team and the last number of the serial identification number of the note was selected. The number represents the first house to be selected. i.e. Number 5 on the note means the fifth house in the row.
- Step 4. Using the number from the note and walking in the direction indicated by the bottle, the team selects the first house to begin interviewing. For example, if "5" was the number on the note, the first house to be selected is the fifth house in the line of houses in the direction indicated by the bottle.

³ Findings presented in this report.

⁴ Bairro – sub division of a city or town.

- Step 5. The next house to be selected is the nearest house to the first following the direction indicated by the bottle.
- Step 6. When the team reached the boundary of the village/bairro without interviewing all the necessary households, they turned to the nearest house on the left and continued with the selection, until reaching the requisite number of interviews for the cluster (7 children 12-23 months).

The following table illustrates the characteristics of the household sample. The total sample size for the vaccine coverage survey was 211 children (planned 210 children) between the age of 12 months and 23 months. The average age of the children participating in the survey is 18 months and just under half of the sample was comprised of female children (45.9%). Fifteen districts were covered in the survey. The number of cluster per district was dictated by the proportional size of the district population to the total population of the province.

Table 1 General Characteristics of the Household Survey Sample

District	Sample size	% Female children	% that held vaccination cards	Average age in the child in months
Ancuabe	14	28.57	100.00	16.93
Balama	21	38.10	100.00	17.28
Chiure	28	46.43	100.00	17.16
Macomia	14	50.00	100.00	18.78
Mecufi	8	62.50	100.00	17.84
Mocimboa da praia	7	42.86	100.00	15.91
Montepuez	14	64.29	100.00	17.36
Mueda	21	47.62	85.71	18.34
Muidumbe	7	71.43	100.00	19.76
Namuno	28	42.86	96.43	19.17
Nangade	7	42.86	100.00	21.33
Palma	7	57.14	100.00	18.39
Cidade de Pemba	21	47.62	100.00	17.22
Pemba Metuge	7	14.29	100.00	20.00
Quissanga	7	42.86	85.71	17.80
Total	211	45.97	97.63	18.03

In addition to the household survey, a questionnaire was carried out with health staff responsible for the EPI. Twenty nine health facility interviews were carried out in hospitals, health centres and health posts (representing 21.8% of all health facilities in the province). The health facilities represent the nearest health facility for the populations in the randomly selected clusters, and therefore provide additional information to interpret the vaccine coverage rates. The data presents descriptive statistics that are not statistically valid. The

selection of the health facilities is dependent on the cluster sample, i.e. health facilities were not randomly selected from all health facilities in the province, but were selected according to proximity to the 30 clusters (methodology for selecting the clusters was described in previous paragraphs).

Table 2. Description of the Health Facilities Sample

District	Name of locality	Type of health facility	# surveys
1. Ancuabe	Sede	Health centre	1
2. Ancuabe	sem info	Health centre	1
3. Balama	Pecuaría – Balama Sede	Health centre	1
4. Balama	Mavala	Health centre	1
5. Balama	Nacapa	Health centre	1
6. Chiure	Nivussaco (Samora Machel)	Health centre	1
7. Chuire	Nampula	Health centre	1
8. Chiure	Nametil (Sede)	Health centre	1
9. Chuire	Mugipala (Chuire Velho)	Health centre	1
10. Macomia	Nangra	Health centre	1
11. Macomia	Nacutuco	Health centre	1
12. Mecufi	Zaulane B	Health centre	1
13. Mocimboa da Praia	Sede	Health centre	1
14. Montepuez	Merige (Urbano)	Health centre	1
15. Montepuez	Caula – Mirate	Health post	1
16. Mueda	Sede – Maputo	Health centre	1
17. Mueda	Imbuo	Health centre	1
18. Mueda	Nehavara-Negomana	Health centre	1
19. Muidumbe	Muambula	Health centre	1
20. Namuno	Namacala – Papai	Health centre	1
21. Namuno	Ncumpe	Health centre	1
22. Namuno	Sede – Maahari	Health centre	1
23. Namuno	Ntata	Health centre	0*
24. Nangade	Ntamba sede	Health centre	1
25. Palma	Sede	Rural hospital	1
26. Pemba city	Cariaco	Health centre	1
27. Pemba city	Paquite	Health centre	1
28. Pemba city	Eduardo Mondlane	Health centre	1
29. Pemba metuge	Metuge sede	Health post	1
30. Quisanga	Nraha	Health post	1
Total of interviews			29

* the questionnaire was not carried out in this health facility as it was impossible to reach the area where the health facility is localized.

In each of the communities visited community leaders were interviewed⁵ about; the common illnesses for different demographic groups in the community; knowledge about vaccines and vaccine campaigns; access and use of health services. The results from the interviews are used throughout the report to support data from other sources (household interview and interviews with health personnel)

3.2. Ethics Approval

The MISAU Bioethics Committee and the Minister of Health granted approval for the baseline study.⁶

3.3. Training for the survey

The survey team was trained during four days by two experienced trainers. The training consisted of; presentation of the objectives of the survey; sessions on the vaccination calendar; classroom practice with the questionnaires; and field test training and feedback. Three teams of three enumerators and one supervisor were selected from the trainees, and two of the trainees were kept as reserves.

3.4. Data analysis

Information from the questionnaires was double entered to reduce data entry error. Analysis was carried out in SPSS.

The household vaccine coverage survey sample is **statistically significant for the total sample (211)** and mean and median results are reported for the data. The sample is a standard WHO designed cluster sample that provides data that is statistical significant for the universe under consideration. For example in this case the universe was the province of Cabo Delgado, therefore the data is significant at provincial level.

Throughout the report some of the **differences between the districts** have been cited. These should be taken as **indicative rather than statistically significant**. If the data was to be significant at district level, using this sample framework, it would be necessary to carry out a 7 child x 30 cluster survey for each district.

P value significance tests were carried out for a number of the cross tabulations, namely size of household and vaccine coverage, and sex of household head and vaccine coverage. These were not statistically significant. Chi Squared tests were not run with other variables due to the small numbers in the cells.

The findings reported on the 29 interviews undertaken in the health facilities (one health facility per cluster) and 30 community leaders are not statistically significant but present an

⁵ See list in Annex 2.

⁶ See Protocol submission

indication of the functioning of the cold chain and the management of the supplies for vaccination and rapid diagnosis tests, and community perception of EPI. One interview was not carried out as the health facility was inaccessible due to the height of the water in the river.

3.5. Presentation of the results.

The findings and discussion are presented in the following order:

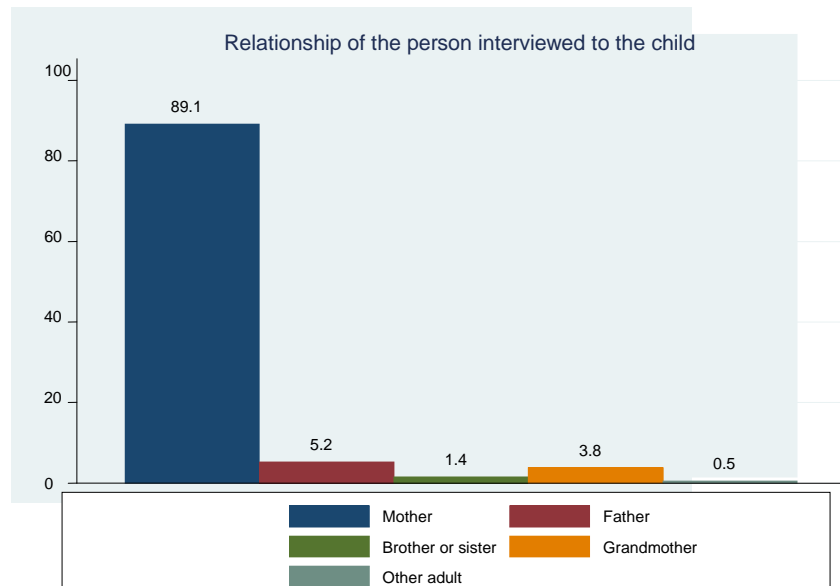
- i. Demographic data pertaining to the households of the children eligible for the survey, including; educational level of household head, housing and living conditions, and household livelihood information.
- ii. Vaccine Coverage including; definition of vaccine status, vaccine coverage for the province, vaccine coverage and sex of respondent, size of household and vaccine status, compliance with vaccine calendar, reasons for non immunization, discussion points for immunization programme.
- iii. Access to vaccine services, including; where households access vaccination services, distance to services offering vaccinations, use of health services, motives for non administration of vaccine when attending a health facility, and changes in the quality of care in the last five years.
- iv. Rapid Diagnosis Tests, including; use of RDTs, and management of supply chain.
- v. Cold Chain System and Health Staff Performance, including; status of stocks of vaccines, health staff morale, and logistics.
- vi. Essential Cold Chain Equipment, including; fridge management and transport issues.

The results section is followed by a section for conclusions and key observations.

4. Demographic data.

4.1. Sex of respondents to the household survey

The majority of the people interviewed were women (94.8%). However, in the district of Palma only 57% of the people interviewed were female; in the districts of Macomia, Mocimba da Praia and Mueda almost 15% of the people interviewed were male. The majority of the people interviewed were the mothers of the children in question (89%), and only 5.2% were the fathers of the children (see graph 1 below).

