

A Study to Describe Barriers to Childhood Vaccination in Mozambique

Final Report

July 2003



Final Draft

Submitted to:

United States Agency for International
Development

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Acknowledgments

Gratitude is expressed to the EPI and RESP teams at the Ministry of Health central level, without whom this survey simply would not have been possible. In each of the three sampled provinces (Zambezia, Gaza, and Nampula), the Provincial Health Director and/or Medical Director forged a pathway to allow fieldwork in districts and communities to proceed smoothly. At each district, EPI directors managed difficult connections to notify health facilities that the teams were on the way and thus assured a warm welcome at every health center, health post, and rural community.

The advisory group was instrumental in forming a sound protocol and guiding subsequent stages of the study. Members included the following representatives:

Ministry of Health: Dr. Martinho Dgedge, Adjunct National Health Director; Dr. Mouzinho Saide, Director, RESP; and Dr. Ana Charles, Manager, EPI

USAID: Dr. Ilka Esquivel, Results Leader, Health Support Sector; and Dr. Christian Barratt, HPN Officer, SO3

HSDS (JSI bilateral project): Dr. Tim Rosche, Project Director; Dr. Renata Schumacher, Child Survival Advisor; Sr. Manuel Matosse, EPI Program Officer;

UNICEF: Dr. Jonas Chambule, Project Officer Health and Nutrition Program

WHO: Dr. Lucia Linares, Epidemiologist Advisor.

Project HOPE performed the difficult task of administering the study and coordinating communications between partners; and both Population Services International and World Vision provided valuable support in locating and contracting experienced qualitative and quantitative interviewers (listed in Annex 1).

Finally, acknowledgment must be given to the interviewer trainers who worked long hours under sometimes difficult conditions to assure that interviewers were prepared before being sent to the field:

Dr. Cristovão Muahio, Instituto Nacional de Estatístico

Dra. Prafula Jaiantilal, RESP

Dr. Aurelio Miambo, University of Eduardo Mondlane

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Definition of Terms and Acronyms

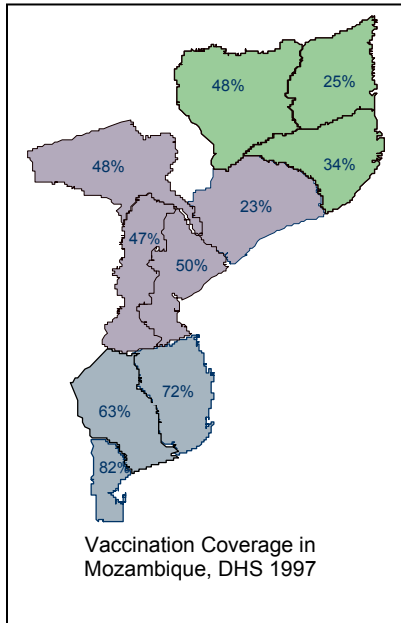
| | |
|---------|--|
| AEFI | Adverse Events Following Immunization |
| DHS | Demographic and Health Survey |
| EPI | Expanded Program on Immunization |
| EHP | Expanded Health Program |
| GT SWAP | GT Sector Wide Approach to Programming |
| HSDS | Health Services Delivery Support Program |
| IEC | Information, Education, and Communication |
| IMCI | Integrated Management of Childhood Illness |
| ISRI | Instituto Superior de Relações Internacionais |
| MOH | Ministry of Health (Mozambique) |
| NGO | Non-Governmental Organization |
| PVO | Private Voluntary Organization |
| QUIBB | Basic Indicators of Well-Being Study |
| RESP | Ministry of Health's IEC Department |
| USAID | United States Agency for International Development |
| UNICEF | United Nations Children Fund |
| WHO | World Health Organization |

1.0 Introduction

1.1. Background

The Ministry of Health's (MOH) Expanded Program on Immunization (EPI) has recognized a number of barriers to higher and more timely vaccination coverage, including vaccine stock ruptures; lack of fixed facilities within easy access of approximately half of the population; shortage of well-trained field staff; and misconceptions regarding vaccination by primary care givers and families. Much of the population does not speak Portuguese, and 70 percent of women country-wide are illiterate, compounding the challenge of public education. A number of these factors are the legacy of decades of war, during which health facilities and schools were destroyed, trained staff were lost, and few new professionals were trained.

Little objective, systematic data exists to describe the Mozambican situation with regards to vaccination. An international country case study on communication support for immunization (UNICEF, WHO/AFRO, and USAID 1999) recommended formative research on barriers to and motivations for improving immunization performance. USAID funded the MOH, through Project CHANGE, to conduct such a study during 2002/3. This report presents study results. Implementation has been supported by an advisory group with MOH (departments of EPI and RESP), USAID, JSI/HSDS, WHO, and UNICEF representation; and a work group with MOH (departments of EPI and RESP) and USAID representation. Project HOPE, an international NGO, has provided in-country administrative support.



1.2. The Expanded Program on Immunization in Mozambique

Mozambique's Expanded Program on Immunization (EPI) began in 1979 with the objective of reducing morbidity and mortality from tuberculosis, diphtheria, pertussis, tetanus, poliomyelitis and measles.

At the MOH's central level, the EPI is a section within the Department of Community Health. All programs within the department are integrated. As a result, EPI competes with nutrition, reproductive health, child health, and oral health for limited financial and human resources. Control is somewhat decentralized, with provinces taking responsibility for logistics and management at district health facilities.

As with other health programs in Mozambique, EPI effectiveness is hampered by chronic shortages of resources, limited trained health personnel, low

salaries, and difficult logistics due to a large geographic area and poor communications and infrastructure. Full coverage rates remain low in many provinces and children frequently receive their vaccines far beyond the due date.

Routine Vaccination Schedule in Mozambique

| | |
|----------|----------------------|
| 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 |

As much as half of the population lacks good access to fixed health facilities that offer routine immunization, and since 1992 the EPI has been relying on mobile brigades based in district capitals to reach populations far from functioning health facilities. In part, these services are supported by NGOs present in provinces. Even with mobile brigades, however, some groups are hard to reach. In sparsely populated areas, people have to make difficult and time-consuming journeys to reach fixed facilities or mobile brigade outreach areas. Problems of access are compounded by logistical difficulties including the lack of vaccine and consumables, cold chain breakage, and transportation problems.

The MOH's educational arm, RESP, is responsible for information and education in support of vaccination. To date, there have been various successes concerning specific vaccination campaigns, but limited educational activities to support routine vaccination. Most efforts involve group health education talks at the point of service. A basic understanding of routine vaccination is missing, which may affect parents' demand for vaccination services; and adherence to the vaccination schedule.

In recent years; the EPI has introduced Hepatitis B vaccine and vitamin A supplementation for all children; trained all EPI staff nationwide in management and application of the new introductions; reviewed and modified the child health card; increased the EPI staff; and given some attention to supply of cold chain materials and conducted the associated training.

1.3. Related Studies on Immunization Knowledge, Attitudes and Practice

Although it has been recognized that there is an urgent need for a better understanding of existing barriers to timely vaccination of children, and the knowledge, attitudes and practice of parents and health workers regarding vaccination, only three small qualitative studies conducted in 1999 have sought to provide insight.

Eight focus group discussions with primary care givers were conducted in the provinces of Sofala, Zambezia and Nampula (Rocha 2000) as part of an evaluation of four PVO child survival projects¹. Results revealed a low level of knowledge and understanding on the role of vaccination in the prevention of childhood diseases. In addition it was found that many primary care givers do not know their child's age or birthday, which makes it difficult for them to know when the child is due for a particular vaccine even if they were aware of the vaccination schedule.

A qualitative study conducted in three provinces (UNICEF, WHO/AFRO, and USAID 1999) a team studied communications and social mobilization support for polio eradication and routine vaccination in Mozambique. The team interviewed mothers,

¹ Terre des Hommes/ Beira; Project Hope/ Zambezia; Save the Children and World Vision/Nampula

fathers, traditional birth attendants, community and religious leaders, and health care workers. Results show that, while in general people understand that vaccination prevents diseases, they do not know which diseases are prevented nor do they mention vaccination as an important means to prevent disease in children.

Qualitative research by the Higher Institute of International Relations (Baptista and Baleira 1999) describes several misconceptions that cause parents to fear vaccines and to refuse to bring in their young children for vaccination. These misconceptions include the ideas that vaccines “suck blood out of a person,” prevent women from having more children, and introduce disease in the body. Taboo, tradition and religion are cited as keeping people from immunizing their children. Groups specifically mentioned as opposing vaccine include followers of John Malanga and Jehovah’s Witnesses.

Both studies (UNICEF, WHO/AFRO, and USAID 1999 and Baptista and Baleira 1999) cite “unfriendly” health services as a factor diminishing parent’s demand for vaccinations. Problems include long waiting times, being charged for free health services, inconvenient opening hours, unreliable services due to logistical problems, failure to provide essential information, and poor treatment by health personnel. Health staff’s poor pay, lack of orientation, low motivation and few incentives contribute to the problems.

While these studies provide an indication of problem areas, a more complete analysis of the situation will allow a comprehensive understanding of existing barriers and will allow informed management decisions.

2.0. Study Objectives

2.1. General Objective

The present study gathered quantitative and qualitative information that describes problems, barriers, and successes in relation to vaccination services in 36 communities in each of three provinces in Mozambique. It is intended that results will be used to develop clear recommendations for policies, management, and activities of the MOH's Expanded Program on Immunization, and, ultimately, to increase vaccination coverage countrywide.

Areas of interest include timeliness of vaccinations; dropout from services and reasons for dropout, public perception of vaccines and vaccine services; quality of service delivery; and IEC needs and opportunities.

2.2 Specific Objectives:

1. Explore perceptions, experiences and expectations among the population sampled concerning the provision of vaccination services in fixed posts and mobile brigades
2. Describe problems of access to vaccination services in terms of time and quality of services
3. Describe health worker role in provision of vaccination services in fixed posts and mobile brigades
4. Identify sources of information used by the population regarding vaccinations

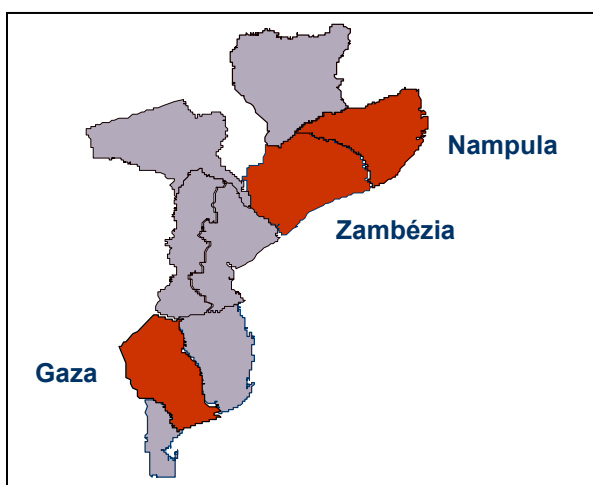
5. Identify the occurrence of missed opportunities for vaccination and reasons for missed opportunities
6. Explore perceptions, understanding, and use of the child health card by primary caregivers and health workers

3.0 Study Methodology

3.1 Study Area

One province was selected from each of the three regions of the country; including a worst-case scenario (Zambezia) and a best-case scenario (Gaza) in terms of vaccination coverage figures (range 23%-64%).

The selection of these three provinces provides a look at the broad spectrum of barriers that mothers face in achieving timely vaccinations for their children throughout the



country and allows for a comparison of areas with low coverage versus areas with relatively high coverage. In each province, four districts representing areas of relatively high versus low coverage - and including both urban and rural communities-were selected in concurrence with the Provincial Director of Health, the Medical Director, and/or the EPI Director. For a list of selected health facilities and associated communities within each district, see Annex 2.

The sampled districts include:

| Zambezia | Nampula | Gaza |
|-----------|----------------|-----------|
| Milange | Nampula Cidade | Xai Xai |
| Ile | Malema | Bilene |
| Pebane | Erati | Guija |
| Quelimane | Mogovolas | Massingir |

3.2 Study Design

The study consisted of five components that provide complementary sources of quantitative and qualitative data. In the three provinces combined, the study included:

- 851 valid interviews using structured questionnaires with purposefully selected primary caregivers of children between 3 and 23 months of age (individual interview questionnaire; Annex 3).

- 24 focus group discussions with primary caregivers of children between 3 and 23 months of age. Mothers were divided into two groups: those of ‘on-schedule’ children and those of not-on-schedule children² (focus group discussion guide; Annex 4).
- 32 in-depth interviews with health care workers selected from a cross-section of health staff responsible for planning and/or routinely providing vaccination services, information, and/or education (health worker interview guide; Annex 5)
- 32 observation-based assessments of the actual provision of vaccination services at selected health facilities (facility observation guide; Annex 6)
- 299 exit interviews with primary care givers of children below 24 months attending vaccination services at each of the selected health facilities, with a focus on the use of the child health card (exit interview questionnaire; Annex 7)

Original protocol described slightly larger sample sizes for some instruments: 864 individual interviews, 24 focus group discussions, 36 in-depth interviews with health care providers, 36 facility observations, and 360 exit interviews. Conducted and/or valid interviews were somewhat fewer than the protocol originally described because mobile brigade services were difficult to find in some districts during the time of fieldwork; and thus the associated observations/exit interviews/health worker interviews could not be conducted. In Gaza, data collection was constrained by heavy rains during the days of fieldwork, limiting access to mobile brigade areas. A small number of individual interviews were discarded due to interviewee selection error, or inaccurate completion of questionnaires.

3.3 Sample Selection

In each province, field supervisors used the following steps to identify the sample in selected districts for each survey instrument, resulting in a purposefully selected, non-probability sample for each study component:

Individual interviews with primary caregivers (‘mothers’)

1. In each of the selected districts health facilities were stratified by type of clinic providing vaccination services (health clinic, health post with cold chain facilities, and mobile brigade sites). In each domain, one health facility was selected purposefully in discussion with the district or provincial health authorities.
2. For each of the selected health facilities, a list of all communities (villages) in the catchment area was compiled, and from this list a sample of three communities (clusters) per health facility was selected purposefully. Communities of varying distances to the health facility were included in the sample.
3. From each of the three selected clusters, 8-10 primary caregivers of children 3-23 months of age were selected using a random walk method. Where there was more than one child in the desired age group in a household, the youngest child was selected and the primary caregiver of this child interviewed.

