



IOCH
Immunization and Other Child Health Project

Vaccination Coverage Survey
By Unicef & IOCH

Maulvi Bazar District

Survey Report No. 05

**This survey was conducted by IOCH, a project of Management Sciences for Health,
funded by USAID under AID contract No. HRN-I-01-98-00033-00, Task Order No. 01**

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August 2000

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Acronyms

BCC	Behavior Change Communication
BCG	Bacillus of Calmette and Guerin
CES	Coverage Evaluation Survey
COSAS	Coverage Survey Analysis System
DPT	Diphtheria, Pertussis and Tetanus
EPI	Expanded Program on Immunization
IOCH	Immunization and Other Child Health
MNT	Measles, OPV and TT (multi antigen) campaign
Mouza	Smallest administrative locality in an Upazila
MSH	Management Sciences for Health
NGO	Non Governmental Organization
NID	National Immunization Day
OPV	Oral Polio Vaccine
TT	Tetanus Toxoid
Upazila	Sub district (previously known as Thana)
UNICEF	United Nations Children's Fund
WHO	World Health Organization

Terminology

This provides the meaning of some of the more technical terms used in this report and a brief explanation of their use.

By card: An immunization given to a child is termed as by card if the date of the dose is entered on an immunization card. Only doses recorded by card are treated as valid data in this survey.

By history: Immunization history collected from a parent's recall is termed as by history. Often no date will be mentioned. This information is only included in crude data.

Crude coverage rate is calculated from the doses recorded by card and/or by history. It is not ascertained whether the doses were given at the correct age and/or following the correct interval (where applicable). Crude data however, helps us to understand how much additional coverage could be achieved if all vaccines were given at the optimum age for the child and following the optimum interval. It also provides useful information on access to the EPI program and on the operational aspects of the provision of health services.

Valid coverage rate is calculated from the vaccinations recorded by card. Valid data includes only the doses of vaccines that were given after the minimum date of eligibility and/or after the minimum interval necessary to be effective and to protect the child. There is no maximum interval for a dose and therefore a dose administered after 52 weeks is still regarded as valid. By comparing crude coverage with valid coverage data of any particular antigen, one can determine how much coverage was lost due to the inability to give vaccine at the appropriate time.

Invalid doses are those administered at the wrong age and/or at the wrong interval. Doses administered before the minimum age in the case of DPT/Polio 1st doses and Measles vaccine or with less than four weeks interval in the case of DPT or Polio vaccines are classified as "invalid" doses.

The **criteria for a valid dose** used in this survey is the criteria recognized by the Bangladesh EPI program: minimum age for DPT/Polio 1st dose - 6 weeks old; minimum DPT/Polio interval - 4 weeks; minimum age for Measles vaccine - 38 weeks old.

Program access is measured by the percentage of children surveyed who received DPT 1st dose (crude data – by card and history) in the routine immunization session.

Fully immunized means the child has received all the doses it requires (BCG, OPV 1-3, DPT 1-3 and measles).

Missed Opportunity refers to a visit of a child to a vaccination center for a dose that he received. However at that time he was also eligible for another dose of antigen that he did not receive. If the missed dose was provided at a later date, it is a *corrected missed opportunity*. If not, it is an *uncorrected missed opportunity*.

Executive Summary

Background

Government of Bangladesh conducted a multi-antigen campaign (here in this report will be termed as MNT campaign) in September 1999 (12th to 21st September) in high-risk areas for vaccine preventable diseases. This campaign was conducted in Maulvi Bazar district. Between February 10–22, 2000 a coverage evaluation survey was conducted by UNICEF through MRC-MODE limited (an independent agency) in the selected unions of Baralekaha, Kamalganj, Kulaura, Rajnagar and Sreemangal Upazilas of Maulvi Bazar district to assess vaccination coverage of the children and women achieved through the campaign. Additional information on routine immunization and NID campaign were also collected to understand the operational profile of the provision of immunization services in this area.

Objectives

The principal objectives of the survey were to assess:

- a) the levels of routine immunization coverage of children (12–23 months);
- b) the levels of TT immunization coverage in women of child bearing age (15-49 years) regardless of their marital status
- c) the OPV and Vitamin A coverage levels achieved during the sixth NID campaign conducted in Nov-Dec 1999 among children (0-59 months) and
- d) the OPV, measles and TT vaccination coverage achieved during the September 1999 multi antigen (MNT) campaign.

Coverage Levels for the Routine Immunization of Children

Access: 83% of the children received at least one dose of antigen (DPT 1st dose in this case) from routine immunization sessions based on crude data (card plus history). However, 16% of the children did not receive any immunization.

Crude coverage between 12-23 months: 83% children received BCG, 65% received three doses of OPV, 65% received three doses of DPT and 61% received measles vaccine.

Valid coverage between 12-23 months: 83% children received BCG, 55% received three doses of OPV, 56% received three doses of DPT and 52% received measles vaccine.