Graph 1. Relationship of child to the person interviewed. (%)

Source. VillageReach DPS Coverage Survey 2010

4.2. Household Size

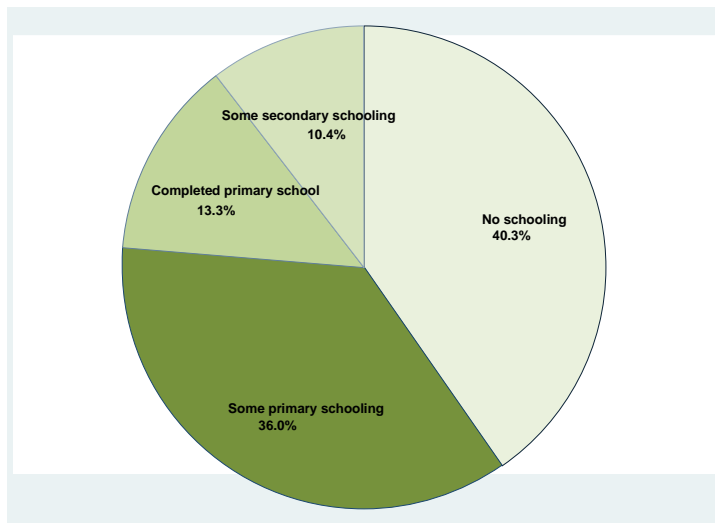
The average age of the people interviewed was 28 years of age (27.98), with a range across the districts of 32 years of age in Mocimaba da Praia to 25 years of age in Muidumbe. Average household size was 6 (6.5) with 1.6 children under the age of two. The districts with the largest average family size were Mocimboa da Praia (7.86) and Pemba City (7.24), and the district with the smallest average household size was Namuno (4.86). A quarter (25.1%) of households in the sample reported to be female-headed, this is considerably lower than the rate of female headed households in the Southern Provinces of the country, for example in the province of Gaza where up to 50% of households are female headed⁷ in a number of districts. See table 6 in Annex 1 for details.

4.3. Educational Levels of Mothers/Guardians

A high proportion of mothers/guardians involved in the survey have no formal education (40.3%) or only a few years of primary schooling (36%). Less than a fifth of the mothers/guardians had completed primary school (13.3%) or a few years of secondary schooling (10.4%). (See graph 2 below).

⁷ Data from 2007 Population Census. National Institute of Statistics.

Graph 2. Educational levels of mothers or guardians

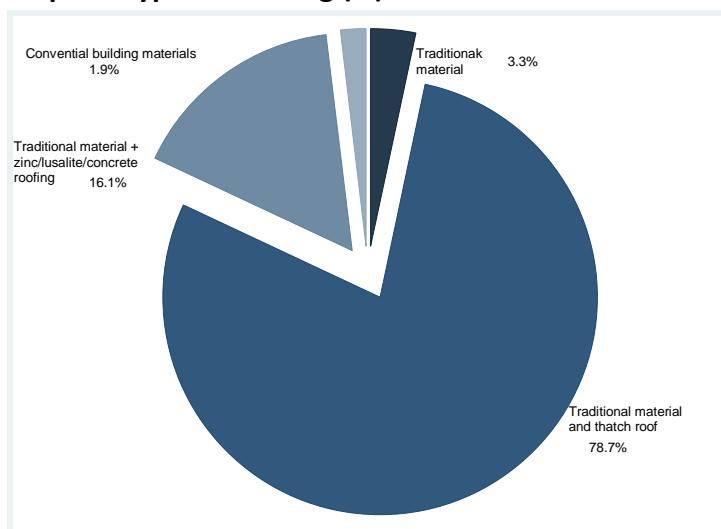


Source. VillageReach DPS Coverage Survey 2010

4.4. Housing and living conditions

The following graph indicates that the majority of people in the survey live in homes made of traditional materials with less than a quarter living in homes with cement walls or zinc/tiled roofing. However, it should also be noted that one of the traditional materials used in the province of Cabo Delgado is hard wearing bamboo that provides a safe and sustainable housing for the households.

Graph 3 Type of Housing (%)



Source. VillageReach DPS Coverage Survey 2010

4.5. Household Livelihood Information.

The majority of the families involved in the survey are farmers as evidenced by the number of households with farmland (88.6%). The range of households with farmland in the districts is between three quarter (71.4% in Macomia) and one hundred percent of households (Pemba Metuge, Montepuez, Mocimboa da Praia, Mecufi, Palma and Ancuabe). The only outlier in the sample was the city of Pemba where only a third (33.3%) of households had farmland. Very few households have livestock; less than half of the households have chickens (44.5%) and less than 10% have any other animals (ducks 6%, pigs 9.9%⁸ and goats 8%). Similarly less than half (44%) of the households own radios. (See table 7 in annex 1.)

4.6. Morbidity profile

Information was gathered from the community leaders about perceptions of the most common illnesses for different demographic groups. Malaria is cited as the most common illnesses for all demographic groups, with the exception of the elderly, where the most common illnesses are linked to eye sight, rheumatism and chest problems. For children the most common illnesses were seen to be malaria, diarrhea and upper respiratory tract infections. Sexually transmitted diseases including HIV were cited as common in the community, for both men and women.

The leaders stated that the reasons for the illnesses were; improper use of water (water not adequately treated) leading to diarrhea; poor sanitation practices; lack of Mosquito nets; and poor diets that leave the children weak and susceptible to disease.

5. Vaccine Coverage

The main reason for conducting the survey was to establish a baseline for the VillageReach intervention in Cabo Delgado. In addition, the data will give some indication of the longevity of the impact of the first five year initiative (2002-2007) in the province.

⁸ It should be noted that the average percentage of households across the sample is not representative of the ownership patterns, only the districts of Ancuabe, Chiure, Mueda, Muimbe and Namuno indicate households with pig ownership.

5.1. Definitions of Vaccination Status

Fig. 1. Definitions used for vaccination status

Definitions

“Vaccination status of child” was defined as follows:

Fully Immunized (1)	Received valid doses of all vaccinations before the age of 12 months. Criteria for receipt of valid doses of all vaccinations were: <ul style="list-style-type: none"> • BCG vaccination verified by history plus scar, card plus scar, or card only; • all three polio vaccinations received a minimum of 28 days apart as verified on card; • all three DTP/HepB vaccines received a minimum of 28 days apart as verified on card; and, • measles vaccination received after 9 months of age as verified on card.
Fully Immunized (2)	Receipt of BCG vaccination verified by history plus scar, card plus scar, or card only and all other vaccinations; and all other vaccinations as verified by card only, including children vaccinated > 12 months
Fully vaccinated	Receipt of BCG vaccination verified by history plus scar, card plus scar, or card only and all other vaccinations including children > 12 months; and all other vaccinations as verified by card or history
Partially-vaccinated child	Receipt of at least one of the vaccines according to the criteria described for “fully-vaccinated child.”
Non-vaccinated child	Not having received any of the vaccines according to the “fully-vaccinated child” criteria.
Vaccination failure	Children who qualify as partially- or non-vaccinated.

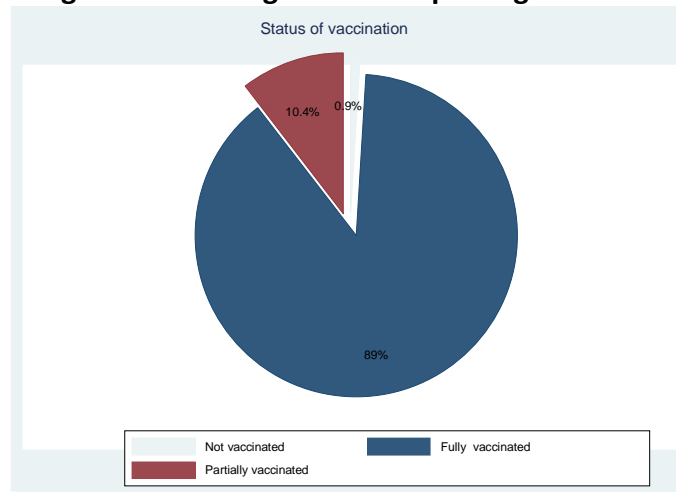
5.2. Vaccine coverage for the province

The 2008 survey, collected information for two age groups of children; 12 months to 23 months; and 24 months – 35 months. In the 2010 survey only the 12-23 month age group was covered as they represent an age group that have been potentially vaccinated since the end of the first EPI programme supported by VillageReach with the DPS Cabo Delgado, and are the recommended age group for the WHO 30 clusters x 7 children survey for vaccine coverage as they are the youngest children with a likelihood of being fully vaccination and thus represent the most recent vaccination coverage rates. The data will provide a clear baseline for the second phase project.

The vaccine coverage rate was 89.1%⁹ for all children in the survey. The proportion of children fully immunized including children immunized children >12 months, is estimated to be 57.9%. Only 40.8%¹⁰ of children meet the strict criteria for fully immunized below the age of 12 months.