²‘On-schedule’ for focus group discussions was defined as:
 3 < 3 ½ meses BCG + Polio 1 + DTP-HepB 1
 3½ < 6 ½ meses BCG + Polio 2 + DTP-HepB 2
 6 ½ < 10 meses BCG + Polio 3 + DTP-HepB 3
 10 < 24 meses BCG + Polio 3 + DTP-HepB 3 + Measles

Exit interviews, health facility observation and health worker interviews

4. Health facility observation of provision of vaccination services, client exit interviews, and health worker in-depth interviews all took place at the health facilities selected in the first stage of sample selection (one health center, one health post and one mobile team site in each district). An interviewer observed the provision of vaccination services, from start to finish on the given day, using the observation guide.

For exit interviews at the same health facility a quota sampling system was used: the interviewer intercepted the first caregiver as she left vaccination services; and conducted subsequent interviews with each caregiver leaving services at the moment the interviewer finished with the previous caregiver until a quota of 10 interviews was reached. Criteria for inclusion of primary care givers included caregivers of children less than 24 months of age, seeking vaccination services.

Among health workers working a selected health facility, the person with chief responsibility for vaccination services was selected to participate in health worker interviews. If the chief person was not available, another health staff involved in vaccination services was interviewed.

Focus groups discussions

5. In the catchment area of each of the selected health facilities, focus group participants for the two types of focus groups were selected. Participants for “on-schedule” discussion group were selected *mainly* at health facilities; and participant for “not on-schedule” group were selected *mainly* in communities. (Selection criteria; Annex 8)

3.4 Interviewer Training and Field Work

In each of the three provinces, a group of interviewers was selected based on previous experience and knowledge of local languages. Interviewers were divided in two groups, roughly described as the quantitative group and the qualitative group. The quantitative group conducted individual interviews, while the qualitative group was responsible for exit interviews, facility observation, health worker interviews, and focus group discussions. Groups received concurrent five-day trainings directly before fieldwork.

While all study instruments were in Portuguese, each interviewer was required to create a personal translation guide for local language to be used during data collection. Main local languages included Xichangana, Emakhuwa, Elomwe, and Echuwabo.

Fieldwork took place in October and November of 2002, just before the heaviest rains. In all provinces, fieldwork was completed within five days. The four districts were sampled concurrently, and a trained district supervisor led each district team. A provincial supervisor was based in each provincial capital.

Data collection quality control measures included selection of experienced interviewers; language testing to assure competence in local language; trained supervision at central, provincial, and district levels; and emphasis on practicum during training.

Problems encountered during training and conduct of field work included a lower than expected capacity of interviewers, and a consequent shortage of time during training to fully equip interviewers to conduct quality interviews. Recommendations for future surveys include longer training periods, greater emphasis on local language proficiency, and smaller interview teams that are able to work for a longer period.

3.5 Data Management and Analysis

Quantitative Data Analysis

Data from the individual interviews, exit interviews and health facility observations were double entered using EpiInfo version 2002. A data entry program guided and controlled data entry. After data entry, a verification program was run and data differences checked and corrected.

In data analysis, four indicators of vaccination coverage were used:

- 1) “fully immunized child” = standard indicator measuring the percentage of children of 12-23 months who have received all required EPI vaccines; regardless of whether they received a vaccine at the recommended age.
- 2) “on-schedule” = for any given age the percentage of children who have received *all* required vaccines *for that age group*³ (see Box 2)
- 3) “timeliness” = for each specific vaccine the percentage of children who have received this vaccine within *one month* of the due date.
- 4) “Drop-out” = the difference in the percentage of children 12-23 months of age who received DPT-HepB1 and those who received DTP3; and same difference between Polio1 and Polio3.

Definition of “On-Schedule” as an Indicator of Coverage

A child is considered ‘On-schedule’ if she/he has received all of the vaccines in her/his age category:

| <u>Age Category</u> | <u>Required Vaccines</u> |
|---------------------|---|
| 3-3 ½ months | BCG, Polio1, DPT-HepB1 |
| 3½-4 ½ months | BCG, Polio1+2, DPT-HepB1+2 |
| 4 ½-10 ½ months | BCG, Polio1+2+3, DPT_HepB1+2+3 |
| 10 ½-24 months | BCG, Polio1+2+3, DPT-HepB1+2+3, Measles |

“On-schedule” is used as the main outcome variable for cross-tabulations to assess the relationship between selected characteristics and vaccination status.

Qualitative Data Analysis

For each focus group discussion, the interview teams compiled response category tables directly after discussions were conducted. Tables, complete raw notes; and taped

³ The Hepatitis B vaccine was introduced only a year ago and therefore not considered in the definition of on-schedule for those children vaccinated before the introduction of this vaccine.

records were submitted for analysis. For analysis, discussions were grouped by type (on-schedule versus not-on-schedule); table data was confirmed using taped transcripts, summary tables were created; and material was coded. Further groupings were made by sub-themes, and trends and patterns were noted.

A similar process was conducted for health workers interviews (although interviews were not taped). Immediate review and organization was conducted in the field by interview teams. At central level, responses were grouped by themes and sub-themes. Summary tables were developed, and broad conclusions were drawn.

4.0 Results

Key results are based on analysis of the individual interviews with mothers of children aged 3-23 months, and are organized by study objective. These results are supported by focus group discussions, health worker interviews, exit interviews, and facility observation. Data source is noted in the lower left corner of each table. For a more complete look at qualitative results, see focus group discussion summaries (Annex 9) and health worker interview summaries (Annex 10)

4.1 Characteristics of Sample

For the three provinces, selected characteristics of the population of the quantitative component of the study were compared to characteristics of the population in these same provinces as described by the Basic Indicators of Well-Being Study conducted in 2001 (QUIBB 2001). The QUIBB is a population-based 2-stage cluster sample. This comparison indicates that, while this study sample was *not* randomly selected and therefore is *not* representative, it shares key characteristics of a representative sample (see Table 1).

Since the study population was selected around health facilities, the study sample is expected to be biased upward with regards to variables related to access to health care, including indicators of vaccination status. This is indeed the case for the percentage of mothers who had prenatal care and for the percentage of mothers who delivered in a health facility as well as for the percentage of children with health cards, which are all higher in this study population than reported in the QUIBB. However, this is not the case for vaccination coverage, which is similar in the two populations, except in Zambezia where coverage as reported in the QUIBB was extremely low.

Additional details about the characteristics of the study population are included in Table A1 (Annex 11). All respondents, except four, were mothers of the selected child and in the remainder of this report respondents will be referred to as 'mothers'.

Table 1. Comparison of study population with population of random sample

Comparison of study population with QUIBB 2001 for some selected characteristics

| | Zambezia | | Nampula | | Gaza | | Total | |
|-------------------------------------|----------|-------|---------|-------|-------|-------|-------|-------|
| | study | QUIBB | study | QUIBB | study | QUIBB | study | QUIBB |
| literacy* | 17.4 | 11.4 | 17.5 | 15.5 | 39.3 | 43.9 | 24.8 | 28.8 |
| has electricity | 3.4 | 1.1 | 2.7 | 3.8 | 5.3 | 5.0 | 3.8 | 5.8 |
| has a radio | 42.4 | 48.9 | 52.6 | 49.3 | 58.8 | 43.6 | 51.2 | 49.5 |
| has a bicycle | 42.6 | 46.8 | 32.5 | 23.3 | 31.4 | 15.3 | 35.6 | 27.2 |
| does not have a latrine (field) | 66.4 | 93.0 | 48.6 | 73.2 | 15.8 | 30.1 | 43.6 | 57.5 |
| had prenatal care | 67.8 | 48.4 | 84.4 | 64.5 | 96.5 | 89.7 | 82.9 | 75.8 |
| had delivery in health facility | 30.9 | 28.1 | 41.7 | 34.6 | 73.2 | 64.0 | 48.6 | 49.1 |
| child has health card | 81.4 | 57.8 | 80.7 | 74.3 | 98.9 | 90.0 | 87.1 | 81.0 |
| children 12-23 mos fully vaccinated | 45.5 | 14.9 | 45.1 | 51.9 | 73.0 | 77.6 | 55.6 | 53.9 |

* The definition of literacy is slightly different between the two studies. In this study it includes all mothers who can read a letter easily or with difficulty. In QUIBB, women were considered literate if they reported being able to read and write.

source: Individual Interviews

4.2 Age distribution of children

Table 2 presents the age distribution of children about whom data regarding vaccination status were collected. No significant differences in age distribution are seen between the three provinces or between health facilities with fixed vaccination services (i.e. health center and health posts) and mobile brigade areas (data not shown). Differences would be a concern since the likelihood to be on-schedule increases with age. Over half of the children (57.9 percent) are 10 months or older and should have completed the full series of vaccinations according to the EPI schedule.

Table 2. Age distribution of children by province

Percentage distribution of children by age group and province

| | Zambezia | Nampula | Gaza | Total |
|------------------|---------------|---------------|---------------|---------------|
| | <i>n</i> =286 | <i>n</i> =280 | <i>n</i> =285 | <i>n</i> =851 |
| <i>age group</i> | | | | |
| 3-5 months | 21.0 | 15.0 | 18.9 | 18.3 |
| 6-11 months | 32.2 | 41.4 | 27.7 | 33.7 |
| 12-23 months | 46.9 | 43.6 | 53.3 | 47.9 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |

source: Individual Interviews

4.3 Vaccination Status

Possession of health card

Vaccination status was assessed by copying vaccination information from the child health card onto Individual Questionnaires. For those children who did not have a health card, vaccination status was assessed based on the mother's memory of vaccines given. For 80.7 percent of children, mothers presented the child health card. An additional 6.4 percent of children had a card but the mother could not present it. In Zambezia and Nampula about 80 percent of children had a card, while in Gaza virtually all children had a child health card (see Table 3). The high percentage of children with a

child health card indicates that most children have contact with health services at least at some point in time. Further details are presented in Table A2 Annex 11.

Table 3. Possession of the child health card

| Percentage of children with child health card by type of health facility and province | | | | |
|---|---------------|---------------|---------------|---------------|
| | Zambezia | Nampula | Gaza | Total |
| | <i>n</i> =286 | <i>n</i> =280 | <i>n</i> =285 | <i>n</i> =851 |
| fixed facility | 91.1 | 83.3 | 99.1 | 91.5 |
| mobile brigade | 61.7 | 75.5 | 98.6 | 76.9 |
| Total | 81.5 | 80.7 | 98.9 | 87.1 |

source: Individual Interviews

Vaccinations On-Schedule

Table 4 shows the percentage of children who never received any vaccine; those who received some vaccines but are behind on the vaccination schedule; and those who are on-schedule. In all three provinces, the percentage of children on-schedule is higher in the fixed facility areas as compared to mobile brigades. In fixed facility areas, about half of all children are on-schedule. In the mobile brigades service areas, just over a third are on-schedule. Marked differences between the three provinces are seen. Children in Gaza are far more likely to be on-schedule as compared to children in Zambezia and Nampula, both in fixed facility areas and mobile brigade areas. See Table A3 in Annex 11 for being on-schedule by age group.

Table 4. Vaccinations on-schedule

Percentage of children without any vaccinations, children with vaccinations behind schedule and children with vaccinations on-schedule by type of health facility and province

| | Zambezia | Nampula | Gaza | Total |
|-----------------------------|---------------------|---------------------|---------------------|---------------------|
| <i>fixed facilities</i> | <i>n</i> =196 | <i>n</i> =186 | <i>n</i> =213 | <i>n</i> =591 |
| none received | 7.8 | 13.4 | 0.9 | 7.1 |
| behind | 51.0 | 44.1 | 26.3 | 34.9 |
| on schedule | 41.1 | 42.5 | 72.8 | 53.0 |
| <i>mobile brigade areas</i> | <i>n</i> =94 | <i>n</i> =94 | <i>n</i> =72 | <i>n</i> =168 |
| none received | 39.4 | 20.2 | 6.9 | 23.5 |
| behind | 26.6 | 53.2 | 30.6 | 37.3 |
| on schedule | 34.0 | 26.6 | 62.5 | 39.2 |
| Total | <i>n</i>=286 | <i>n</i>=280 | <i>n</i>=286 | <i>n</i>=851 |
| none received | 18.2 | 15.7 | 2.5 | 12.1 |
| behind | 43.0 | 47.1 | 27.4 | 39.1 |
| on schedule | 38.8 | 37.1 | 70.2 | 48.8 |

source: Individual Interviews

In all three provinces combined, 12.1 percent of children have not received any vaccine. As expected, the figure is much higher for children in mobile brigade areas; 23.5 percent

of children have not received any vaccine, while in the areas of fixed facilities this is only 7.1 percent of children. In Zambezia mobile brigade areas, particularly, many children have never been vaccinated (39.4 percent). Table A4 and A5 (Annex 11) provide additional details of the group of children that have never received any vaccine and show that the percentage of children who are never vaccinated decreases with age from 19.9 percent of children 3-5.9 months to 8.8 percent of children over one year of age.

Timeliness of vaccination

Even a fully vaccinated child may have spent many months of life unprotected from vaccine preventable diseases if they received all required vaccines beyond the due date. Therefore, looking at timeliness of vaccination is helpful in identifying problems in the vaccination process.

A vaccine was considered as “timely” if it was received not earlier than WHO recommended age and no later than the month in which the vaccine was due (see page 8). The percentage of children who received each vaccine on time, late, not at all; as well as those who received the vaccine but had no record of when, and those children who received the vaccine *before* the WHO-recommended age were calculated.

Table 5 shows timeliness of vaccination for the Polio1 and Measles vaccines by type of health facility and province. Timeliness for the remaining vaccines for each province in areas of fixed and mobile facilities combined are reported in Tables A6–9 (Annex 11) and includes average age at which each vaccine is received by province and type of health facility.