Both of the full immunization rates are extremely low, standing at less than 50% of all children. The lack of information from the health cards (held by 97.6% of mothers) should be investigated and may be due to enumerator error or a lack of rigour in the filling in of the cards at the health centre.

Graph 4. Vaccine Status of Children (including children with fully vaccinated after 12 months of age and including mothers reporting of vaccination)



Source. VillageReach DPS Coverage Survey 2010

Table 3. Vaccination and Immunization rates

⁹ Fully vaccinated (2): all children vaccinated, including children vaccinated after 12 months of age, and mothers reporting of vaccination.

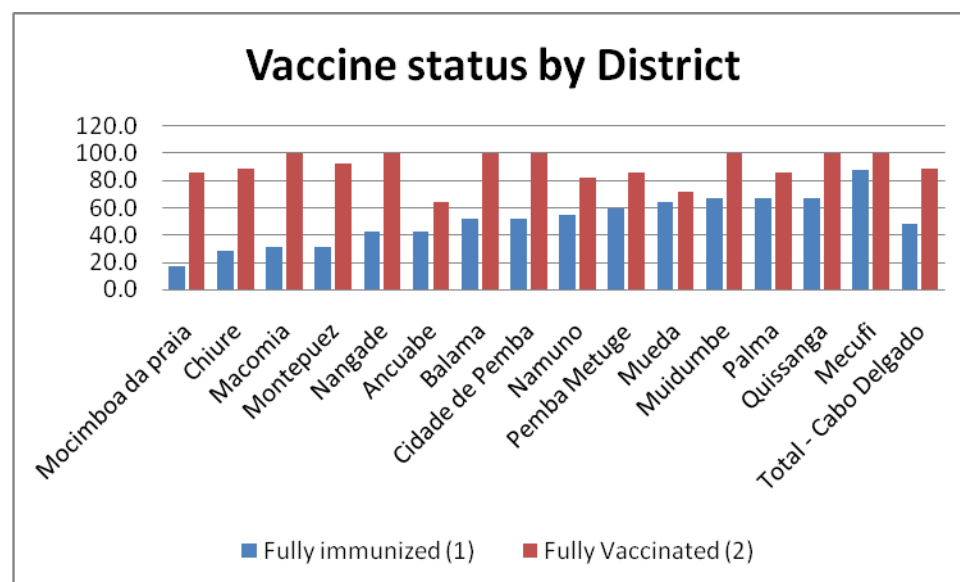
¹⁰ Fully immunized (1): Including only children with complete data recorded on health cards. All vaccines under 12 months, measles > 9 months, and BCG within 28 days.

District	Fully immunized by 12 months	Fully immunized after 12 months	Fully vaccinated
	42.9	50.0	64.3
Ancuabe	52.4	57.1	100.0
Balama	28.0	35.7	89.3
Chiure	30.8	35.7	100.0
Macomia	87.5	87.5	100.0
Mecufi	16.7	14.3	85.7
Moc da praia	30.8	28.6	92.9
Montepuez	64.3	57.1	71.4
Mueda	66.7	57.1	100.0
Muidumbe	55.0	42.9	82.1
Namuno	42.9	57.1	100.0
Nangade	66.7	57.1	85.7
Palma	52.4	61.9	100.0
C. de Pemba	60.0	57.1	85.7
P. Metuge	66.7	57.1	100.0
Quissanga	48.3	48.8	89.1
Total - C Delg			

5.3. Vaccine coverage at district level

The results obtained at district level are not statistically significant, but may be indicative of problems with the service. The districts with the lowest fully immunization rate (1) are Mocimboa da Praia (16.7%), Chiure (28%) and Macomia and Montepuez (30.8%), although for all districts the vaccination coverage rate including mothers reporting (definitions Fully Vaccinated 1&2 in above table) are high (definition 2: Mocimboa da Praia – 85.7%; Chiure – 89.3%; Macomia – 100%). Districts with the lowest vaccine coverage rates (fully vaccinated 2) are Ancuabe (64.3%), followed by Mueda (71.4%).

Graph 5. Percentage of Children Vaccinated by district using definitions of Fully Immunized (1) and Fully Vaccinated (2)



5.4. Compliance with vaccination calendar.

The average and median age for BCG and the three polio doses are charted on graph (8) below and demonstrate that there are no significant anomalies in the vaccination pattern; vaccines are given within the normal age range for the BCG and Polio (3 doses) vaccines administered (see fig 2 below), **it should, however, be noted that, on average, vaccines are administered slightly later than the stipulated calendar.**

Fig. 2. Vaccine Calendar for Infant Immunization- Mozambique

Vaccine Calendar	
Birth	BCG and Polio0
2 months	Polio1 and DPT-HepB1
3 months	Polio2 and DPT-HepB2
4 months	Polio3 and DPT –HepB3
9 months	Measles

Source. Ministry of Health.Mozambique

The median age for vaccination is slightly lower than the mean age, this is due to the late vaccination of children in the districts of Ancuabe, Namuno and Palma, distorting the mean value, but having a lesser influence on the median value (see table 4 below with the above mentioned Districts highlighted).

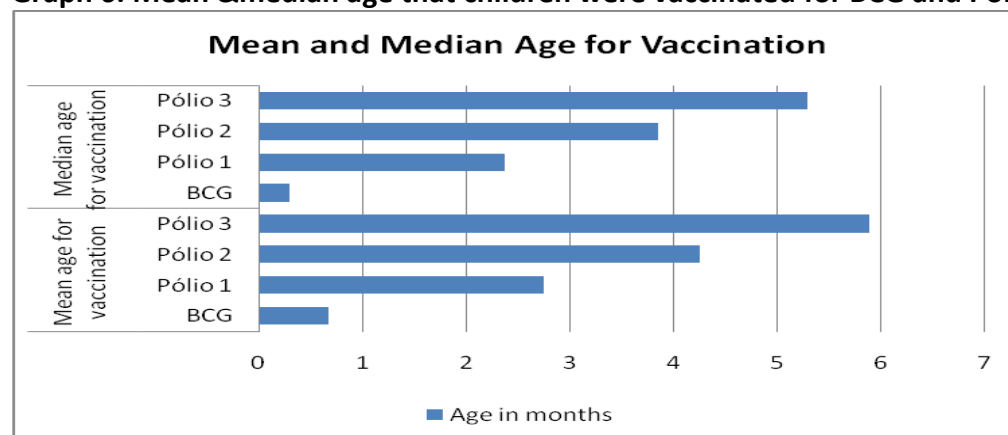
Table 4. Mean and Median Age that infants are given BCG and Polio vaccinations by district

District	Mean age in months when vaccinated				Median age in months when vaccinated			
	BCG	Pólio 1	Pólio 2	Pólio 3	BCG	Pólio 1	Pólio 2	Pólio 3
Ancuabe	1.22	5.22	6.81	7.92	0.85	4.50	6.36	7.20
Balama	0.61	2.58	4.09	5.35	0.33	2.47	3.55	5.29

Chiure	0.69	2.71	4.30	6.38	0.46	2.63	3.81	6.02
Macomia	0.60	2.69	4.25	5.96	0.46	2.63	4.03	5.77
Mecufi	0.66	2.82	4.38	5.88	0.20	2.86	4.44	5.84
Mocimboa da praia	0.41	2.31	4.73	5.69	0.23	2.07	3.22	4.31
Montepuez	0.43	2.34	3.46	4.69	0.23	2.28	3.37	4.39
Mueda	0.80	3.06	4.14	5.09	0.13	2.33	3.72	5.26
Muidumbe	0.19	2.03	3.32	4.48	0.12	2.09	3.19	4.22
Namuno	1.23	2.47	4.38	6.76	0.71	2.30	3.88	5.26
Nangade	0.11	2.04	3.67	6.88	0.13	2.14	3.39	5.65
Palma	0.37	3.32	3.58	7.23	0.20	3.39	4.34	7.00
Cidade de Pemba	0.44	2.34	3.91	5.24	0.23	2.04	3.29	4.34
Pemba Metuge	0.31	2.42	3.78	4.92	0.10	2.33	3.42	4.57
Quissanga	0.70	2.27	4.49	5.98	0.69	2.30	4.32	6.30
Total	0.67	2.75	4.25	5.89	0.3	2.37	3.85	5.29

Source. VillageReach DPS Coverage Survey 2010

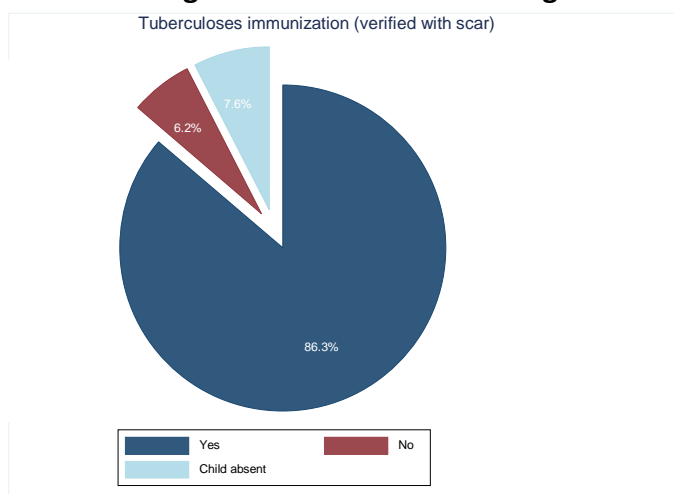
Graph 6. Mean & median age that children were vaccinated for BCG and Polio by vaccine type.



Source. VillageReach DPS Coverage Survey 2010

The majority of children (86.3%) had a verifiable vaccination scar for the BCG (protection against Tuberculosis). See graph 7 below. However, as can be seen from table 2, the BCG is administered late in the districts of Ancuabe and Namuno; one of the possible reasons is low levels of women giving birth in health facilities that would result in a delay in receiving the BCG that is given at the moment at birth.¹¹

¹¹ There is no additional data to support this statement, but it may be something that can be followed up at district level.

Graph 7. Percentage of children immunized against tuberculosis (BCG) with scar.

Source. VillageReach DPS Coverage Survey 2010

The mean and median age, in months, of children receiving vaccinations for DTP indicate that the three DTP vaccinations are generally within acceptable limits, except in the district of Ancuabe where the whole series of vaccines are administered late (see table 4 and 5).

The measles vaccine should be given to children at 9 months of age. In six districts the vaccination is given between 9-10 months (see green highlight in table 3 below). However, in the following districts there are considerable delays (orange highlight in table 3 below).

- Ancuabe: anti measles vaccine is given with a delay of approximately 3 months (average age 12.5 months: Median age 11.5 months).
- Mecufi, Mocimboa da Praia, Mueda, Muidumbe, Namuno, Nangade, Pemba Metuge the vaccine is given with one month delay (10-11 months).

In the district of Montepuez the measles vaccine was administered early- between 8-9 months. (Purple highlight in table below)

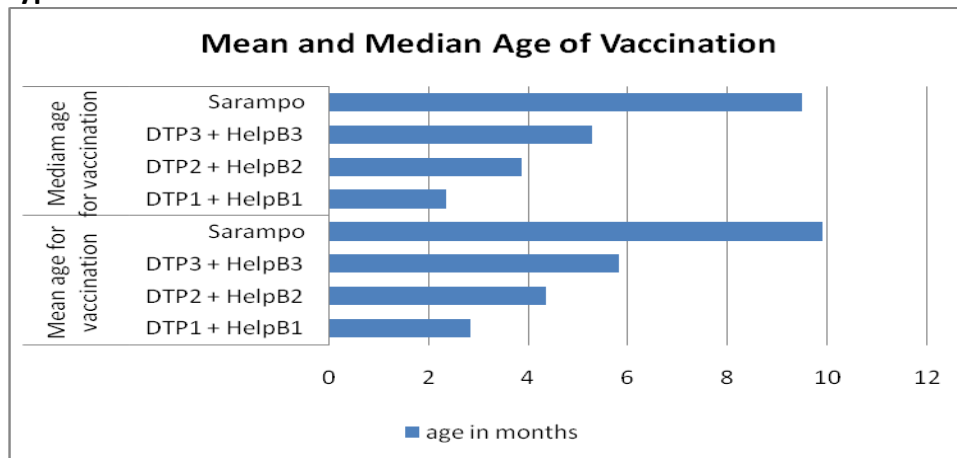
Table 5. Age in months that children were vaccinated against DTP and Measles by mean & median by district.

District	Mean age, in months child vaccinated				Median age, in months, child vaccinated			
	DTP1 + HelpB1	DTP2 + HelpB2	DTP3 + HelpB3	Measles	DTP1 + HelpB1	DTP2 + HelpB2	DTP3 + HelpB3	Sarampo
Ancuabe	5.22	6.26	7.92	12.53	4.50	5.82	7.20	11.47
Balama	2.58	4.12	5.35	9.72	2.47	3.68	5.29	9.30
Chiure	2.71	4.3	6.39	9.32	2.63	3.81	6.02	8.88
Macomia	3.61	4.64	5.96	9.16	2.63	4.11	5.77	9.01
Mecufi	2.82	4.38	5.88	10.3	2.86	4.44	5.84	10.27
Mocimboa da praia	2.31	4.77	6.14	10.02	2.07	3.52	5.10	9.30
Montepuez	2.34	3.46	4.47	8.12	2.28	3.37	4.14	8.98
Mueda	3.36	4.05	5	10.86	2.27	3.62	5.06	10.19
Muidumbe	2.03	3.32	4.48	10.08	2.09	3.19	4.22	10.60
Namuno	2.47	4.38	6.12	10.09	2.30	3.88	5.21	9.53
Nangade	2.04	3.67	6.88	10.77	2.14	3.39	5.65	10.06

Palma	3.33	5.3	7.23	9.47	3.39	5.13	7.00	9.48
Cidade de Pemba	2.19	4.43	5.19	9.61	2.01	3.16	4.27	9.21
Pemba Metuge	2.42	3.78	4.92	10.44	2.33	3.42	4.57	10.39
Quissanga	2.41	3.82	6.61	9.44	2.55	3.55	6.12	9.37
Total	2.82	4.33	5.82	9.89	2.33	3.85	5.28	9.47

Source. VillageReach DPS Coverage Survey 2010

Graph 7. Median and mean age of Children vaccinated against DTP and Measles by vaccine type

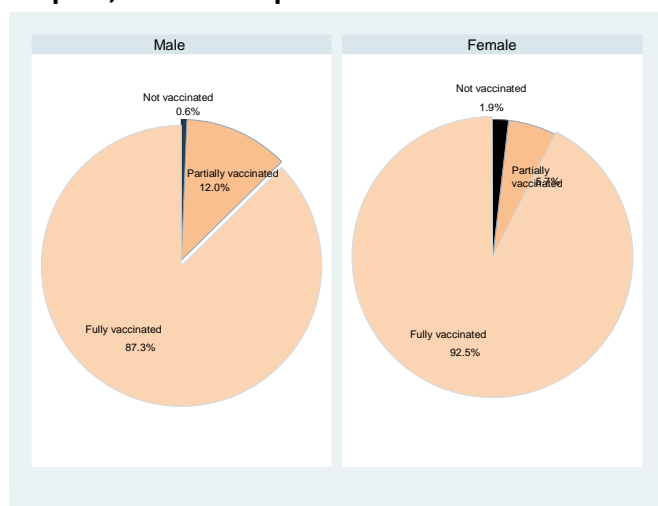


Source. VillageReach DPS Coverage Survey 2010

5.5. Fully immunized children and relationship to sex of head of household.

The data collected during the survey indicates a relationship between the sex of the head of household and the likelihood to be fully immunized. As can be seen from the pie charts below, infants in female headed households are more likely to be fully immunized (92.5%), against (87.5%) of infants in male headed households (P = 0.314 / not statistically significant). Double the number of children in male headed households are only partially vaccinated (12% in male headed households; 5.7% in female headed households).

Graph 8, Relationship between vaccination status and the sex of the head of household (%)



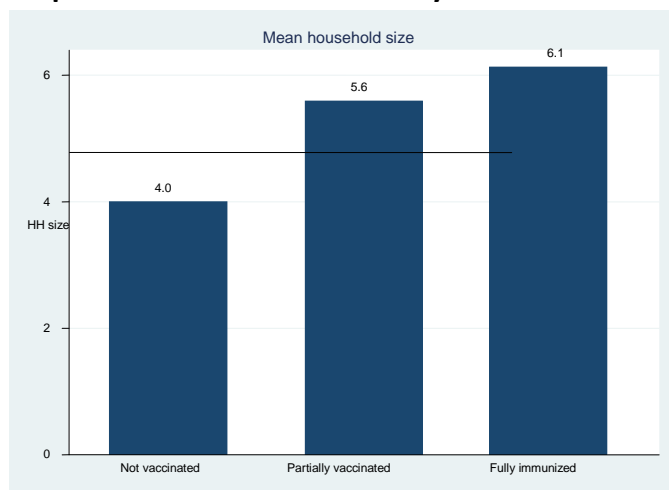
Source. VillageReach DPS Coverage Survey 2010

5.6. Size of household and vaccination status

Interestingly the data indicates that households with larger households are more likely to have infants that are fully immunized; average size of household with fully immunized children is 6.1

against 5.6 for households with partially or not vaccinated infants ($P = 0.314$ / not statistically significant). One hypothesis could be that families with more children are more familiar with health services and are accessing the services more effectively. Further investigation could help to develop strategies for sensitization using peer education – more experienced mothers to young mothers. See graphs 9 below.

Graph 9. Mean household size by child immunization status.



5.7. Reasons for non immunization

The main reasons given for the children not being immunized were that the vaccination service is distant from home (60.9%), followed by family problems that included illness in the family (13%). Less than 5% of mothers stated that they did not have any information about vaccination (4.3%), and the same percentage of those interviewed were worried about the side effects of the vaccinations (4.3%). See table 5 in the annex for details. Community leaders felt that one of the main reasons for women not taking the children for vaccination were; the long distance of the health facilities from the communities (as indicated in the household interviews) and the time that women spend in the farms that are also distant from the communities (this reason was not mentioned in the household interviews). Three of the leaders felt that there was still a lack of knowledge and that some mothers did not know about the vaccine programme, and neglected to find out about it.