Table 5. Timeliness of vaccination

Percentage of eligible children who received Polio1 vaccine and who received Measles vaccine by type of health facility and province

| | Zambezia | | Nampula | | Gaza | |
|---------------------------------|----------|---------|---------|---------|--------|---------|
| | Polio1 | Measles | Polio1 | Measles | Polio1 | Measles |
| Fixed Facility | | | | | | |
| <i>nr. of eligible children</i> | 192 | 112 | 186 | 104 | 213 | 143 |
| late | 29.2 | 21.4 | 24.2 | 22.1 | 21.1 | 31.5 |
| on time | 38.5 | 25.9 | 39.2 | 22.1 | 68.5 | 39.2 |
| total received* | 83.3 | 64.3 | 77.4 | 61.5 | 96.2 | 78.3 |
| Mobile Brigade | | | | | | |
| <i>nr. of eligible children</i> | 94 | 48 | 94 | 48 | 72 | 39 |
| late | 20.2 | 16.7 | 16.0 | 18.8 | 16.6 | 30.8 |
| on time | 27.6 | 16.7 | 26.6 | 29.1 | 62.5 | 33.3 |
| total received* | 52.1 | 41.7 | 59.6 | 64.6 | 90.3 | 71.8 |

* This includes children who received the vaccine but they received it too early or it is not known when they received the vaccine

source: Individual Interviews

After BCG, which is usually given shortly after delivery if a child is born in a health facility, Polio1 and DPT-HepB1 are the first vaccines given and therefore are considered

indicators of availability of and physical access to vaccination services⁴. In Zambezia and Nampula only 52.1 percent and 59.6 percent respectively of children in the mobile brigade areas have received this vaccine. In Gaza, 90.3 percent of children in mobile brigade areas have received Polio1, suggesting that in Gaza in the mobile brigade areas access to vaccination services is higher as compared to the mobile brigade areas of Zambezia and Nampula. The difference between provinces is also seen within fixed facility areas. In Gaza, not only the percentage of children who receive the vaccine is higher but also the percentage of children who receive the vaccine *on time* is also much higher, both in fixed facility and mobile brigade areas.

Table 6. Drop-out

Percentage of drop-out by type of facility and province (based on difference between Polio1 and Polio3 among children 12-23 months of age)

| | Zambezia | Nampula | Gaza | Total |
|----------------------|-------------|-------------|-------------|-------------|
| fixed facilities | 16.1 | 13.6 | 11.6 | 13.6 |
| mobile brigade areas | 14.6 | 17.1 | 18.7 | 16.7 |
| Total | 15.6 | 13.1 | 14.8 | 14.5 |

source: Individual Interviews

Similar differences among types of facilities and provinces are seen for measles, which should have been received between by all children 10 month and older. However, on average measles vaccination is received 2.2 months beyond this age (2.4 months in Zambezia, 2.7 months in Nampula and 1.8 months in Gaza, data not in Tables). Mean age at which each vaccine is received is reported in Table A9 (Annex 11).

Drop-out

Drop-out rates are an important indicator of quality of vaccination services. Drop-out rates of 10% and above are considered an indication of problems in the delivery of vaccination services (WHO). Problems such as not receiving the services one came for, poor treatment and a lack of communication between health workers and mothers, cause dissatisfaction and discontinuation of use of services.

Drop-out rates as reported in Table 6 are based on data of mothers who presented a child health card only. It is interesting to note that, while in Gaza more children are on-schedule and ultimately fully vaccinated and also vaccines are received more timely, drop-out rates are very similar in the three provinces. Also, drop-out rates between the types of facilities are only small. In all three sample provinces, drop-out rates are above 10 percent, indicating the existence of service delivery problems in all three provinces. Table A10 (Annex 11) provides additional information about vaccination coverage among children 12-23 months.

⁴ BCG is not considered a good indicator of availability and access to vaccination services since many mothers deliver at home where the child does not receive BCG.

4.4 Objective 1: Perceptions, experiences and expectations concerning the provision of vaccination services in fixed posts and mobile brigades

Finding: Mothers' knowledge of vaccine-preventable childhood diseases and the vaccination calendar is low

Knowledge regarding the key aspects of vaccination is low. In individual interviews, only about a third of mothers were able to cite the number of visits needed to complete vaccination when following the vaccination schedule (correct answer: 4-6) or at which age the child should complete vaccination (correct answer: 9 months). Only about one of every five mothers knows that a child is due for measles vaccination at 9 months. Similarly, knowledge of the EPI target diseases is low. Over half of women cannot spontaneously mention any of the vaccine preventable diseases and only 13 percent can mention three or more (ranging from 7.3 percent in Zambezia to 19.6 percent in Gaza). While not shown in Table 7, knowledge is lower among women who cannot read.

Table 7. Mothers' knowledge of vaccination schedule

Percentage of mothers answering questions correctly regarding vaccination schedule and knowledge of vaccine preventable diseases by province and type of health facility

| | Zambezia <i>n</i> =286 | Nampula <i>n</i> =280 | Gaza <i>n</i> =285 | fixed facility <i>n</i> =591 | mobile brigade <i>n</i> =260 | Total <i>n</i> =851 |
|---------------------------------------|---------------------------|--------------------------|-----------------------|------------------------------------|------------------------------------|------------------------|
| <i>Mother knows...</i> | | | | | | |
| number of visits for full vaccination | 24.8 | 38.6 | 44.9 | 38.4 | 30.7 | 36.1 |
| age to complete vaccination | 17.5 | 23.8 | 54.7 | 36.2 | 22.6 | 32.1 |
| age measles vaccination | 13.6 | 21.7 | 31.6 | 24.7 | 16.7 | 22.3 |
| three vaccine preventable diseases | 7.3 | 12.1 | 19.6 | 11.8 | 15.8 | 13.0 |
| no vaccine preventable diseases | 68.5 | 56.4 | 44.6 | 56.7 | 56.2 | 56.5 |

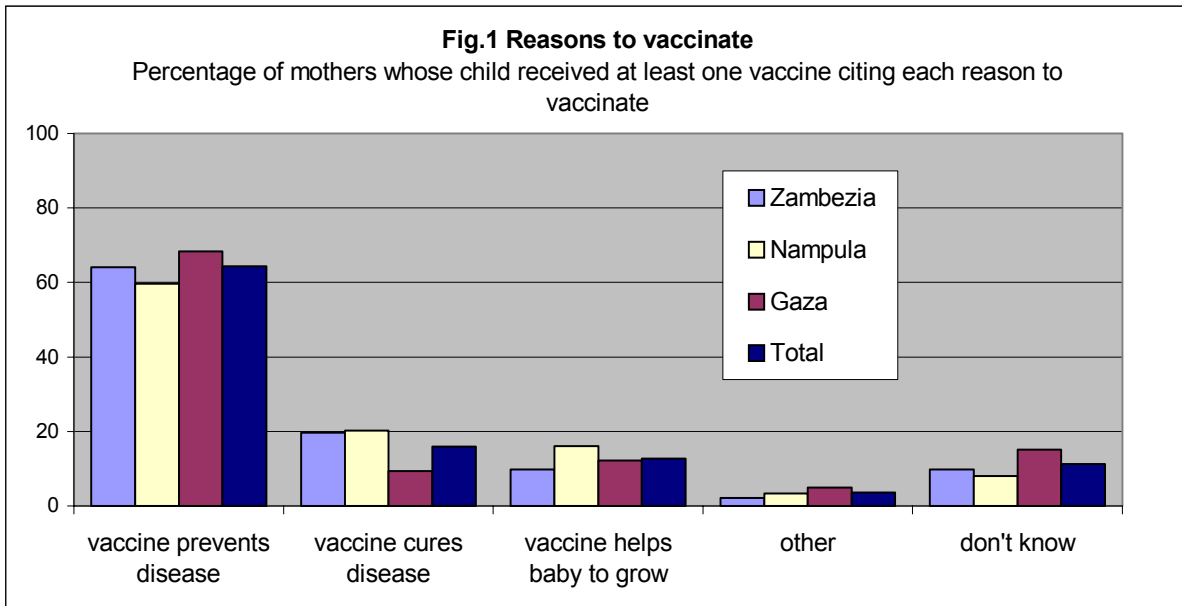
source: Individual Interviews

Focus group data support the findings on knowledge. In discussions with both mothers on-schedule and mothers not on-schedule, when asked “what diseases do vaccines prevent” mothers mention “TB, polio, cough, and measles” but also cite “malaria” and “diarrhea” as vaccine-preventable diseases. Mothers with children not on-schedule often respond that vaccines protect from “all sicknesses”, implying that the protection ascribed to vaccination is general, not specific. When asked about the periodicity of vaccinations, responses varied widely, from “every month” to “when the child is sick”. Mother expressed an awareness of their own ignorance, and a desire for access to more information. No clear differences in knowledge were seen between the two focus group types.

Finding: Despite a general lack of accurate knowledge, most mothers feel vaccination is important in protecting the health of their child

In the individual interviews, all mothers whose child had received at least one vaccine were asked *why* they went to have their child vaccinated. Multiple responses were possible. In all three provinces, the majority of mothers mentioned the prevention of disease, while 12.7 percent mentioned healthy growth and 16.0 percent the cure of

disease (see Figure 1 and/or Table A11, Annex 11). Only few mothers (2.7 percent) mentioned both prevention *and* cure as their reason for seeking vaccination (data not shown). The category ‘other’ includes many mothers who answered something like “Because they (at the health center/health post) told me to”.



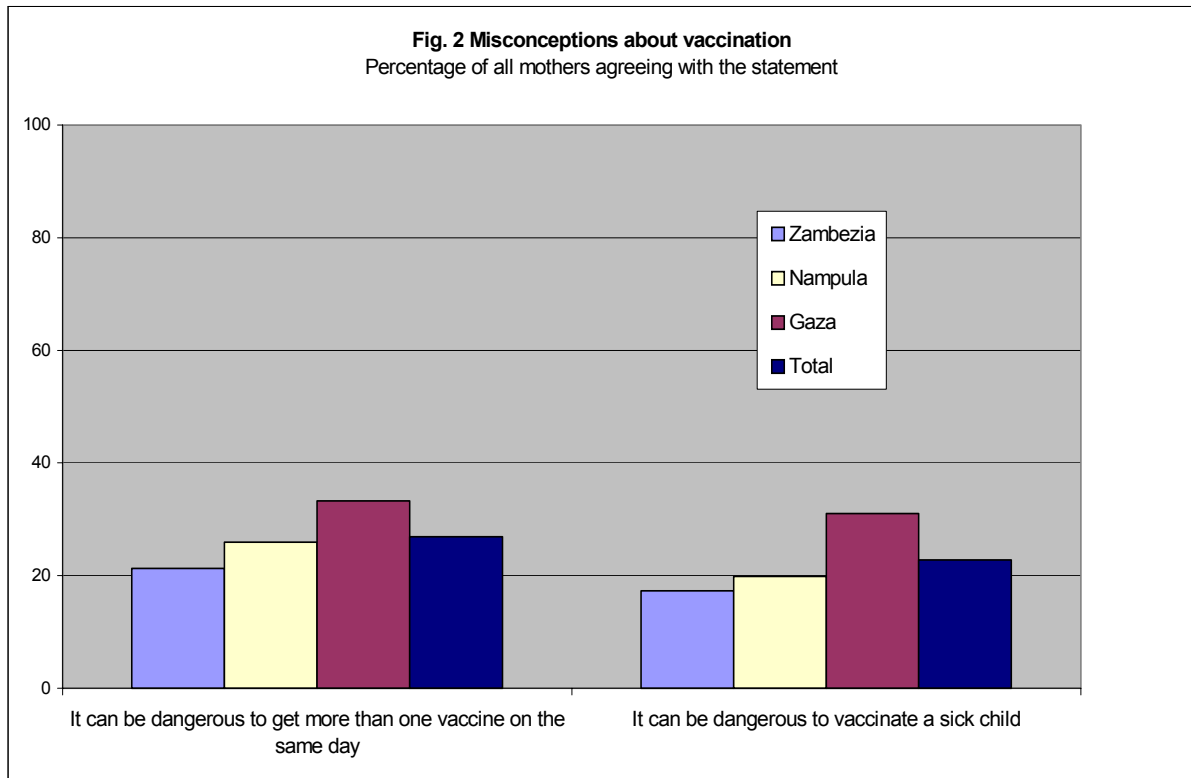
source: Individual Interviews

Focus groups discussions emphasize the finding: demand for vaccination is high regardless of knowledge level of mother. In both on-schedule and not-on-schedule discussion groups, virtually every mother responded “**yes**” to the question “do you want to keep your child completely vaccinated”. Mothers of both groups called mothers who don’t vaccinate “*lazy*”, “*negligent*”, and, even, “*criminals*”. One mother said “*To not vaccinate is like being an animal*”. Reasons to vaccinate correlate with those reported in individual interviews. Mothers most often seek vaccination to protect a child’s health, but at the same time expressed an unclear distinction between “prevention” and “cure”. Responses also included: “*A person who is sick must get a vaccine.*” and “*vaccines cure malaria*”.

Finding: Misconceptions about vaccination exist, but there are few taboos or superstitions.

Mothers were asked their opinion on two statements regarding vaccines (see Figure 2 and/or Table A12, Annex 11). Results show that misconceptions do exist: 26.9 percent of all mothers believe it can be dangerous to receive more than one vaccine in a day; and 22.8 percent of all mothers think it is dangerous to vaccinate a sick child.

Interestingly, in Gaza, where coverage is higher, more mothers think that it is dangerous to receive more than one vaccine on the same day and that a child who is sick should not be vaccinated.



source: Individual Interviews

Mothers of children who have *never* received a vaccine were asked about their reasons for *not* vaccinating. Their answers did not indicate that taboos and misconceptions play an important role in the decision not to vaccinate. None of these mothers mentioned religion or supposedly existing misconceptions such as “vaccine sucks blood”. A few mentioned that vaccines do not provide protection but rather cause disease. The overwhelming barrier for mothers who have never had their child vaccinated was cited as distance to services.

Focus group discussions probed mothers for more information concerning misperceptions and taboos that might keep mothers from vaccinating their children, but very few were found. Some mothers said there are mothers who hold a greater believe in traditional medicine; and/or that hospitals were for the “new generation” of people with money. But again, regardless of vaccination status of the child; the majority of mothers display a high regard for vaccinations.

Finding: While mothers say they have no fear of vaccination in general, there is worry about side effects.