5.8. Knowledge about the vaccine programme

The majority of people interviewed had heard about vaccines (94%) and nearly half (49.5%) were aware of the reason for vaccinating children. However, this result means that half of the population does not have enough information about the need and reasons for childhood vaccinations. It is important to note that a fifth of the people stated that they heard about vaccinations from community leaders (21%), a third from the mobile clinic that take public health services to the remote rural areas (34.3%) , and a further third from nurses or hospital staff (36.9%). In conclusion, the majority of people still receive information from the health

services, but that community leaders play an important role in information dissemination. See table 13 in annex 1 for details.

The community leaders also felt that the people in the community know about vaccination, and that the information comes primarily from the health staff in the health facilities or from the mobile clinics that visit the communities. Another source of the information is the leaders themselves and community based activists. Only one leader mentioned the radio as a source of information.

Although both the leaders and the household interviews identify the community leaders as sources of information there is a worrying lack of detailed knowledge of the vaccines among the leaders; 14 of the 30 leaders interviewed could not name any of the childhood vaccines and the remaining 16 were able to correctly name between 1-3 vaccines. This result points to a need to carry out specific sensitization campaigns with the community leaders in order that they can provide accurate information to community members.

5.9. Veracity of information provided.

Due to the high levels of children that had health cards (97%) the main source of information for verifying vaccine status were the health cards for each of the vaccination. Less than 5% of the information was obtained through mother informing the enumerator. See table 4 in annex 1.

6. Access to Vaccine Services

6.1. Distance to Health centre used for Vaccination

Almost all people interviewed walk to the health centre (91.5%); the remaining people use bicycles (7.6%). Over a third of people take less than an hour to reach the health facilities (37.9%), however, almost half of the sample households (46.5%) take more than two hours to reach the health facilities. The high rate of full vaccination demonstrates the tenacity of the mothers/guardians in guaranteeing that their children are protected from preventable diseases. (Table 10 annex 1)

The following table shows the information provided from the community leaders interviews about the distance to the nearest health facilities from the village/bairro where the survey was carried out. The results roughly correlate with the household data, although it should be noted that the distances and the time taken are fairly subjective. There are two communities in Mueda and Mocimboa that take between 4-7 hours to reach the nearest health centre according to the estimates of the community leaders.

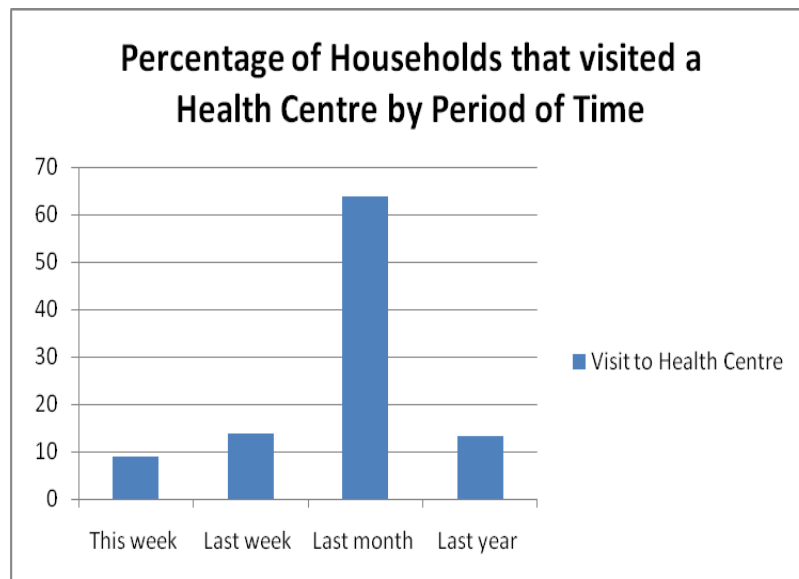
Table 6. Distance to Nearest Health Facility (ordered by communities closest through to communities furthest away from health facilities by time taken to Health Facility)

Village/Bairro	District	Distance to Nearest Health Facility
Mavala sede	Balama	20-30 minutes on foot
Macomia sede	Macomia	3 km. 1 hour on foot
Bairro Cariacó	Pemba cidade	500 mts to nearest - 2 km furthest (approx 1 hour)
Bairro Paquite	Pemba cidade	20 minutes on foot
Mieze	Pemba Metuge	0.5 km : 30 minutos by bicycle
Ncumpi	Namuno	500 metros-1.5 k. 10 minutos
Zaulane	Mecufi	0.5 km. 30 minutes on foot
Ntamba	Nangade	10 minutes on foot
Maputo	Mueda	1.2 km. 30 minutes on foot
Mirige	Montepuez	1 km. 30 minutes on foot
Muambula	Muidumbe	Less than an hour on foot
B. Ed Mondl	Pemba cidade	5 km
Mahera (PA Ancuabe sede)	Ancuabe	2 hours on foot
Nacutuco	Macomia	7 km. 2 hours on foot
Namitil	Chiure	11 km (CS Muala) e 12 km (CS Chiure sede) 2 hours on foot
Caula	Montepuez	3 km. 2 hours on foot
Nacapa	Balama	5 km. 2 hours on foot
Muco/PA de Papai	Namuno	9 km. 2hours on foot
Milamba	Namuno	18 km. 2.30 min on foot
Mahate	Quissanga	5 km. 2.30 min on foot
Imbuo aldeia	Mueda	9 km . 2 -3 hours on foot
Nampula	Chiure	7 km. 2-3 hours on foot or by bicycles
Muaja (PA Mera)	Ancuabe	3 hours on foot
Pecuarria/go to Balama sede	Balama	14 km to CS sede and 14 km to CS Impiri 3 hours on foot
Mcumbi	Palma	12 km. 3 hours on foot
Samora Machel (PA de Ucu)	Chiure	17 km. 3 hours on foot
Mugipala	Chiure	18 km. 3 hours on foot to CS Chiure Velho And 2 hours on foot to CS M'Mala
Nachingwea (seria Ntata)	Namuno	21 km. 3 hours on foot
Antadora (PA de Mbau)	Mocimboa	4 hours on foot
Nahavara	Mueda	7 hours on foot

Source. Community leader interviews

6.2. Accessing and Use of Health Care Services

Visits to health facilities are frequent with the majority of households having visited a health centre within the last month (86.7%). See graph 11 below for more details.

Graph 11. Percentage of households that visited a health centre by different time periods.

Source. Village Reach Baseline. Household Survey

Information from the community leader interviews confirms that the community has regular contact with the health services. With the exception of one leader, all had visited a health facility in the last three months, and were satisfied with the treatment they had received for themselves or a family member.

In addition to visiting the health facilities due to illness, over half of the leaders stated that they knew the head of the health facility and members of staff, and worked with the health service. 60% of the leaders stated that they had had contact with the health workers to organize: the vaccine and Vit A campaigns, cleaning and sanitation activities, distribution of Mosquito nets and to participate in the inauguration of new health facilities. The majority of the leaders confirmed that they had worked with the mobile clinics during the 2010 vaccine campaign.

6.3. Motives for Failing to Receive Vaccination (on visiting a health centre); lost opportunities.

Over a third of respondents (40.5%) stated that they had failed to receive a vaccine for their child while visiting a health centre. The reasons for not receiving the vaccination were various, the most common were; 37.3% reported that there was a lack of vaccines in the health centre; 22.9% reported vaccines were not offered on that day; 9.6% reported that health staff were not present. A further 12% stated that they did not know why they were not offered vaccinations. This is extremely serious as it represents lost opportunities for child vaccination and rapid testing of key illnesses. Given the distances that people travel to attend the health facilities, taking the greatest advantage in terms of offering services to people who attend should be a priority. See Table 15 in the annex for details.

The patterns of reasons were different for each district. Some of the key differences are highlighted below.

- Ancuabe has the highest percentage of respondents that stated that they had at one time failed to receive vaccination for their child (57%), due to not having been offered vaccines or lack of vaccines available. It should be noted Ancuabe has the lowest vaccination rates for all districts (64.3%) against the average for the total sample of (89%). Although the district coverage rate is not statistically significant this finding should be taken into account when designing the strategies for the second phase project.
- Namuno also had high levels of lost opportunities (55.6%), due to not been offered the vaccine or lack of availability of vaccines in the centre.
- Lost opportunities in the city of Pemba (52.4%) were due to staff not at work, vaccines not offered the day of the visit and lack of vaccines.
(see details table 15 annex 1)

6.4. Changes in the Quality of the Health System Offered in the last five years

Just over a third of respondents (38.5%) felt that there had been a change in the quality of the health service in the last five years. However the range of responses by district is marked, with no-one in Quissanga and only 14.2% in Muidumbe saying there had been any difference in the service; but 71.4% in Nangade and 62.5% in Mecufi stating that there had been a notable difference in the service in the last five years. (See table 16 in annex 1 for details). It is difficult to interpret these findings and more statistically valid information would be needed to draw clear conclusions.