Regardless of focus group type, it is clear that side effects cause mothers time and worry. Almost all children have experienced side effects, but mothers with children on-schedule in their vaccinations seem to accept side effects as a normal, not negative, aspect of vaccination. “Some children, when vaccinated, can have fevers, abscesses, or scars; swelling of the leg. This doesn’t give us any insecurity...” Mothers with children

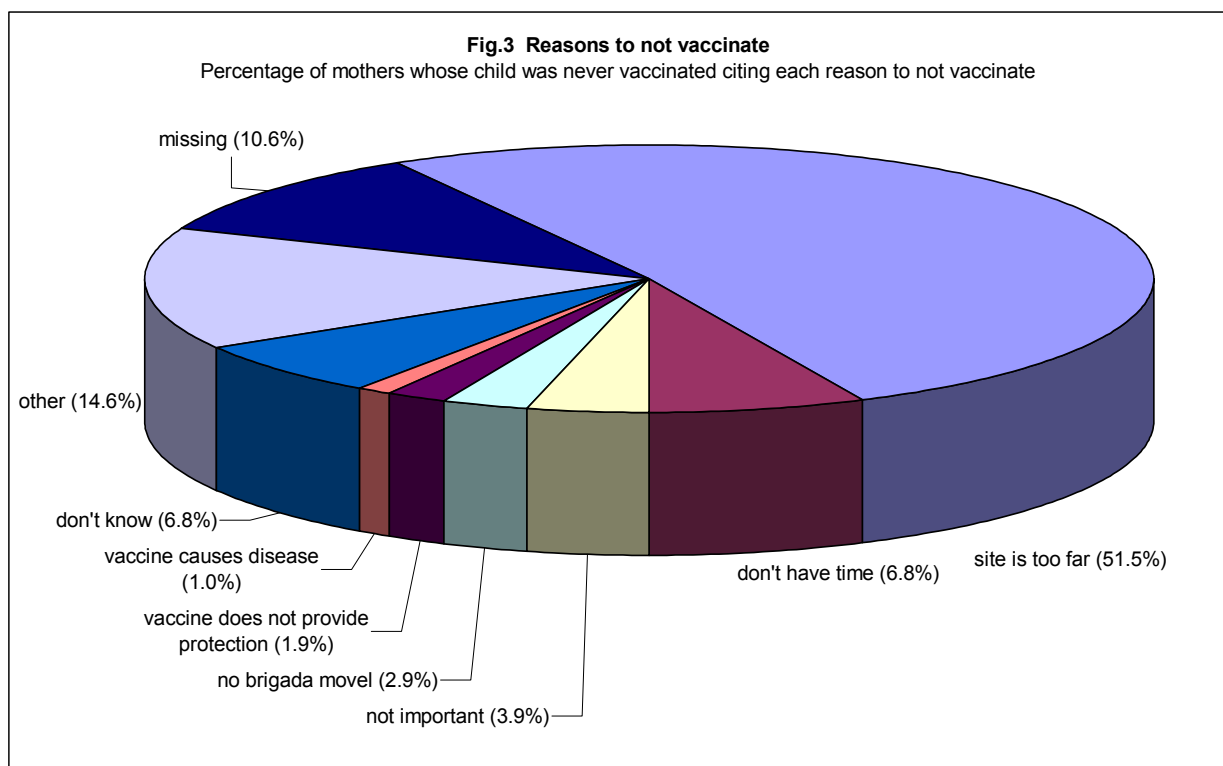
who are not on-schedule in their vaccinations express more trepidation about side effects: “After the first vaccine, he was really hot and the leg swelled up. I thought to change my health post.”

Some mothers report concern about techniques of health workers: “...there is a risk that the needle will break off in the leg of the baby.” “...some nurses give bad injections and the wound bleeds and the child cries a lot.” It isn’t clear to what extent the fears are provoked by normal, expected side effects; and which are caused by poor technique of health workers.

Finding: Distance to services – not lack of time or competing activities – makes it difficult for mothers to complete vaccinations.

Figure 3 (Table A13, Annex 11) presents the main reasons for not vaccinating among mothers whose child has never received a vaccine. These results are based on the answers of mothers in Zambezia and Nampula; only one mother from Gaza is included, since very few children there had received no vaccines.

Results indicate that *distance to the vaccination site* - and not a lack of time, having too many other chores, religion, negative beliefs about vaccine, or not being allowed to go by a husband - is the major reason mothers do not have their child vaccinated. Over half of mothers whose child never received any vaccine (51.5 percent) mentioned distance to the vaccination site as the major reason for not immunizing their child (multiple responses possible). Very few mention a lack of time (6.8 percent).



source: Individual Interviews

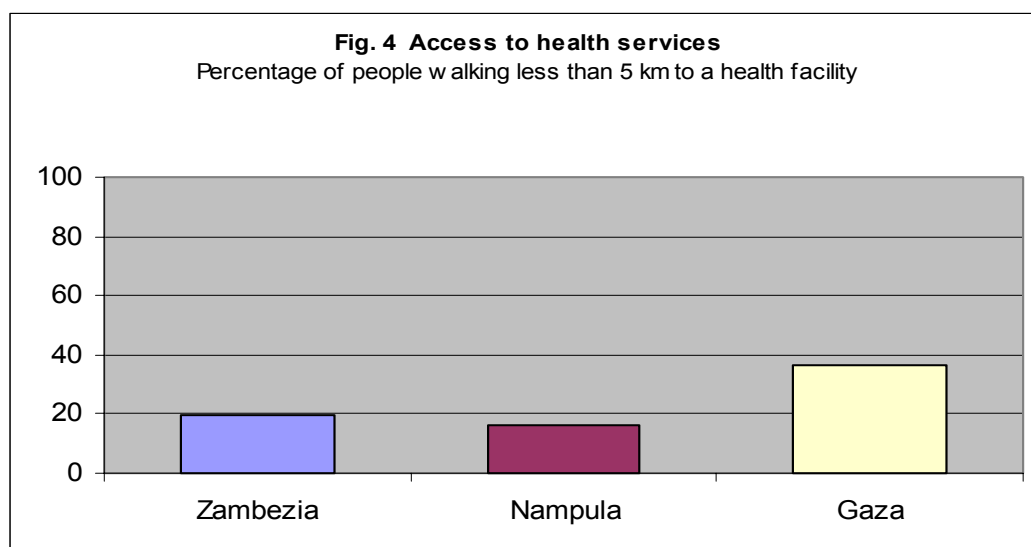
Among *all* mothers in the individual sample, data do not indicate that having other children to take care of constitutes an important barrier to complete vaccination timely. Only 10.7 percent agreed with the statement “I have other children and therefore it is difficult to have my child vaccinated” (8.5 percent in Zambezia, 7.8 percent in Gaza and 15.8 percent in Nampula).

These results were corroborated by focus group discussions - mothers in both group types strongly lament the distance they must travel to reach vaccination services.

4.5 Objective 2: Problems of access to vaccination services

Finding: Physical access to fixed services is low

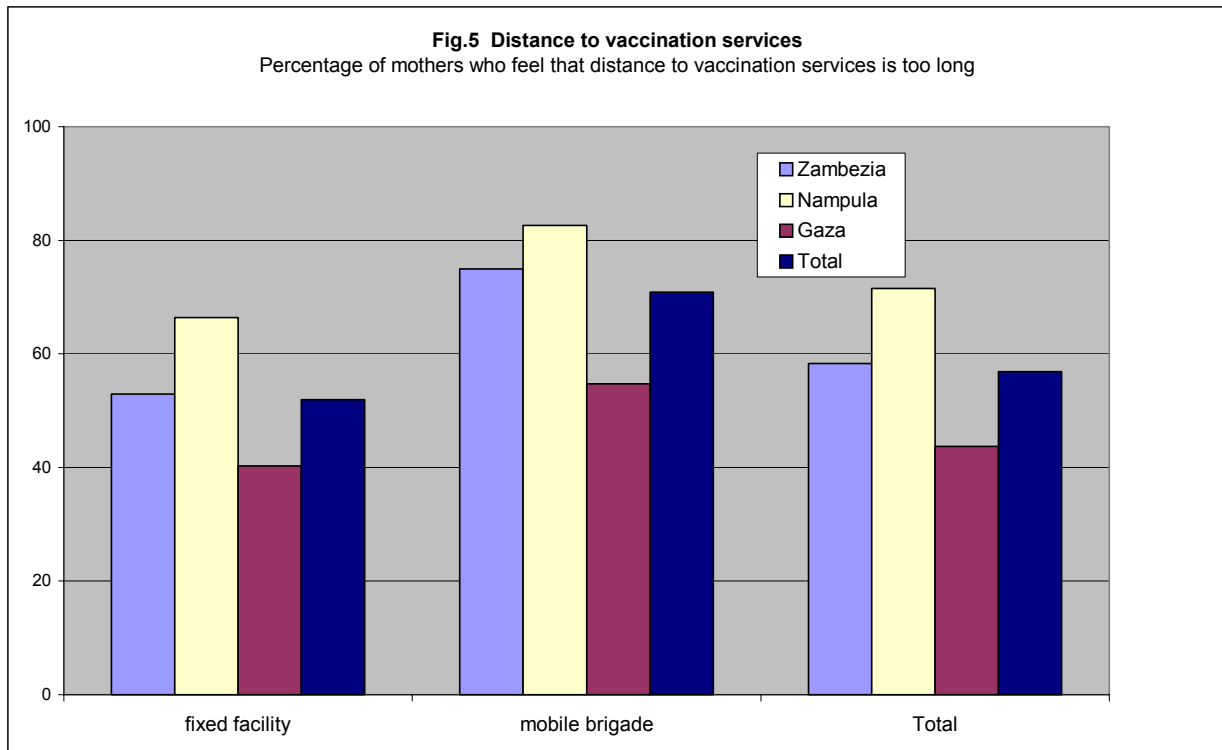
WHO defines “access to services” as being within either 5 kilometers or a 1-hour walk of health services. As data from the USAID/EHP Health Facilities Survey show, many mothers throughout Mozambique have to travel more than five kilometers to reach a health facility (see Figure 4 and/or Table A14, Annex 11).



source: USAID/EHP Health Facility Survey 2000

Almost half of all mothers (48.2 percent) report traveling more than one hour to reach vaccination services. Mothers using mobile brigades more often report traveling over an hour to reach services than those using fixed services (see Table A15, Annex 11). Both groups of mothers say the distance is too far (see Figure 5 and/or Table A16, Annex 11).

The results indicate that even with the use of mobile brigades, which intend to bring vaccination services closer to communities, many mothers continue to have to walk long distances to reach services.



source: Individual Interviews

Finding: Hours of vaccination services are inconsistent

In individual interviews, all mothers were asked whether they find the hours at which vaccination services are offered convenient. The majority of mothers (82.7 percent) find hours of services convenient. In Gaza, more mothers are satisfied with opening hours (93.0 percent) than in Zambezia (78.9 percent) and Nampula (75.9 percent).

Of the 32 facility observations, very few services had started vaccinations by 8:00. Two never started because of cold chain problem and unavailability of vaccines. Mobile brigades in particular, because of long travel times, start services late (see Table 8).

Table 8. Starting time of vaccination services

Percentage of vaccination services starting before 8:00, between 8:00 and 9:00, between 9:00 and 10:00 and after 10:00 o'clock by province and type of health facility

| | Zambezia | Nampula | Gaza | fixed facility | mobile brigade | Total |
|--------------|--------------|--------------|--------------|----------------|----------------|--------------|
| | <i>n=10</i> | <i>n=10</i> | <i>n=10</i> | <i>n=22</i> | <i>n=8</i> | <i>n=30</i> |
| by 8:00 | 10.0 | 30.0 | 10.0 | 22.7 | 0.0 | 16.7 |
| 8:00-9:00 | 50.0 | 30.0 | 40.0 | 45.5 | 25.0 | 40.0 |
| 9:00-10:00 | 10.0 | 40.0 | 30.0 | 22.7 | 37.5 | 26.7 |
| after 10:00 | 30.0 | 0.0 | 20.0 | 9.1 | 37.5 | 16.7 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

source : Individual Interviews

The latest a vaccination services was observed beginning was 11:30. Late start times result in mothers having long waits for service. Work is normally continued until all mothers are attended. Closing times range from 9.26 hrs – 16.45 hrs; and on average, vaccination services were conducted for four hours each day (see Table 9). Generally, hours of vaccination services fall short of the designated government health facility hours (7:30-15:30).

Table 9. Closing time of vaccination services

Average closing time of vaccination services and duration of vaccination services by province and type of health facility

| | Zambezia <i>n=10</i> | Nampula <i>n=10</i> | Gaza <i>n=10</i> | fixed facility <i>n=22</i> | mobile brigade <i>n=8</i> | Total <i>n=30</i> |
|--------------|-------------------------|------------------------|---------------------|-------------------------------|---------------------------------|----------------------|
| closing time | 12:30 | 12:57 | 13:47 | 12:41 | 14:09 | 13:05 |
| time spent | 3.4 | 3.7 | 4.8 | 3.8 | 4.2 | 4.0 |

source: Facility Observations

Finding: Mobile brigade services are unpredictable

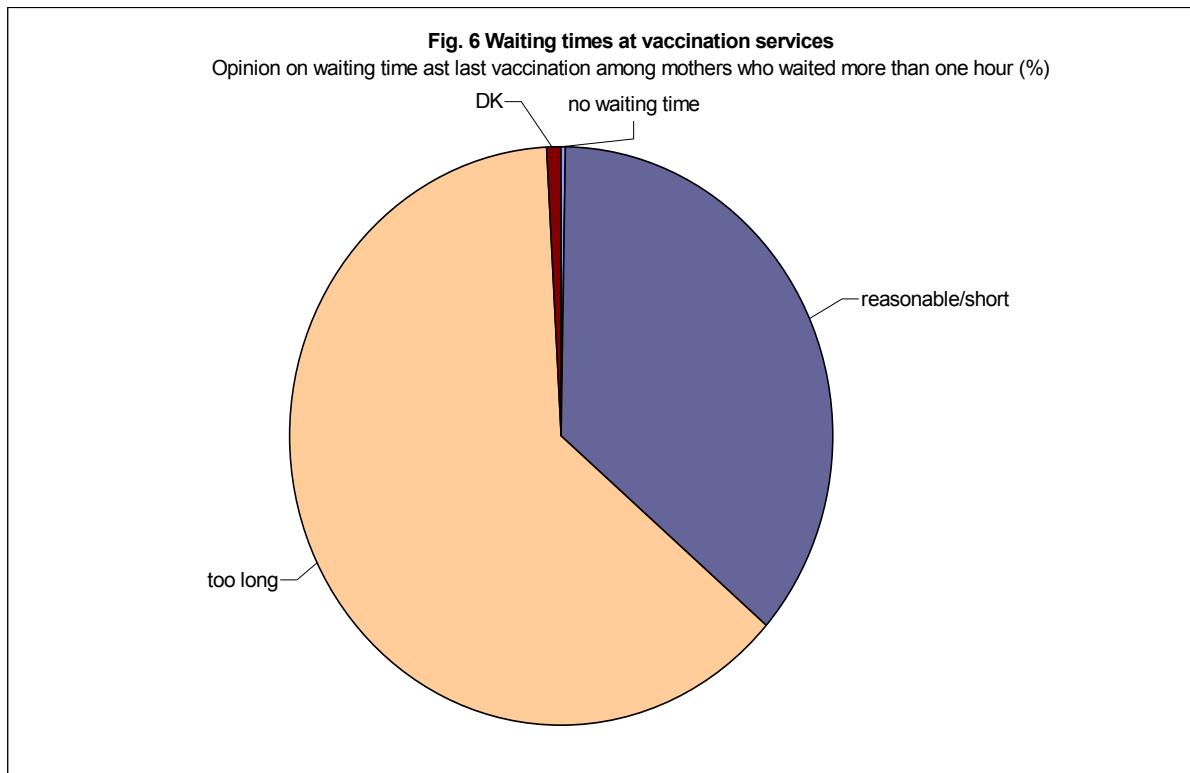
Many problems plague mobile brigades: inconsistent planning; little standardized reporting; difficulties with transport, fuel, per-diems, and vaccines and other consumables. During interviews with health workers, the primary complaint voiced was too little time, transport, and support for conducting mobile brigades. The survey team encountered an absence of information while trying to compile data on programs and plans for mobile brigades: there is no standardized scheduling or reporting mechanism at either central or provincial level.