The information from the community leaders showed that the majority of people are reasonably satisfied with the health services offered but would like improvements in the following areas; more access to medicines; better maternity services; distribution of Mosquito nets; and more mobile health clinic and/or health facilities closer to the villages. The leaders felt that the service could be improved by; having more health staff, and in particular medical doctors; construction of maternity units and in-patient facilities; and ambulances. The leaders acknowledges that in the last six years there have been improvements in the health services, including; seven leaders stated that there were improved service by the health staff; five stated that there were more medicines; six said that there were new health facilities; and two mentioned that the health facilities had ambulances.

7. Discussion points relating to vaccine coverage and access to health services

7.1. Vaccine Sensitization Campaigns

It is interesting to note that although the levels of schooling are extremely low, adherence to the vaccine programme is high, illustrating that clear public health messages (that do not rely on the written word) and active campaigning can be effective tools to increase coverage. Investment in working with community leaders could pay dividends in terms of adherence to the vaccine programme; improving their levels of knowledge will improve the efficacy of the sensitization campaigns.

7.2. Vaccine Coverage Rates

There has been a reduction in vaccine coverage from 2008 to 2010 (children below 12 months of age) of nearly 18 percentage points, although the vaccine coverage including children above 12 months of age is only slightly lower than the 92.6% in 2008, at 89% in 2010. This indicates that although the actions of the previous project appear to have introduced some lasting change in the province,¹² there are worrying trends in terms of late vaccination of children. This may be partially due to the low coverage of institutional births (45.5%)¹³ that would delay the sequence of vaccinations. It is important to carry out more detailed work on the late vaccine schedule to identify all the reasons and find solutions. Additional reasons for the lower coverage may include; lost opportunities when mothers present at the health centres and cannot vaccinate the children (see preceding paragraph 6.4); distance from the health centres that discourages repeat visits to health facilities (see preceding paragraph 6.1); or misunderstanding about the importance of the vaccine schedule. For example, the district of Ancuabe registered the highest number of missed opportunities due to not been offered vaccines or vaccines not been available and the lowest overall coverage. Although not statistically significant, the tendencies indicated in these results deserve attention and should be factored into further investigations and programming.

7.3. Satisfaction with the Health Service

There are indications that people feel that the health services have improved over the last five years. The major limitations are linked to the lack of health staff, medicine and the distance to the health facilities.

¹² Coverage rates have not dropped to pre project rates of 68%.

¹³ MICS 2009. Cabo Delgado has the second lowest percentage of Institutional Births at 45.5%, Zambezia has the lowest percentage at 40%.

8. Cold Chain System and Health Staff Performance

8.1. Interviews with health staff on cold chain management

The next set of results was obtained from interviews with health personnel (29). Interviews were carried out with health staff in all of the districts visited. A total of twenty nine interviews were carried out in health posts (10.3% of sample), health centres (86.2% of sample) and hospitals (3.4% of sample). The sample represents 21.8% of the total number of facilities in the province. These findings are indicative of tendencies and are not statistically significant¹⁴. They do, however, provide interesting information to support the launching of the Dedicated Logistics System, and will provide a basis for comparison after three years.

8.1. Management of Vaccine Stocks

At the time the survey was conducted the majority of the health workers (96%) stated that vaccinations were re-stocked on a monthly basis. However, half of the respondents (55.2%) stated that there were stock-outs during the month. Shortages of “*Pentavalente*” (protection against Diphtheria, tetanus, hepatitis B, type B influenza, *ferina* cough) vaccination were universal¹⁵; none of the health facilities had these vaccinations at the time of the survey as the vaccines had been recalled by the manufacturer. Other than the lack of *Pentavalente*, only 20% of health facilities stated that they had stock problems at the time of the survey. See the breakdown for shortage in table 4 below.

Table 7. Type of Vaccine that was out of stock in the last month (number)

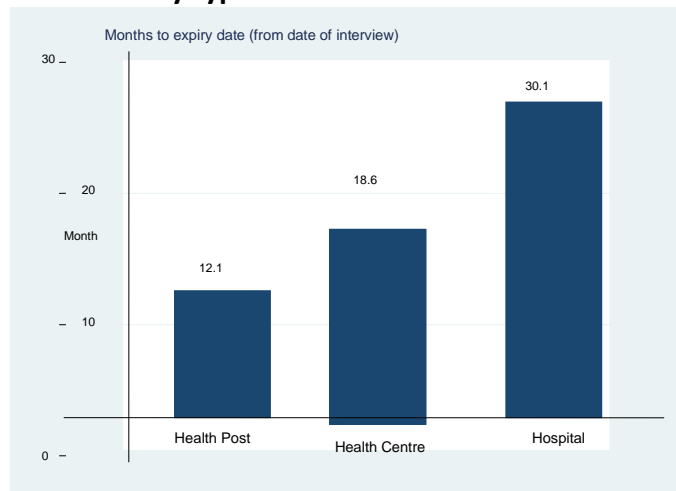
	BCG	Pentavalente	VAP	VAS	VAT
Health centre	1	25	2	2	1
Health Post	1	3	1	1	1
Hospital	0	1	0	0	0
Total	2	29	3	3	2

The majority of vaccines in the health facilities were not expired (96.7%); an encouraging result. However, it should be noted that there are key differences in terms of the date of stock between the hospitals, health centres and health posts. The time to expiry of the vaccines in the health posts is three times lower than at hospital level, and although vaccines in the health posts still have 12 months to expiry, the difference between the health facilities are indicative of key issues in the logistics management.

¹⁴ See methodology section for explanation of statistical significance.

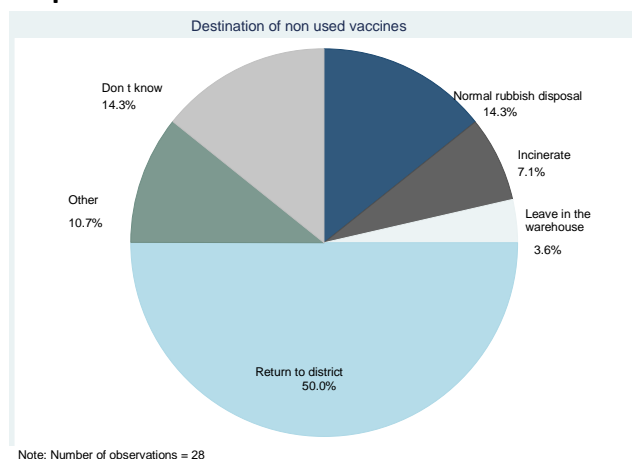
¹⁵ Unfortunately, at the time of the survey there were no pentavalent vaccines being used because there was a problem with the vaccine manufacturer and all the pentavalent vaccines were recalled.

Graph 12. Average number of months to vaccine expiry date (from date of interview) by health facility type

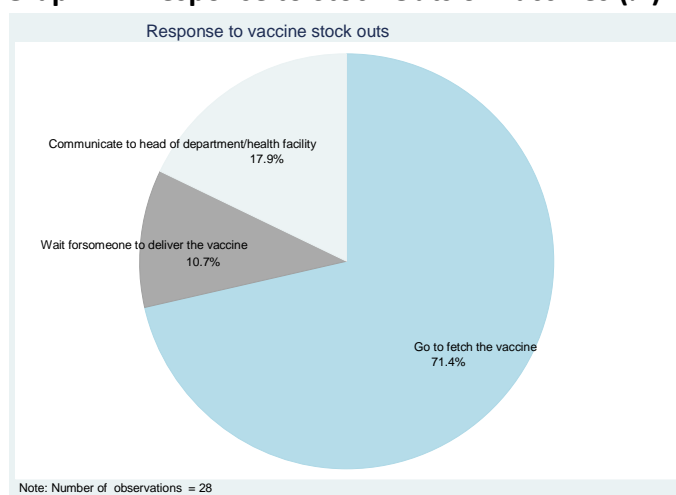


Questions were asked of health staff about the reasons for the non use of vaccines. In the health centre and hospitals there were no incidents of non use of vaccines in the last three months. All of the non use of vaccines in this study took place at health post level; the reasons given for non use were that the vaccines out of date or vaccines were damaged (table 21 in annex 1). The percentage of wastage is very low.

When questioned about the management of vaccines that have expired or are damaged, health workers gave a range of answers, of which a number are of concern. For example 3.6% stated that these vaccines were left in the warehouses and 14.3% stated that they were put into the normal rubbish disposal. Both of these responses are worrying; in the first case leaving the vaccines in the warehouse could lead to inadvertent errors with the vaccines been used; and in the second case it is extremely dangerous to place medical supplies in the rubbish disposal. All of these supplies should be placed in specific disposal units. The norm for vaccinations is that they should be returned in order to improve stock control and safe disposal. Only half of the respondents stated that the vaccines were returned to the vaccine deposit (see graph 13 below).

Graph 13. Destination of vaccines that have not been used (%)

Health workers were asked about the procedures when they do not have vaccines in stock (outside of normal delivery mechanisms). Only a tenth (10.7%) had a passive attitude, stating that they would wait for the vaccines to arrive, the majority of health workers (71.4%) stated that they would go and fetch the necessary vaccines, and a further (17.9%) said that they would communicate with the head of the department/health centre (see graph 14 below), demonstrating a proactive attitude to solving problems with the cold chain.