In focus group discussions, mothers described an apparent disparity in quality of service between mobile brigades and fixed facilities. In mobile brigade areas, many mothers report poor organization, rushed service; and irregular visitation. Mothers say: “*No-one explains how to fight sickness.*” “*HW just do what they have to do, rapidly and without care, poorly done, and return to the city.*” Mothers who use mobile brigades feel the health worker loses patience when the days are long and the clients are numerous – they are reported to yell, get angry, discourage questions, criticize, and even slap mothers; “*The services are not well-organized, they abuse us. Must be improved, the health workers must not insult mothers.*”

Finding: Mothers experience long waiting times for services

The delayed start of vaccination services and the quantity of mothers health workers have to attend to frequently results in long waiting times. Over 60 percent of mothers report that the last time they went for vaccination they had to wait one or more hours before they were attended to, ranging from 43.0 percent in Gaza to 74.9 percent in Nampula. Waiting time does not differ significantly between the types of facilities (see Table A17, Annex 11). The last time they went for vaccination services, 41.8 percent of mothers found the waiting time too long; of the mothers who waited an hour or more for services, 62.8 percent felt the wait was too long (see Figure 6 and/or Table A18, Annex 11).

Fewer mothers in Gaza feel they generally have to wait a long time as compared to Zambezia and Nampula (see Table A19, Annex 11). Again, there is little difference between types of facilities in the way mothers feel about the amount of time they usually have to wait for services (data not shown). Unpredictability of service is further illustrated by the percentage of mothers who say that sometimes when they arrive at the vaccination site to have their child vaccinated, the site is closed (18 percent). This is more common in Zambezia (20.9 percent) and in Nampula (26.7 percent) as compared to Gaza (8.6 percent) (Table A19, Annex 11).



source: Individual Interviews

Finding: Stock rupture in vaccines and other supplies are a regular occurrence

Data from facility observations support the allegation that stock rupture of vaccine happens frequently and, obviously, results in a delay of vaccination for a particular vaccine, thus contributing to the high percentage of children not-on-schedule. On a broader scale, stock rupture may also discourage mothers from returning to complete the vaccination schedule.

A quarter of the observed health facilities did not have all vaccines available throughout the observed vaccination session; two of them because of cold chain problems. Data suggest that stock rupture of vaccine is more of a problem in health posts – usually further away from the district capital and the distribution point of vaccine. During fieldwork, the problem was more common in Nampula Province, where 5 out of 10 observed health facilities did not have all required vaccines available (see Table 10). In some cases BCG may not have been available because of the ‘open vial policy’ intended to reduce vaccine wastage. To comply with maximum wastage standards, some health facilities offer BCG vaccine only on certain days of the week.

Table 10. Availability of vaccines

| Number of health facilities missing the specified vaccine | | | | | | | |
|---|-------------------------|------------------------|---------------------|---------------------------------|-------------------------------|---------------------------------|----------------------|
| | Zambezia <i>n=11</i> | Nampula <i>n=10</i> | Gaza <i>n=11</i> | health center <i>n=14</i> | health post <i>n=10</i> | mobile brigade <i>n=8</i> | Total <i>n=32</i> |
| BCG | 1 | 4 | 1 | 2 | 4 | 0 | 6 |
| Polio | 1 | 2 | 1 | 2 | 2 | 0 | 4 |
| DPT-HepB | 2 | 1 | 1 | 1 | 3 | 0 | 4 |
| Measles | 1 | 0 | 1 | 0 | 2 | 0 | 2 |
| not all vaccines available | 2 | 5 | 1 | 3 | 5 | 0 | 8 |

source: Facility Observations

Ruptures in other vaccination supplies were also observed. Nampula faced a serious stock rupture in child health cards; 8 out of 10 health facilities did not have enough health cards available and in one facility some children were not attended due to the stock out. One health center in Nampula had been out of auto-destructible syringes for DPT-HepB vaccine for one month. Cold chain problems were encountered in 3 out of 32 health facilities and in two facilities there were no vaccination services for this reason.

4.6 Objective 3: Health worker role in provision of vaccination services

Finding: Health workers find the workload excessive.

Many health workers, especially in rural health posts, work alone and are responsible for all aspects of primary health care – pre/post natal care, deliveries, family planning, emergencies, consults, education, mobile brigade, and vaccination. Most health care workers interviewed expressed dissatisfaction with their work due to the heavy load coupled with low and/or inconsistently paid salaries and per-diems.

Finding: Health workers experience a lack of support in terms of materials and provisions.

Many of those interviewed expressed dissatisfaction with their work due to lack of materials and supplies, inconsistent transport for mobile brigades, and difficult communications.

Frequent ruptures of vaccine stock and other supplies have been documented in both individual interviews and health facility observation. Health workers confirm those results: in Gaza and Zambezia, *over half* of those interviewed complained of lack of materials and supplies needed for work; in Nampula *every* health worker cited shortages of supplies such as health cards, refrigerators, cold boxes, transport, vaccines, and thermometers. Especially in rural health posts, health workers expressed a sense of isolation.

Finding: Health workers experience a lack of continued training and opportunities for professional development.

While data from health facility observations show that virtually all health workers involved in vaccination, except two aides, received at least some basic training in vaccination, many health workers received this training long ago.

Health workers expressed a need for more training in almost all areas. Core training – as a basic, elementary, medium nurse; or as a technician - ranged from 4.5-13 years ago. Review courses (defined as a course or seminar addressing vaccination topics) were attended by only half of the health workers interviewed. Just under half of health workers interviewed felt their training in the area of vaccination was insufficient. Training topics suggested include statistics, cold chain maintenance, maternal and infant health, coverage calculations, vaccine application, management of the EPI, and injection security.

In individual interviews, 26 percent of mothers report that sometimes their child does not get vaccinated because the child is sick (see again Table A19, Annex 11). Interviews with health workers support the allegation: the belief exists that a child with a fever of over 38° Celsius must not be vaccinated until the fever is reduced. In practice, this can mean letting the child return home without a needed vaccination.

Virtually none of the health workers interviewed could identify the target population for routine vaccination, the current year’s objective, or coverage for the last year; though many expressed a keen desire to learn.

Finding: Health workers show insufficient respect for mothers

Table 11 describes how mothers feel about several aspects of health worker behavior. Most mothers feel that health workers were gentle with the child while applying vaccine and are positive about the way they were greeted by health personnel, and the majority of mothers say the health worker explained sufficiently what he/she was going to do. On the other hand, 41.0 percent of mothers said the health worker did something that made her feel uncomfortable. The problem seems worst in Zambezia, where 61.4 percent of mothers were made to feel uncomfortable.

Table 11. Health worker attitude

Percentage of mothers whose child received at least one vaccine and who agree with the statement about health workers attitude during the last time she went for vaccination

| | Zambezia | Nampula | Gaza | Total |
|---|--------------|--------------|--------------|--------------|
| <i>The last time mother went for vaccinator...</i> | <i>n=234</i> | <i>n=236</i> | <i>n=278</i> | <i>n=748</i> |
| she felt that HP was gentle with the child | 96.1 | 91.9 | 97.5 | 95.3 |
| health personnel her greeted in friendly manner | 96.2 | 91.5 | 97.1 | 95.1 |
| HP explained sufficiently what she/he was going to do | 63.2 | 62.5 | 66.5 | 64.2 |
| HP did/said things that made her feel uncomfortable | 61.4 | 39.8 | 25.3 | 41.0 |
| she was given the opportunity to ask questions | 13.3 | 12.9 | 25.9 | 18.0 |

source: Individual Interviews

From focus group discussions, we know mothers felt uncomfortable when health workers were rushed, when they allowed friends to jump to the front of the line, and/or when they lose their patience because they are overworked. Health workers, particularly in mobile brigades, were reported to criticize mothers frequently, yell, and get angry if a mother was not in compliance with health standards set by the health worker.

Very few mothers say they were given the opportunity to ask questions (18.0 percent). In Gaza, more mothers were allowed to ask questions as compared to the other two

provinces. Interestingly, in Zambezia and Nampula, mothers who are literate more often said they had the opportunity to ask questions (25.5 percent and 18.6 percent respectively) than those who are not literate (10.2 and 11.7 percent respectively, data not shown). In Gaza, this difference between literate and illiterate mothers is not seen.

4.7 Objective 4: Sources of information used by the population

Finding: Opportunities to educate mothers are underutilized

The health worker is a primary source of information and education for mothers concerning the *importance* of vaccination; *where* and *when* to vaccinate; and in responding to a mother’s doubts, fears, and questions. However, survey data indicate that many opportunities to educate mothers are frequently not used.

Table 12. Missed opportunities for educating mothers

Percentage of mothers receiving information about vaccination during prenatal care and percentage of mothers receiving information at birth

| | Zambezia | Nampula | Gaza | Total |
|--------------------------------------|----------------|----------------|----------------|----------------|
| <i>received prenatal care</i> | <i>n = 194</i> | <i>n = 233</i> | <i>n = 274</i> | <i>n = 701</i> |
| heard about <i>importance</i> | 64.9 | 75.5 | 81.4 | 74.9 |
| heard about <i>where</i> to go | 84.5 | 83.7 | 91.6 | 87.0 |
| heard about <i>when</i> to go | 82.5 | 79.4 | 90.5 | 84.6 |
| <i>gave birth in health facility</i> | <i>n=97</i> | <i>n=120</i> | <i>n=210</i> | <i>n=427</i> |
| heard about <i>importance</i> | 66.0 | 79.2 | 83.3 | 78.2 |
| heard about <i>where</i> to go | 88.7 | 82.5 | 93.3 | 89.2 |
| heard about <i>when</i> to go | 90.7 | 84.2 | 93.3 | 90.2 |

source: Individual Interviews

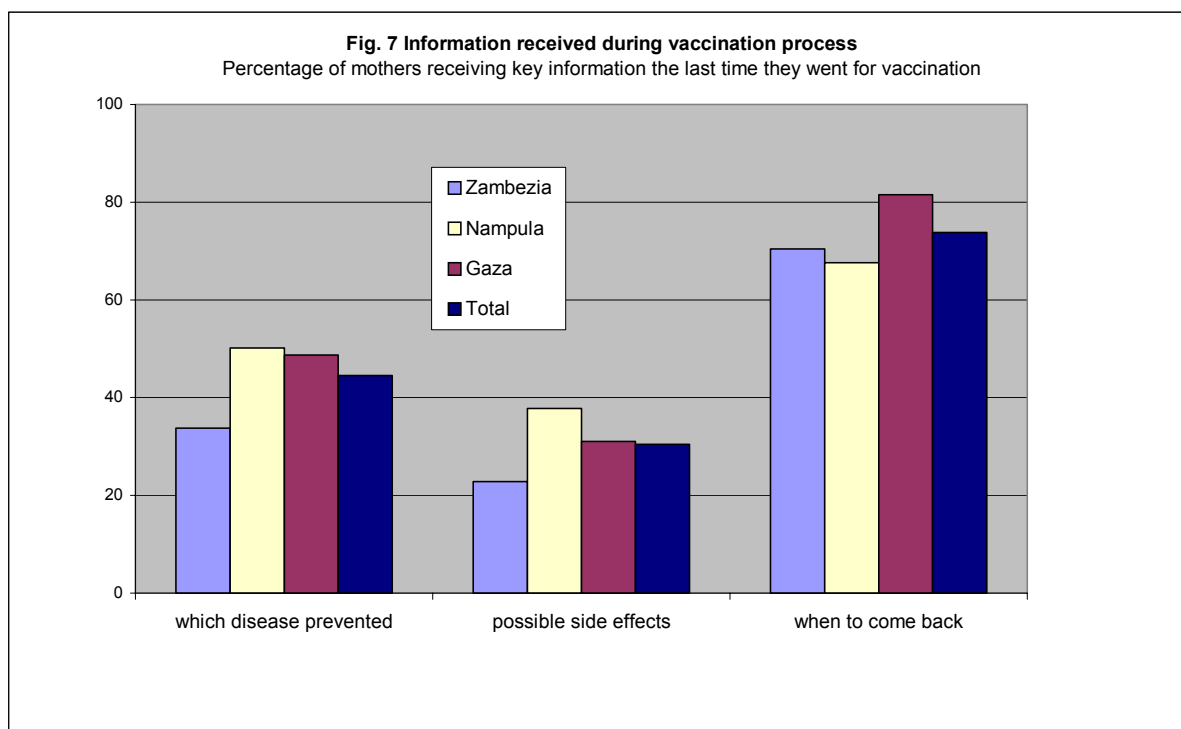
Prenatal check-ups and birth in a health facility provide the health worker with an ideal opportunity to inform the mother about the importance of vaccination for her child. Table 12 demonstrates that, while this opportunity is used, there is room for improvement. Of those mothers who did have prenatal checkups, 74.9 percent received information about the importance of vaccination. Eighty-seven percent were told *where* to go, and 84.6 percent were told *when* to go for vaccination. Percentages are slightly higher among mothers delivering in a health facility; 78.2 percent received information about the importance of vaccination; 89.2 percent were told where to go and 90.2 percent were told when to go for vaccination. Still, about 10 percent of mothers receiving prenatal care do not receive information about where to go for the child’s vaccinations.

When receiving prenatal care or giving birth in a health facility, mothers in Gaza are more likely to be informed about vaccination than in Zambezia or Nampula. However, this difference between provinces is even larger when looking at *all* mothers, since in Zambezia and Nampula fewer mothers receive prenatal care or deliver in a health facility as compared to Gaza. In Zambezia, only 48.3 percent of *all* mothers had prenatal care and/or deliver in a health facility *and* were informed about the importance of vaccination; in Nampula this is 68.2 percent and in Gaza 85.2 percent.

The data also suggests that higher priority is given to informing a mother about *where* and *when* she needs to go to have her child vaccinated than to educating her about the *importance* of vaccination and thus motivating her to start the vaccination process.

Finding: Mothers do not receive key information during vaccination services.

Mothers are frequently not provided with key information during vaccination services. Less than half of mothers say that the last time they went for a vaccination they were told for which disease(s) the child was vaccinated (see Figure 7 and/or Table A20, Annex 11). Exit interviews confirm the finding: 43.1 percent of mothers just leaving services did not know for which disease the child had received a vaccine.



source: Individual Interviews

Only about a third of mothers were told about the possible side effects of the vaccine received; and of those, 75 percent were told what to do in case of side effects (not shown in graph).

Over a quarter of mothers said they were not told when to come back for the next vaccination. The actual situation may be even worse. Exit interviews show that about a third of mothers at fixed facilities and nearly two thirds of mothers at mobile brigades had no idea when to come back for the next vaccination (48.4 percent in Zambezia, 17.1 percent in Gaza and 64.7 percent in Nampula; data not shown in Table).

Despite the fact that health workers feel they make great effort to educate mothers concerning vaccination, survey results show opportunities to educate mothers are underutilized. Of all mothers whose child received at least one vaccine, only 32.7 percent say they *ever* participated in a group talk about vaccination (see Table A21, Annex 11). During health facility observations at the 32 health facilities, only 16 IEC

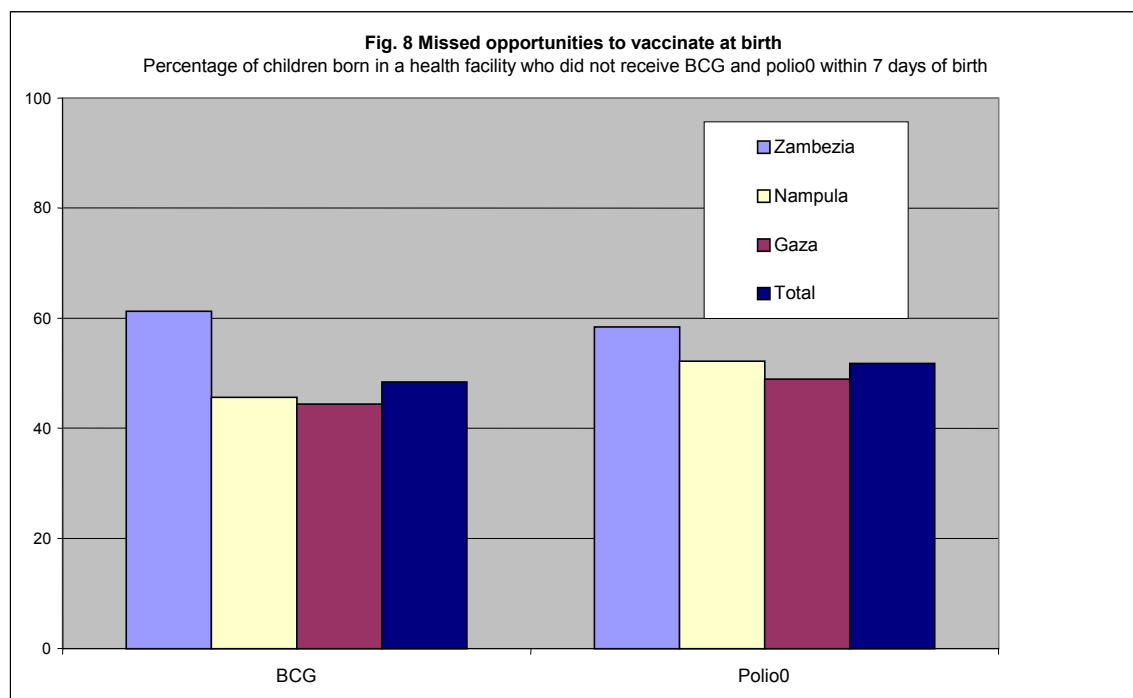
session were observed of which seven covered topics related to vaccination. No educational aids (posters, leaflets, flyers) were observed in use.

4.8 Objective 5: Missed opportunities to vaccinate

Finding: Missed opportunities to vaccinate occur frequently

Analysis of vaccination data from the child health card indicates that there are many missed opportunities to vaccinate (i.e. the child appeared at a health facility and was due for a vaccine, but was not vaccinated).

One such missed opportunity occurs at birth. All children born in a maternity or hospital should receive BCG, Polio0, and a child health card before discharge. Data show that in over 50 percent of cases of children born in a health facility, the BCG vaccine was not received within 7 days of birth (assuming the majority of women delivering in a health facility return home within a week); ranging from 45.8 percent in Gaza to 64.4 percent in Zambezia. Similarly, many children leave the health facility without receiving Polio0 (see Figure 8 and/or Table A22).



source: Individual Interviews

Other missed opportunities occur when the child comes to the health clinic and is weighed or receives a vaccine, but does not receive all vaccines due. All children five months and older and who have been weighed five times should have received at least BCG, Polio 1, 2 and 3 and DPT-HepB1, 2 and 3. However, Table 13 shows that among these children, 18.1 percent miss one or more of these vaccines, ranging from 10.7 percent in Gaza to 27.2 percent in Nampula. There is no difference between fixed facilities and mobile brigades with regards to the percentage of children who have not received all due vaccines.

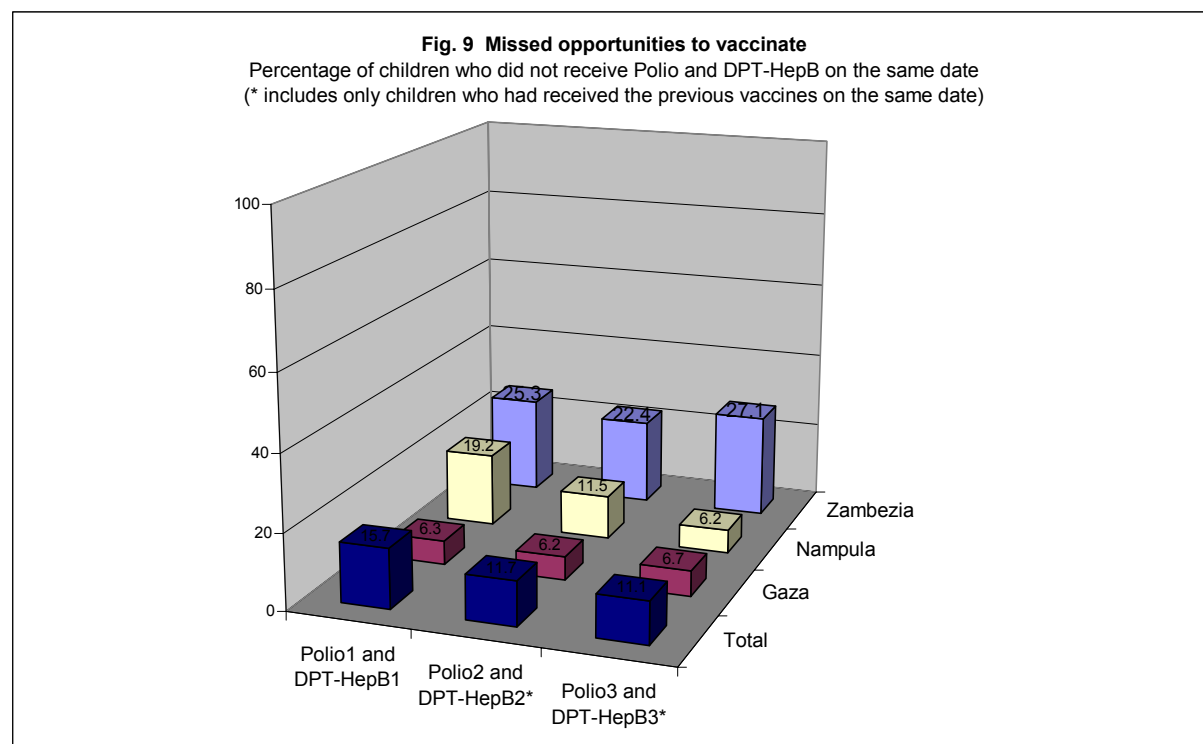
Table 13. Missed opportunities for vaccination

Percentage of children who did *not* receive BCG, Polio3 and DPT-HepB3 among children 5 months and older and weighed at least 5 times

| | Zambezia | Nampula | Gaza | Total |
|--------------------------------|---------------|---------------|---------------|---------------|
| | <i>n</i> =110 | <i>n</i> =103 | <i>n</i> =168 | <i>n</i> =381 |
| BCG | 5.5 | 8.7 | 1.8 | 4.7 |
| Polio1 | 3.6 | 4.9 | 1.8 | 3.1 |
| Polio2 | 10.0 | 10.7 | 4.2 | 7.6 |
| Polio3 | 11.8 | 17.5 | 4.8 | 10.2 |
| DPT-HepB1 | 1.8 | 2.9 | 1.2 | 1.8 |
| DPT-HepB2 | 1.8 | 6.8 | 2.4 | 3.4 |
| DPT-HepB3 | 6.4 | 14.6 | 7.1 | 8.9 |
| did not receive all 7 vaccines | 20.9 | 27.2 | 10.7 | 18.1 |

source: Individual Interviews

The occurrence of missed opportunities is further illustrated by the percentage of children who received DPT-HepB1 and/or Polio1 but have not received BCG; and the percentage of children who did *not* receive Polio1 and DPT-HepB1 the same day.



source: Individual Interviews

Nearly eight percent of children who have received Polio1 and/or DPT-HepB1 have not received BCG (7.2 percent in Zambezia, 15.0 percent in Nampula and 2.6 percent in Gaza, (data not shown in table), while 15.7 percent of children who received either

Polio1 or DPT-HepB1 did *not* receive the other vaccine on the same day (25.3 percent in Zambezia, 19.2 percent in Nampula and 6.3 percent in Gaza)(see Figure 9 and/or Table A23, Annex 11). Similar percentages of not receiving Polio and DPT-HepB on the same date are seen for subsequent vaccines including the second and third doses of Polio and DPT-HepB among children who had received the previous vaccines together.

Finally, 8.1 percent of mothers said that the last time they went for vaccination, their child was not vaccinated. While this includes some mothers whose child was not due for a next vaccine, about half of them say it was because there was no vaccine; and 5.1 percent says it was because the child was sick (data not shown).

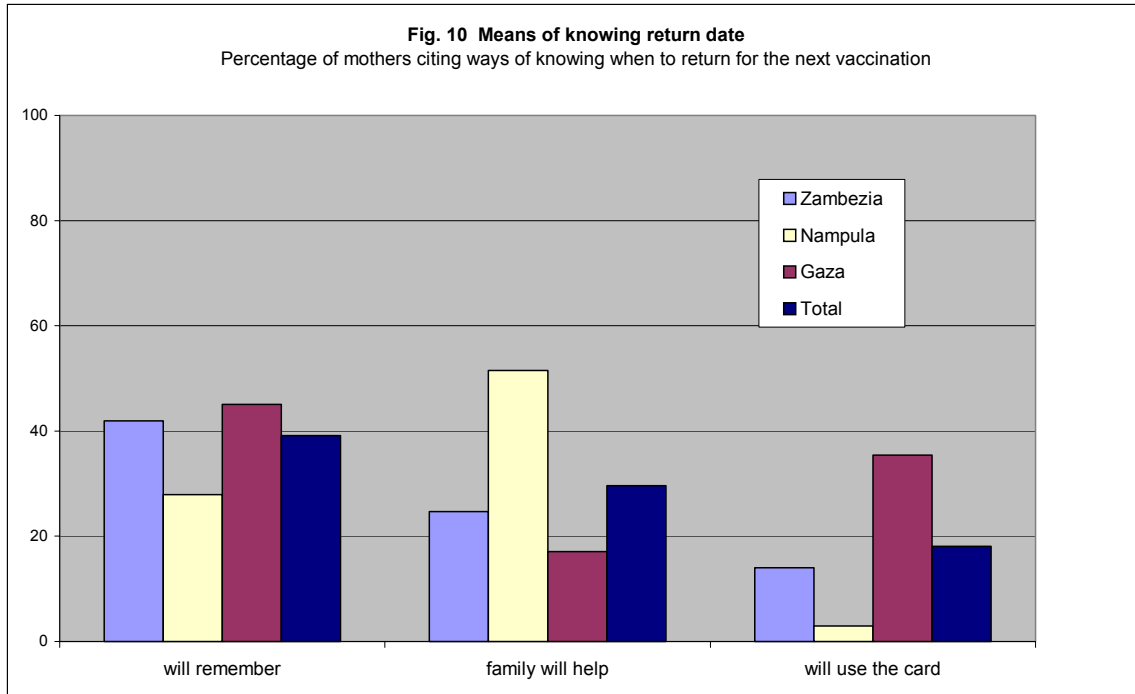
4.9 Objective 6: Perception, understanding, and use of the child health card

Finding: Mothers give high value to the child health card

Focus group discussions with both mothers of on-schedule children and mothers of not-on-schedule children showed that mothers greatly value their health cards for providing a) access to services b) an 'identity card' for their child; and c) a record of the child's growth and vaccinations. "*I'd rather lose my capulana than my child's health card*" said one not-on-schedule mother. Many mothers reported they would be turned away from services without the child's health card; and there appeared to be very few instances of mothers forgetting the card.

Finding: Mothers have little understanding of the information contained in the child health card

As shown earlier, an estimated 74 percent of women in Mozambique cannot read. This means that without help from another person the majority of mothers cannot understand the vaccination schedule, vaccines received, next vaccine due, and the return date for the next vaccine on the child health card.



source: Exit Interviews

Data from both exit interviews and focus groups discussion confirm that few mothers use the child health card to remember when to return. In exit interviews, mothers were asked how they will know when to come back for the next due vaccination (multiple responses were possible, see Figure 10 and/or Table A24, Annex 11). Most frequently, mothers said they would simply remember the date on which they had to return (however, nearly a third of these women were not able to mention a return date when asked earlier); and many say they will be helped by family members to know the return date. Only 18.1 percent of mothers said they would use the child health card to know the return date. This is much higher in Gaza (35.4 percent), where literacy is higher, and lower in Nampula (only 2.9 percent), where over half of mothers say they will use the help of another person (Table A25, Annex 11). Nearly 10 percent of mothers said have no idea how they will know when to come back for the next vaccine.