Graph 14. Response to Stock Outs of Vaccines (%)

9. Rapid Diagnosis Tests.

The new phase of VillageReach/EGFPA support to the DPS in Cabo Delgado will include working with the management of the rapid tests for syphilis, malaria and HIV (Test names: HIV Determine and HIV Uni-Gold). The tests for syphilis and HIV are now part of the national protocol for the identification and treatment of sexually transmitted diseases and are an extremely important addition to primary health care in the country. Rapid tests for the

identification of malaria are increasingly used in health facilities, including those without laboratories to appropriately identify cases of malaria.

9.1. Use of Rapid Diagnostic Tests (RDT)

The majority of health workers had used all of the RDTs in their health facility. The lowest usage was registered for syphilis where 17.2% of health workers stated that this test was not used in the health facility (this may be due to the presence of adequate laboratories in these health centres – information was not available to verify the reason for the non use). For HIV Determine 96.5% of health workers had used the test, 93.1% had used Uni-Gold, and 96.5% had used the rapid malaria test.

Table 8. Percentage of Health Facilities that have used RDTs

	RDT	Yes
Use of RDTs in the health facility	HIV Determine	96.55
	HIV Uni-gold	93.10
	Malaria	96.55
	Syphilis	82.76
	Others	17.24

9.2. Management of stocks of RDTs

Approximately three quarters of the health workers stated that the RDTs were stocked on a monthly basis. Syphilis tests were less frequently stocked, only (69%) of health workers stated that the tests were stocked monthly, compared to the monthly stocking of malaria (79.3%) and HIV Determine (79.3%). This finding indicates that in a quarter of the health centres stocking of the RDTs is not carried out on a monthly basis. This is reflected in the stock-outs registered for RDTs (see paragraph 9.3 below).

Table 9. Percentage of Health Facilities that stock RDTs on a monthly basis by type of RDT

	RDT	Yes	No	Sometimes
Monthly re-stocking of the RDTs	HIV Determine	79.31	10.34	10.34
	HIV Uni-gold	72.41	17.24	10.34
	Malaria	79.31	10.34	10.34
	Syphilis	68.97	20.69	10.34

9.3. Planning for reducing stock shortages.

Health workers were asked if, at any time, more stock had been needed than had been requested. The malaria rapid tests had frequently stock outs with 82.7% of respondents saying that they had needed more than was available. For the other RDTs approximately half had needed additional tests. See table 22 in Annex 1.

Table 10. Percentage of Health facilities that required more RDTs than normally available through monthly stocking by type of RDT.

	RDT	Yes
Was there any time when there was a need for more RDTs in the health facility (outside of normal monthly stock).	HIV Determine	41.38
	HIV Uni-gold	44.83
	Malaria	82.76
	Syphilis	48.28
	Other	17.24

At the time of the survey the following RDTs were not in-stock.

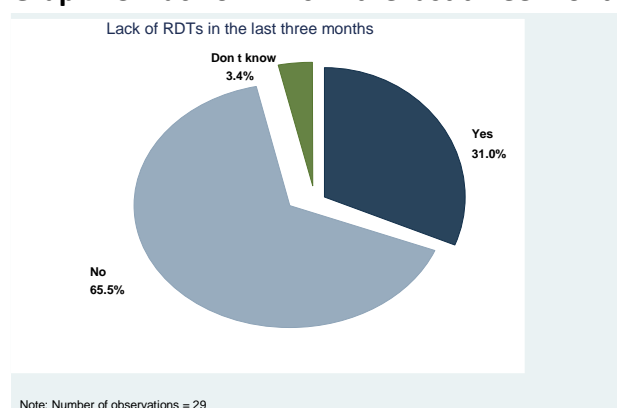
- HIV Uni-gold tests were not available in the majority of the health facilities (93.7%), syphilis tests were not available in half of the facilities (50%) and malaria tests were not available in a third (37.5%) of the facilities at the time of the survey.

The health workers stated that this was an on-going situation with almost half of the health facilities (44.4%) not having HIV Uni-gold and Syphilis RDTs during the last month, and a fifth of the health facilities (22.2%) running out of both HIV Determine and Malaria during the same period.

This reflects serious problems with the supply chain that are manifested at health facility level. The breaks in the supply chain will need to be investigated in order to improve the service.

Graph 15 below illustrates the stock out situation for all RDTs in the last three months and shows that approximately a third (31%) of the health facilities had problems with lack of RDTs at some point during this period.

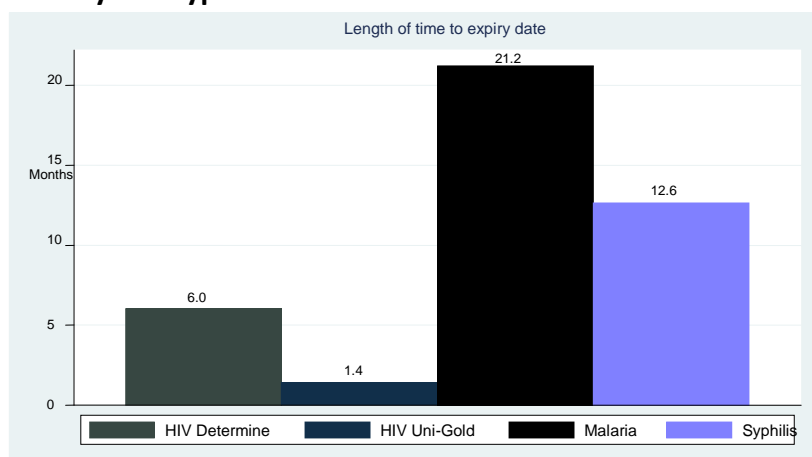
Graph 15. Lack of RDTs in the last three months (%)



For the health facilities with the RDTs in stock, the majority had RDTs with valid use by dates; the average time to expiry date varied from test to test; HIV Uni-Gold 1.4 months; HIV

Determine 6 months; Syphilis 12.6 months; and malaria 21.2 months. See graph 16 below. The short time until expiry of the Uni-Gold tests also indicates room for improvement in the supply chain.

Graph 16. Average length of time to expiry date (from day of interview) in months of the RDTs by test type.



In terms of stock management; the survey showed that in addition to stock outs of the RDTs (see preceding paragraphs), there are also RDTs that will expire or had expired while in the health facilities. Just under a fifth of the RDTs (17.8%) had expired. This anomaly indicates supply chain problems, and should be investigated as a part of the Dedicated Logistics System inclusion of RDTs. A further tenth of the RDTs (10.3%) were damaged and not usable. Part of stock control problems of the RDTs could be explained by the lack of stock control cards for the RDTs. Nearly one-third (31%) of respondents said that there were no stock control cards and 17.2% said they did not know if there were stock cards or not. The use of this fundamental (and simple instrument) for stock management should be part of the capacity building programme for stock management.

9.4. Disposal of expired or damaged RDTs

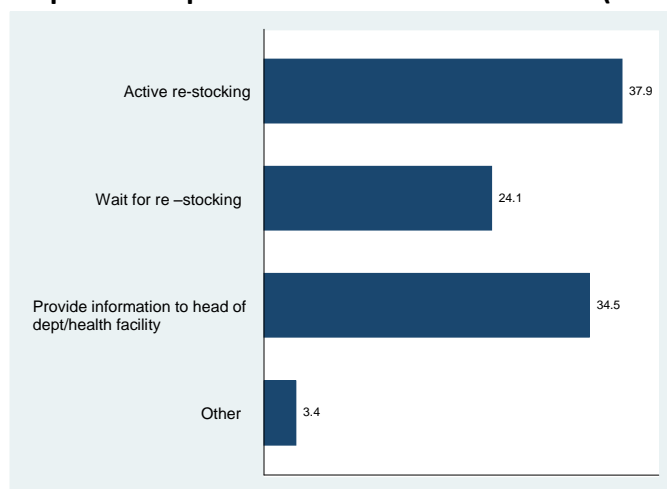
Two thirds of the respondents stated that the unusable tests were returned to the district warehouse (66.7%). However, a third (33.3%) stated that the unusable RDTs were kept in storage in the health facility. As discussed previously this practice should not be encouraged as it may induce errors in application of the RDTs.

9.5. Re-stocking strategy

Health workers were asked what they did when the stock of RDTs ran out; just over a third (37.9%) stated that they would go to the district or province to get additional stocks; and just under a third stated that they would inform the head of the department/health facility about the situation. A quarter of the respondents said they would wait for more RDTs to arrive. As with the infant immunization statistics, it is of concern that there are a quarter of health workers that would not actively seek to rectify the stock out situation.

See graph 17 below.