Mothers poorly understand other information contained in the child health card. Only a third of mothers whose children were weighed could point at the child's weight on the growth curve, while only 5.6 percent knew from the health card which vaccines were received. Less than a quarter of mothers (23.3 percent) who said they knew when to return and whose child health card did show a return date read this information correctly from the child health card (data not in tables).

During focus groups, mothers made clear that they have a hard time navigating the health card: *"I don't know the information there. Don't know what is there because it is difficult to read...I can't see how many vaccines the child got. The health worker tells us that."* Mothers have some creative ways of remembering dates, including counting days with stones/beans, they are reminded by a neighbor, they have a son/husband/teacher who helps to read the card, they notice neighbors leaving for vaccination service and join them, they use the moon cycle, or they mark festivals that coincide with return dates.

Some mothers report that community leaders/health agents announce vaccination days with a megaphone (in mobile brigade areas).

Finding: Health workers do not use child health card consistently

Health workers do not use the child health card as consistently as they should. In focus group discussions with both group types, mothers said that “*sometimes they write (return) dates, sometimes they don’t.*”

Indeed, individual and exit interview results show that return dates are often not written on the card. Information copied from the child health card onto the individual questionnaire show that of all health cards seen, only two-thirds had any date at all in the column for return dates. While the percentage of children who are given a return date may be somewhat underestimated since this includes those children who may not have shown up on the date marked on the card and subsequently not received a new date, Table 14 does demonstrate how common it is that health workers do not indicate a return date on the card. Only 26.6 percent of health cards of children not yet completely vaccinated showed a future return date. Particularly in mobile brigade areas, where teams may not know when they will return, it is very common that no return date is indicated; only 19.5 percent of child health cards show a return date.

Table 14. Receiving return date for next vaccination

Percentage of child health cards of children not yet completely vaccinated showing a return date

| | Zambezia <i>n=121</i> | Nampula <i>n=138</i> | Gaza <i>n=136</i> | Total <i>n=395</i> |
|----------------|--------------------------|-------------------------|----------------------|-----------------------|
| fixed facility | 31.5 | 19.4 | 37.1 | 29.4 |
| mobile brigade | 17.2 | 9.3 | 31.7 | 19.5 |
| Total | 28.1 | 16.2 | 35.5 | 26.6 |

source: Individual Interviews

4.10 Profile of a mother with an on-schedule child

Several characteristics of mothers and service delivery have been explored for their association with being on-schedule.

Access to vaccination services

Several indicators of access to health facilities are associated with child’s vaccination status (see Table 15). In line with the earlier finding that distance is a major reason for children failing to complete primary vaccinations on-schedule, mothers who reported they have to walk more than one hour to get to the vaccination site are less likely to have their child’s vaccinations on-schedule. In addition, mothers who have access to fixed facilities (i.e.: daily or regular services) are more likely to have their child on-schedule.

Mothers who have the experience of sometimes arriving to find the vaccination site closed are less likely to have their child vaccinated on-schedule. Finally, mothers who do not feel that the hours at which vaccination services are offered are convenient are less likely to have their child’s vaccination on-schedule.

Table 15. On-schedule and access to vaccination services

Percentage of children on-schedule by access to vaccination services

| | mother agrees | mother disagrees | sign |
|---|------------------|---------------------|------|
| walks less than one hour to health facility | 59.3 | 50.8 | ** |
| has access to fixed vaccination services | 53.1 | 39.2 | ** |
| sometimes the mothers finds the vaccination site closed | 44.4 | 53.4 | ** |
| hours of vaccination services are convenient | 53.4 | 37.6 | ** |

** p < 0.05

source: Individual Interviews

Quality of vaccination services

Several factors regarding the quality of vaccination services, including health workers attitudes toward the mother and their child, are associated with being on-schedule (see Table 16). Children of mothers who have more positive experiences and opinions of services provided are more likely to be on-schedule. Significantly more mothers have their child's vaccinations on-schedule when they have confidence that health personnel will give the vaccine correctly, when they feel that the health worker explains sufficiently what he/she is going to do, and when they are given the opportunity to ask questions.

Mothers are much less likely to have their child on-schedule when they feel that something the health worker did or said made them feel uncomfortable.

Table 16. On-schedule by mother's opinion of vaccination services

Percentage of children on-schedule by mothers' opinion on quality of vaccination services (among mothers whose child received at least one vaccine)

| | mother agrees | mother disagrees | sign |
|--|------------------|---------------------|------|
| Vaccine is always available | 56.4 | 55.6 | |
| There is always someone to vaccinate | 55.5 | 59.3 | |
| Generally has to wait a long time | 55.3 | 58.2 | |
| Sometimes HW does not vaccinate because the child is sick | 51.1 | 58.0 | * |
| Has confidence in HW that they will give vaccine correctly | 57.4 | 43.8 | ** |
| Health worker greeted people in a friendly manner | 56.5 | 47.2 | |
| Mother had the opportunity to ask questions | 65.2 | 53.9 | ** |
| HP did or said something that made her feel uncomfortable | 48.2 | 61.4 | ** |
| HP treats the child with care | 56.6 | 41.2 | * |
| HP did explain sufficiently what they were going to do | 59.5 | 49.0 | ** |

* $p < 0.10$

** $p < 0.05$

source: Individual Interviews

Information, Education, and Communications

Vaccination at prenatal care and birth

As might be expected, receiving some basic information about vaccination seems important to having the child's vaccinations on-schedule. Among mothers who had prenatal care, those who received information about the *importance* of vaccination are more likely to be on-schedule than mothers who were not informed during prenatal care. Also when mothers were informed *when* to go for vaccinations services the child is more likely to be on-schedule. A smaller and not significant difference is seen between mothers who are told *where* to go and those who were not (see Table 17).

Similarly, among mothers who delivered in a health facility, those who received information about the *importance* are more likely to have a child who has been vaccinated on schedule compared to those who delivered in a health facility but did not receive this information. Again, being told *when* to go seems to be of more importance than being told *where* to go; of mothers who are told when to go, 65.7 percent of their children are on-schedule, while if they are not told when to go, only 50.0 percent are on schedule. This difference is much smaller between those who are told *where* to go and those who are not, suggesting that mothers already know where they can go to have their child vaccinated.

As Table 17 demonstrates, children who were delivered in a health facility are more likely to be on-schedule later in life if they received the first vaccines (BCG and Polio0) at birth as compared to children born in a health facility but were not vaccinated at that time. This supports the idea starting the vaccination process at birth is an important factor in maintaining a child's vaccinations according to schedule.

Table 17. On-schedule by receiving information at prenatal care and birth

| Percentage of children on-schedule by receiving information about vaccination during prenatal care and at time of delivery in a health facility | | | |
|---|------|------|-------|
| | yes | no | sign. |
| <i>prenatal care (n=701)</i> | | | |
| heard about importance | 58.7 | 45.5 | ** |
| heard about where to go | 56.6 | 47.3 | * |
| heard about when to go | 57.0 | 46.3 | ** |
| <i>birth in health facility (n=427)</i> | | | |
| heard about importance | 66.8 | 54.8 | ** |
| heard about where to go | 64.6 | 60.9 | |
| heard about when to go | 65.7 | 50.0 | ** |
| received first vaccine (mother's report) | 66.9 | 50.9 | ** |
| received health card | 65.7 | 56.3 | |
| <i>birth in health facility and has card (n=381)</i> | | | |
| received BCG < 7 days (card only) | 74.9 | 60.2 | ** |
| received Pol0 < 7 days | 62.7 | 72.3 | ** |

* p < 0.10

** p < 0.05

source: Individual Interviews

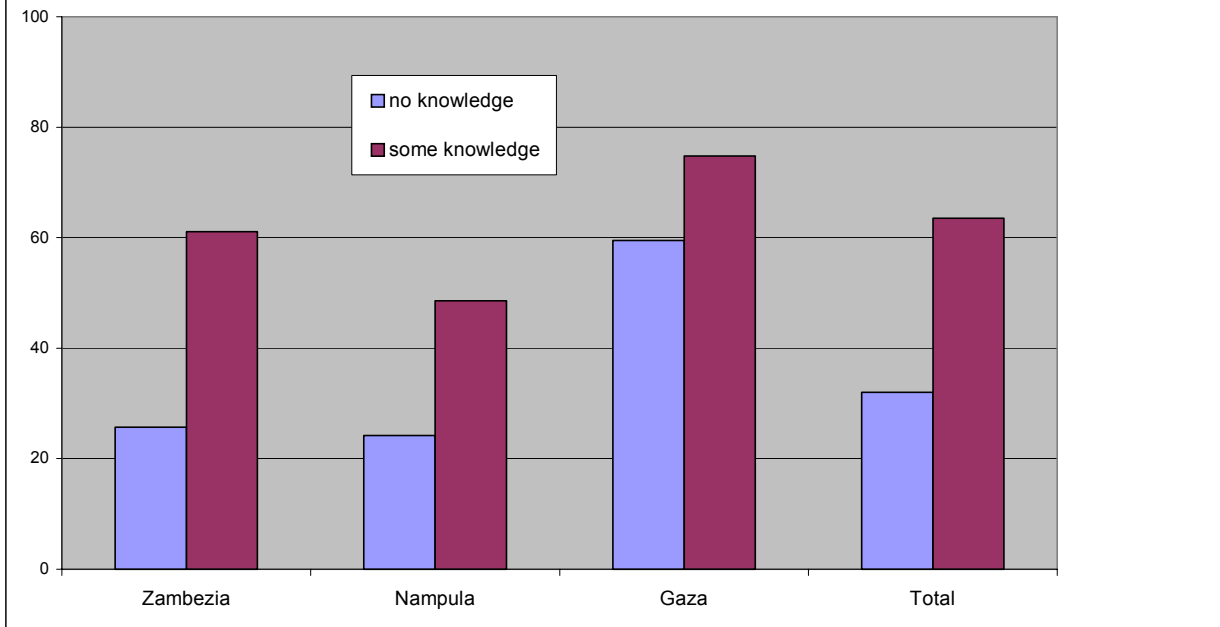
Knowledge of the vaccination schedule

Figure 11 (Table A26, Annex 11) shows a positive correlation between a mother's level of knowledge and the likelihood that a child's vaccinations are on schedule. Of mothers who did not know the answer to any of the questions asked⁵, only 32 percent have their child's vaccinations on schedule. Of mothers who know at least one of the answers to questions about the vaccination schedule, 63.5 percent are on-schedule. Significant differences between mothers who have some knowledge and those who do not have any knowledge are seen in all three provinces. Of course, it is impossible to determine if previous knowledge makes it more likely that mothers will bring their children or if they gain their knowledge in the act of bringing their children for vaccination.

Similarly, results show a positive correlation between an indicated return date on the child health card and being on schedule (Table A27, Annex 11).

⁵ Mothers were considered to have some knowledge if they answered any of the following correctly: 1) number of visits needed to complete vaccination 2) age at which to complete vaccinations 3) age at which measles vaccine should be received, 4) at least 3 vaccine-preventable diseases.

Fig. 11 On-schedule by vaccination knowledge
Percentage of children on schedule by mother's knowledge of vaccination schedule



source: Individual Interviews

5.0 Discussion and Recommendations

There are many things that affect a child's vaccination status, including logistical, programmatic, and demographic factors. Socio-economic status has an enormous impact on vaccination coverage. An analysis of vaccination in developing countries published in *World Development* (Gauri and Khaleghian 2002) cites household survey studies as invariably finding maternal education and socio-economic status to be correlated with the probability of childhood vaccination. Qualitative research in Mozambique (Baptista and Baleira 1999) also reports poverty, education, tradition, and family stability as significant socio-economic factors in relation to vaccination status. The results of this study concur: mothers who are least likely to have a child on-schedule are those with lower socio-economic indicators: they are further from urban centers; live in reed houses, have no water source; and are non-literate.

But affecting socio-economic change is a long-term enterprise. In the interest of increasing vaccination coverage in the immediate future, the following discussion focuses on the logistical and programmatic factors that can be directly affected by management interventions.

Based on the findings presented above, study results point at several characteristics of the mother of an on-schedule child:

A child is more likely to be on-schedule if her/his mother:

1. lives within an hour of a vaccination site
2. has access to regular, daily vaccination services
3. feels that quality of vaccination services is good
4. receives information about vaccination services during prenatal consultations, and/or during the birthing process at a health facility.
5. starts the vaccination process and receives a child health card immediately after child's birth
6. has a positive perception of vaccines
7. has a basic knowledge concerning vaccines

Based on creating these conditions for more mothers, the following recommendations are designed to achieve higher, more timely vaccination coverage in three intervention areas:

- *Access to services*
- *Quality of services*
- *Information/education/communication*

5.1 Access to services

Using the WHO definition of access to health services (within one hour or 5 kilometers of services), 60 percent of the Mozambican population has no access to fixed health facilities⁶. It is estimated that 40 percent of those health facilities throughout the country

⁶ QUIBB (Basic Indicators of Well-Being), 2001

have no cold chain equipment⁷ and so are only able to provide vaccination services through mobile brigades that originate in the district or provincial center. While mobile brigades are designed to expand service coverage, catchment areas are large and users still must travel long distances. No clear planning mechanism exists for mobile brigades; few records exist as to the percentage of the population that is served; neither are there records reporting frequency of visitation, objectives, or coverage by mobile brigade vaccination services. Many mobile brigades are severely limited by resources, provide irregular and unpredictable services, and therefore make timely vaccination impossible for mothers and their children.

Recommendations

Improved mobile brigades; installation of cold chain in existing fixed facilities; and/or expansion of fixed facilities through construction are all options for achieving greater access to routine vaccination services. Prioritizing the options and designing a cost effective approach for expanding access to services will require a focused assessment.

Conduct cost effectiveness comparison of mobile versus fixed vaccination services

Assess current mobile brigade system and services

Additional research is needed to learn the extent of current coverage by mobile brigade systems, to describe strengths, and to identify specific problem areas.

Standardize mobile brigade services

Develop guidelines for regular, community-based visitation schedules, a reporting form/data base, and a supervision plans in order to allow routine monitoring of mobile brigade services.

Expand mobile brigade services

(pending results of cost-effectiveness evaluation)

Install cold chain equipment in health posts currently without regular vaccination services

Define selection criteria for installation of cold chain equipment in existing facilities; identify necessary resources for installation, including equipment, consumable, and additional health worker training.

Fixed services construction with cold chain capabilities

Define appropriate levels of funding, staffing, supervision, and provision of supplies and consumables. Discussions should be pursued with appropriate donors and partners to develop feasible goals and objectives.

5.2. Quality of Services

Mothers commonly complain about quality of vaccination services and, indeed, stock outs, irregular hours, inadequate communications, and poor treatment of mothers by health workers are frequent occurrences. A drop out rate (DPT3-DPT1) of 10%⁸ and above is considered an indicator of vaccination service problems; study results report dropout rates ranging from 8 to 13 percent. Stock outs are a result of inadequate

⁷ USAID/EHP Health Facilities Survey, 2000

⁸ World Health Organization guidelines

planning and logistical problems, including lack of transport, fuel, and per diem; and/or broken cold chain materials. To improve quality of services, health worker training and supervision must be strengthened to include components on stock forecasting; monitoring achievements at the facility level; and communication with clients. Nampula Province needs special attention, as results report regular stock-outs occurring in vaccines and health cards in many health posts. Mobile services nationwide must be scrutinized in terms of quality of services; focus group discussions point to an irregular, lower quality of vaccination services.

More than 70 percent of mothers feel they have to “wait too long for services”. Late opening hours contributes to long wait times. Observation showed almost half (43 percent) of fixed posts and 75 percent of mobile brigades services start vaccination services after 9:00. Many mothers come at the same time; and are vaccinated as a group, contributing to the sense that “*we are vaccinated like dogs*” as one mother said; and reducing opportunities for health workers to inform and educate mothers. Average completion time of vaccination services is 13:00. Vaccinations are usually not offered during afternoons; despite official government hours that run until 15:30 o’clock.

Focus group discussion results report high levels of concern about side effects of vaccination. Most mothers worry about fevers, sores, and infections. Results from individual interviews show that only 30 percent of mothers were told what side effects to expect after a vaccination and, of those, 75 percent were told what to do in case of an adverse event. It is impossible to tell from the data the extent to which the concerns mothers express are provoked by normal, expected side effects or by poor vaccination technique.

Professional development opportunities for health workers are limited. Almost all (90 percent) of those interviewed expressed a desire for more training; and only half of all health workers had ever participated in an update seminar or course (with the exception of the introduction of Hepatitis B). The result is inconsistent and/or outdated technical knowledge and practices, missed opportunities to vaccinate, and reduced confidence of mothers in health services. One missed opportunity to vaccinate occurs due to a practice of not vaccinating a child with a fever greater than 38° Celsius - despite the fact that fever is not considered a contra-indication for any vaccine. A tally of children vaccinated is recorded by hand at most facilities, but the data are seldom used for planning and/or vaccine forecasting because so few health workers understand target group definitions and objectives. No central data base exists to record and analyze achievements.

Supervision was not specifically evaluated during this study, but anecdotal information describes a scarcity of supervisory visits and little standardization or post-visit reporting. *The Draft Report of the Post Introduction Evaluation of the Tetravalent Vaccine (MOH 2002)* describes district visits that occur only once or twice a year; leave no accessible reports or records; follow no supervision guides; and are frequently cancelled due to logistical difficulties.

The opened vial policy limits provision of services for the BCG vaccine, usually given at birth. Because BCG is supplied in 20-dose vials, health workers commonly offer BCG only two or three designated days per week in order to group mothers and meet the 20% allowable wastage maximum. In complying with the wastage policy, health workers discharge mothers from the maternity without vaccinating newborns - and some mothers

simply do not return. As the data show, this is truly a missed opportunity for entering a newborn child into the process of routine vaccinations.

Recommendations

Ensure availability of all EPI vaccines and associated consumables in all health units throughout the year

Conduct a detailed assessment of vaccine, health card, and consumable stock ruptures

More information is needed concerning system breakdowns in order to plan for improvement at central, provisional, and district levels.

Re-examine BCG vial size

By reducing the BCG vial size from a 20 to a 10-dose vial, BCG can be offered five days per week while still meeting the allowable wastage maximum (increased costs must be considered).

Strengthen Ongoing Health Worker Training

All health workers with primary responsibility for vaccination services in health centers, health posts, and mobile brigades should be evaluated for update training. Topic areas indicated are:

- Cold-chain equipment use at facility level: temperature monitoring, equipment maintenance, consumables supply and ordering
- Vaccine storage and care: temperature monitoring, transport
- Stock maintenance and ledgers: guidelines and proper use for avoiding stock-outs
- Objectives and coverage calculation: definitions, tallying coverage area, target population for routine vaccines
- Child health card: best practices
- Communication skills: informing/educating mothers; creating a two-way dialogue
- Vaccine contra-indications: clarify norms

To assist in providing health workers with necessary information, the new EPI Manual (draft version circulated in 2002) should be completed and delivered to all health workers in combination with overview training. The manual should be clearly organized, simply written, and must cover all standard procedures and expectation for health workers' performance. Annual updates on new or changed policies and norms should be prepared and disseminated to all health workers.

Improve EPI monitoring and evaluation

Without a means of collecting quality data for monitoring and evaluation, it is impossible to measure program successes and ongoing challenges. Particular needs include:

Address problem of outdated population figures

Routine monitoring is of limited value when outdated population figures are used to calculate coverage. Feasible solutions must be found to improve accuracy of provincial, district, and village population figures. In some areas, community health

workers can be used to collect accurate population figures and determine the number of children of eligible age for routine vaccinations.

Upgrade quality and use of facility-level coverage figures

The majority of health workers lack the skills to monitor and assess performance at the health facility level. Training in this area is wanted and needed by health workers at all levels. Establish guidelines for using facility coverage reports to guide decision making concerning stock supplies and ordering; training needs; and problem areas in terms of supply and demand for vaccinations.

Identify a means for a periodic, objective countrywide evaluation of routine vaccination coverage

All interested partners must agree on a method of conducting a periodic, objective evaluation of coverage. The Demographic and Health Survey is a logical choice, as a two-stage cluster sample conducted every five years, significant to provincial level. It includes a module on vaccination; and is scheduled to be conducted in 2003.

Standardize Supervision

Provincial, district, and facility supervisory targets need to be set, and supported with financial and logistical backing; as well as supervision guides and a clear format and process for reporting supervisory results. Supervision guides should include, at minimum:

- Application of vaccine
- Vaccine storage and care
- Stock maintenance and ledgers
- Objectives and coverage calculation
- Child health card
- Communication skills/provision of Information
- Vaccine contra-indications

Add adverse events tracking on routine reporting forms

Currently, Mozambique does not systematically track Adverse Events Following Vaccination (AEFI). In order to separate concern over adverse effects due to poor health worker technique (abscesses and infections) from a mother's worry over normal and usual side effects, AEFI should be tracked. If AEFI are found to be in normal range, mothers' worry can be addressed through information/education.

5.3 Information, Education, and Communications

Mothers overwhelmingly perceive vaccination as important to a child's health. Even among mothers of children who are not on schedule, vaccines are desired and valued. Detailed knowledge about vaccine preventable diseases is *not* necessary to create or maintain demand – study results show that knowledge is low while demand is high.

However, vaccines are refused in some instances. Reported reasons include misconceptions (is dangerous to vaccinate sick children; and a child shouldn't receive more than one vaccine in a day); fear of side effects; fear of hurting a child, and fear of causing sickness. These beliefs make clear how education might work to increase vaccination acceptance.

Mothers need to understand the general concept that vaccines protect against certain specific diseases but not against all diseases; as well as that for some diseases it is necessary to receive more than one dose of vaccine to be protected. Mothers must be informed of normal and expected side effects; and, clearly, they must be informed as to when to come back for the next vaccination. At present, mothers do not consistently receive even basic information. Health workers are often “too busy” to define the disease a child is vaccinated against, they don’t regularly inform about secondary effects, and even omit written and/or verbal information about return dates.

No guide for standard messages relating to vaccination exists. Educational efforts consist almost entirely of lecture-style “health talks” aimed at mothers. Fathers, grandparents, and community leaders are frequently left out of the educational effort. The quality and content of health talks is left up to the skill and whimsy of the individual health worker. Few education tools and/or materials are available; and those that do exist address vaccination in general terms for a literate population.

Child Health Card

In year 2001, the child health card (last edition produced in the early 1980s) was evaluated and modified. A one-year supply (600,000 copies) was printed; of which very few remain. Changes for the 2001 version included the incorporation of Hepatitis B and vitamin A; a third (underweight) growth line to conform with international IMCI standards; and a more detailed history of pregnancy and delivery. There has been no comprehensive effort to train either mothers or health workers in use and understanding of the new health card.

The 2001 card is designed for a literate, Portuguese speaking population. Few non-literate mothers have the capability to understand the information contained. Somewhat higher use of the child health card in Gaza likely corresponds to the more literate population; and perhaps a stronger interaction between health worker and mother.

Despite general problems of comprehension, mothers in all provinces value and safeguard their child health cards. Over 90% of children receive cards at birth, and there are few instances of lost or forgotten cards. Potential exists for the child health card to be an effective tool in educating and informing mothers if focus is put on a few key points: vaccine schedule, return date, child’s growth, and vaccination received.

Lacking appropriate training on best practices with the new child health card, health workers use them to differing degrees of efficiency and consistency. On busy days, neither growth nor vaccinations are explained to mothers and key information is not routinely related or marked. Some health workers express a disinclination to write down information for mothers who cannot read.

With appropriate health worker training and subsequent use with mothers, the child health card can become an educational tool to support the flow of information between health worker and mother. It can function as a take-home mother’s reminder; and can work equally well for literate and non-literate mothers.

Recommendations

Expand IEC capacity in MOH/Central level

Ministry of Health departments of community education and EPI need focused training in mobilization and materials development for non-literate adults in order to provide quality information/education/ communications services for routine vaccinations.

Include communities in vaccination mobilization

To maintain demand for vaccination services, the topic of vaccination and its importance must become a community issue. When husbands, grandmothers, religious leaders, traditional birth attendants, and community health workers are included in information/education campaigns, they can encourage mothers to seek regular and timely vaccinations; and help mothers understand the child health card. In some instances, particularly where community health workers are established, the community can be involved in detection of drop-outs, in helping mothers understand return dates (if they are written down), in scheduling mobile brigade visits at times when most mothers can be present, and in informing families when mobile brigade visits are scheduled and if they are cancelled or postponed.

Create key message guides for vaccination education efforts

Health workers need support in providing simple, consistent messages for mothers, as well as a variety of tools to make messages clear. All tools should cater to a non-literate population; including radio talk shows and debates, theatre, health talks, pictorial props, posters, brochures, and flyers. Specific messages should include the vaccination schedule, return date and type of service, expected side effects, what to do in case of side effects, and an explanation of service received (disease protected against, growth monitoring).

Train health workers in communications techniques

Training of health workers should not only focus on the technical aspect of vaccination, but also on the development of skills needed to encourage two-way communications with mothers. Supervision of health workers should include monitoring professional behavior and assessing communications skills.

Design “best practices” for health worker use of 2001 child health card

A general health worker training on use and understanding of the 2001 card is overdue. Key points of the training should include:

- Tool for health worker: key sections to update each visit
 - growth curve
 - vaccines given
 - pertinent health issues for child
 - return date and vaccine due (if any)
- Tool for mother: key sections requiring explanation for mothers
 - child’s growth
 - disease protected against
 - return date and service to expect

Conduct full assessment of child health card for redesign

Study results indicate that the child health card contains much more information than is actually used by either health workers or mothers of children. Design simplification could make the health card an easier tool for all users. Assessment should include interviews with mothers, community health volunteers, and health workers at central, provincial, and district levels.

6.0 Conclusions

Of the three sampled provinces, Gaza regularly shows better results for almost all indicators. The percent of on-schedule children who use fixed services is significantly higher than in the central and northern provinces (73 percent versus 41 percent in Zambezia and 43 percent in Nampula). The reasons are clear: Gaza has a much lower population (just above 800,000 compared to a population that exceeds 2,000,000 in both Zambezia and Nampula⁹), and a higher resource base due to greater proximity to Maputo City. The population is more literate, better educated, and has greater access to information¹⁰. The logistics of training, consumables and supplies, and supervision also tend to be easier in the southern provinces. Government and non-governmental support generally decreases with distance from the country's capital. According to the Health Facilities Survey (USAID/EHP 2000) Gaza supports an average of 8842 people per health facility; versus 14,200 in Nampula and 13,838 in Zambezia.

Nonetheless, with appropriate inputs, one can expect similar increases in coverage in all regions in the three intervention areas discussed above.

Access to Services

The largest increase in vaccination coverage will come with expanded access to services. To reach children that are currently out of range of both fixed and mobile vaccination services, expansion of services is essential.

Quality of Services

It can be assumed that the 8-13 percent of mothers who drop-out of the vaccination process *have access* to services; but stopped using them for some reason likely related to service provision. Therefore, with increased quality and consistency of services, this portion of users can be retained and ultimate coverage further increased.

Information/Education/Communications

Given that demand is already high, interventions seeking to increase coverage through educating on the *value* of vaccinations will result in small increases in full coverage. However, interventions designed to increase knowledge and understanding of the vaccination calendar are more likely to result in increases in *timely* vaccinations and thus reduce the period that a child is at risk of vaccine preventable diseases.

⁹ Census 1997

¹⁰ Census 1997

Literature Cited

Baptista and Baleira (1999) *Estudo Sobre as Determinantes do Comportamento em Relação à Vacinação em Moçambique*. Departamento de Estudos Sócio Políticos e Culturais, Instituto Superior de Relações Internacionais.

Gauri and Khaleghian (2002) *Vaccination in Developing Countries: Its Political and Organizational Determinants*, *World Development*, Vol. 30, No. 12, pp 2109-2132

MOH, WHO, UNICEF, and CDC (2002) *Post-Introduction Evaluation of the Tetravalent Vaccine (DTP-HepB) in Mozambique*. Draft Report, September 2002

UNICEF, WHO/AFRO, and USAID (1999) *Social Mobilization and Communication Support for Immunization in Mozambique*. A Joint Lessons Learned Study, October 1999