Graph 17. Response when there are no RDTs (% of responses)



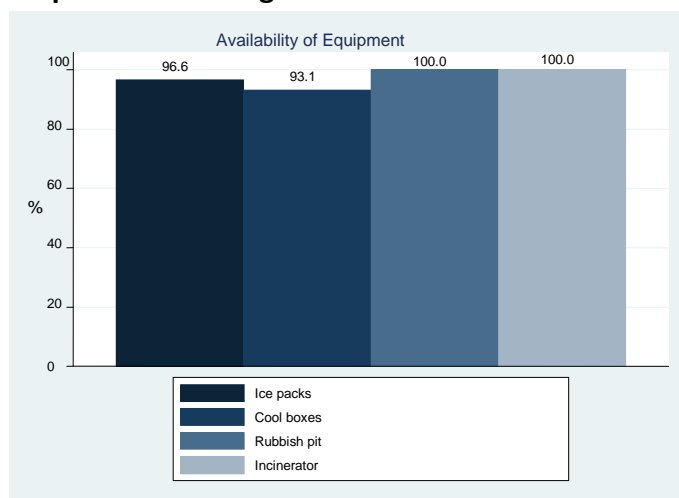
10. Essential Cold Chain Equipment

10.1. Fridge management

The majority of the health centres (96.6%) had functional fridges. The majority of the fridges are gas run fridges (89.3%)¹⁶, followed by electric fridges (7.1%); with a small number of solar powered fridges (3.6%). With the exception of three health workers, the respondents stated that it was possible to maintain the correct temperature for the vaccines and the RDTs. Three of the twenty nine fridges (6.9%) were not functional at the time of the survey, and four fridges had had problems in the last month (13.8%).

In addition to fridges, the health workers were asked if they had cool boxes, ice packs, rubbish pits and incinerators. The results are encouraging with the vast majority of respondents stating that they had all the above equipment. All health facilities had rubbish pits and incinerators, and over 90% had both cool boxes (93.1%) and ice packs (96.6%). See graph 18 below. In terms of disposable equipment, all of the health facilities (100%) have gloves, but only 69% have overalls. The survey did not address the quality of the equipment to verify compliance with national standards.

¹⁶ It should be noted that the introduction of gas run fridges was a key intervention in the VillageReach 2002-2007 project. These fridges are still the principal type found in the province.

Graph 18. Percentage of Health Facilities with Essential Cold Chain Equipment

10.2. Vehicle Use

All health facilities had access to vehicles. The vehicles used by the health facilities were generally double cabin 4x4, only two of the health facilities used ambulances for vaccine stocking. The vehicles were approximately 4 years old with an expected life expectancy of 2 years. On average the vehicles broke down three times in the last twelve months. Vehicle management continues to be a major obstacle for good immunization service management.

10.3. Temperature control

Three measures of temperature control were observed in the health facilities, namely; instructions for fridge management; forms for registering twice daily temperature of the fridge; and the temperature of the fridge on the day of the observation.

There were five cases where the temperature was outside of the acceptable range of 2 to 8 degrees in the twenty nine health facilities. Approximately a quarter of the fridges did not have a form to register twice daily temperature (24.1%) or instructions on fridge management (21.7%). The health posts showed the most problems; only one health post had a temperature control register and temperature in the correct range. Two of the three health posts had instruction manuals for the fridges. The health centres did not have as many problems but still 20% of the facilities did not have fridge operation instructions or temperature control forms; and 12% did not have the correct temperature on the day of observation. (see table 25 in annex 1)

These observations reinforce the findings in the other areas of the survey, i.e. that considerable work needs to be carried out at the lowest levels of the health system in order to ensure quality service for the most vulnerable households living in remote rural areas.

10.4. Health worker morale

Although the majority of the health workers (79.3%) feel that their work is important as they help to prevent illness, a full fifth of the health workers did not feel that their work was important (20.3%). With the exception of one health worker, all the staff members were confident in their ability to handle vaccines due to their training and experience. Two thirds of health facilities (69%) were displaying up-dated vaccination coverage graphs. The mixed picture presented by these findings suggests that there are some morale issues for health workers, but that in general there is commitment and confidence among health workers to provide a quality service.

Health workers had received supervision visits during the last twelve months (95.7%) and the majority stated that they had received advice (87%). Although there was no further inquiry in this survey about supervision this is a key element of immunization service management and can be a positive force for change in both management of vaccines, cold chain and health worker morale.

11. Conclusions and Key Observations

High coverage rates indicate that the activities undertaken in the five year project from 2002 to 2007, may have contributed to longer term sustainability of the system performance during the three years since the termination of the first project. However, the drivers behind the lower percentage coverage rate for children fully immunized below 12 months of age should be analysed and measures taken to improve the coverage rates during the new phase of the programme.

The second phase of the system implementation will concentrate on consolidating these gains and integrating the management of the Rapid Diagnostic Tests (RDT) for malaria, HIV and Syphilis. The data indicates that there are considerable challenges in the management of the supply chain for the RDTs, ranging from the regular replenishment of stock to managing and preventing stock shortages.

The demographics of the population have not changed substantially since the 2008 survey. Equal access to health facilities continues to be problematic with half of the population walking for two hours to reach the nearest health facility. These factors will continue to have an influence on the success of second phase implementation of the project.

Some issues raised in the baseline:

- i. There is a need to ensure that adequate attention is given to the health post level of the cold chain as this continues to be the weakest point in the chain, but represents an essential access point for households in remote rural areas
- ii. There is a need for further analysis of the lost opportunities for vaccination or testing. People are going to health facilities but are not always receiving the necessary

- services. Working to reduce failures in the service offered are essential for improving coverage
- iii. Consider mother to mother education techniques to take advantage of older women's familiarity with the health system to improve vaccine calendar compliance with younger mothers;
 - iv. Develop specific IEC material targeting male heads of households around sensitization on the importance of infant immunization programmes .
 - v. There are clearly serious stock management issues relating to the RDTs. Learning from the experience of improving the vaccine cold chain, the Dedicated Logistics Systems is well positioned to make similar improvements for RDTs.
 - vi. In addition to working on the "hardware" of the system (fridges, vaccine stocks etc), it is important to work on staff morale as the implementation of a quality service requires dedication of health service staff, and there are clear indications that a significant proportion of the staff do not feel that their work is making a valuable contribution.

Maputo

September 2010.

References

MICS. Multiple Indicator Cluster Study. INE UNICEF. 2009

Statistical Analysis. Field Work Results and Data Analysis from the Evaluation of the MISAU/FDC/VillageReach Project to Support PAV in the Cabo Delgado Province of Mozambique. October 20. 2008. Katie Leach-Kemon, Researcher Mariana Dionísio, Researcher. Nelia Taimo.

World Health Organization. Immunization Cluster Coverage Survey--Reference Manual. Geneva, 2005

Annex 1. Detailed Tables of Results (attached under separate cover)

Annex 2. Community Leaders Interview List

Quadro – Líderes entrevistados por aglomerado, posição e nome

Distrito	Aglomerado	Posição do Líder	Nome do Líder
1.Namuno	Ntata	Chefe da aldeia	Fabião Feliciano
2.Namuno	Ncumpi	Líder comunitário	José Constantino
3.Balama	Nacapa	Chefe da aldeia	Marques Assamo
4.Montepuez	Caula 12	Chefe da aldeia	Alexandre Mira
5.Chiure	Mugipala	Chefe da aldeia	Manuel Muarica
6.Chiure	Namitil	Chefe da aldeia	Rafael Gabriel
7.Chiure	Samora Machel	Chefe da aldeia	Maria Bassina
8.Namuno	Muio (substituto de Namacapa)	Chefe da produção	Joaquim Moranmua
9.Montepuez	Mirige 13	Chefe da aldeia	João Jonas Assane
10.Chiure	Nampula	Regulo	Regulo Muaia
11.Mueda	Maputo	Líder comunitário	Victor Manuel Nicudec
12.Mueda	Nahavara	Líder comunitário	Sitamili Cavaga
13.Nangade	Ntamba	Sem resposta	Carlos Oreste Muicumba
14.Mueda	Imbuo aldeia 15	Sem resposta	Nchagueu
15. Palma	Mcumbi	Autoridade Tradicional	Augusto Chaude
16. Mocimboa	Antadora	Chefe da aldeia	Feliciano Agostinho
17.Muidumbe	Muambula	Sem resposta	Antonio Andre Chicumene
18.Quissanga	25	Adjunto do chefe da aldeia	Luis Momade
19.Mecufi	Zaulane B 10	Chefe da localidade	Muamba Andissone
20.Macomia	Nacutuco 26	Adjunto do chefe da aldeia	Reduane Nacir
21.Macomia	27	Adjunto do secretário do bairro	Valerio Adamo Inssa
22.Ancuabe	Mahera 2	Chefe da aldeia	Adriano Cassimo
23.Ancuabe	Nauaja (???)	Chefe da aldeia	Gordiano Antonio
24.Pemba Cidade	Cariacó sede	Responsável Saúde Cariacó	Bartolomeu Saide Selemane
25. Pemba Cidade	Eduardo Mondlane	Adjunto do chefe do bairro	Amade Momade
26.Pemba Cidade	Paquite	Chefe do bairro	Sele Abudo
27.Balama	Mavala sede	Chefe da aldeia	Paulo Iacile
28.Balama	Pecuaría	Chefe da aldeia	Carlos Gomes
29.Namuno	Milamba	Líder Comunitário	Bendita Laina
30. Pemba Metuge	Mieze	Chefe da aldeia	Suade Muipia

Annex 3. Questionnaires used in the survey (attached under separate cover).