Valid coverage by 12 months: 83% children received BCG, 50% received three doses of OPV, 51% received three doses of DPT and 41% received measles vaccine.

Source of immunization: Childhood immunization is provided by EPI outreach centers in 96% of the cases. EPI vaccination center is within half-an-hour walking distance from client's residence in 100% of the cases.

Reasons for non-immunization and partial immunization of children: The main reasons for non-immunization and partial immunization were the lack of knowledge of the parents/caretakers about the importance of immunization and in particular the need to return for the subsequent doses.

Problems detected: although access to immunization was fairly high, there was very high drop out rate (23% from DPT1 to DPT3 and 27% from DPT1 to Measles vaccine) and a number of invalid doses due to early immunization (5% for DPT1 and 15% for Measles vaccine). A small percentage of uncorrected missed opportunities occurred at the immunization sessions (range 0-2% for different antigens). Child immunization cards were available in only 42% of the cases and were lost in another 36% of cases.

Coverage Levels for the Routine TT Immunization of women

73% of women of childbearing age (15-49 years) had received a first dose of TT. Only 21% women had received the five doses of TT vaccine. 27% of the women had not received any immunization.

Reasons for non-immunization and partial immunization of women: The major reason cited for non-immunization was that the women were unaware of the need for immunization. Whereas the major reasons for partial immunization were that they were either unaware of the need for immunization or the health worker had not specified the date to return for the next dose of TT vaccine.

Coverage Levels for the sixth NID Campaign

In the surveyed Unions of Maulvi Bazar district the NID coverage figures were fairly good. 79% children received a dose of OPV during the first round and 77% during the second round. It still means however, that there were children who received only one dose of OPV or no OPV during the sixth NID campaign. This occurred at a time when every child under five years old should receive a dose of OPV on each round of the NID in order for Bangladesh to achieve its goal of being a "Polio free country".

The main reason for non-immunization during the NIDs were that the parents were not aware of the campaign. Some of them did not know the place of the NID site. Health workers were almost always the main source of information about the campaign. Local level miking, posters, radio or television did not play a significant role in the dissemination of information.

Vitamin A capsules were given to 70% of the eligible children on the second round of the sixth NID campaign.

Coverage levels in the September 1999 MNT campaign

77% of the children received a dose of OPV and 51% of the eligible children received measles vaccine during the MNT campaign. 48% of the eligible women received a dose of TT vaccine. Most of those who were not vaccinated during the campaign were unaware of it. Some of the parents had no faith in immunization. Health workers were again the most important source of information for the campaign. Posters, radio, television or local level miking appeared to be less effective in dissemination of MNT campaign messages in this area.

Information and motivation activity

Health worker was the single most important source of information for NID and MNT campaigns in the area surveyed in Maulvi Bazar district. Effectiveness of other mass media as a source of information and motivation is very low.

Suggested solutions

The survey indicates a need for appropriate information being given to parents / caretakers in an effective way about the importance of each child being fully immunized (preferably before 12 months) and about how to achieve full immunization (the time and place of the immunization sessions and the number of doses required). Women of childbearing age require more education about how to prevent neonatal tetanus with 5 doses of TT vaccination. There is also a need for training to be given to the service providers to help them keep up to date with EPI policies and guidelines and increase their capacity for counseling parents about EPI.

Information and motivation activities need to be well planned according to the local situation to make the campaign activities like NID/MNT to be more effective.

Introduction

Government of Bangladesh conducted a multi-antigen campaign in September 1999 (12th to 21st September) in high-risk areas. The campaign targeted women of childbearing age with TT vaccine, children between 9-35 months for measles vaccine and children between 0-59 months with oral polio vaccine. A total of 496 hard to reach and under served unions and slums in 4 city corporations and 27 large municipalities throughout the country were selected for this campaign. This campaign is termed as MNT campaign in this report. The objectives of the campaign were a) to reduce morbidity and mortality from neo-natal tetanus, b) to reduce the morbidity due to measles and c) to accelerate progress towards eradication of polio. These supplementary immunization activities were targeted to those children and women who would otherwise remain un-reached and therefore unprotected. In rural areas women were screened for eligibility of doses through updating of women's immunization register. WHO recommended 5 doses TT schedule was followed for identification of eligibility. In urban areas an extra dose of TT was recommended unless a woman was immunized within last one month of the multi-antigen campaign (MNT campaign). Measles vaccine was recommended for all children between 9-35 months of age irrespective of previous vaccination status excepting those who received it within last one month of campaign. OPV was recommended to give to all children below 5 years of age regardless of previous OPV immunization status.

The routine EPI program in the Upazilas is carried out by Government Health and Family Planning staff at fixed and outreach sites. NGOs and private practitioners also provide immunization services in many places. The doses of immunization provided are supposed to be reported to the Upazila Health and Family Planning Officer at the end of each immunization session. After compilation, the data is submitted on a monthly basis to the concerned Civil Surgeon's office that aggregates it with other district results and sends it on to the EPI HQ in Dhaka. For many reasons (e.g. immunization provided to children older than the target age group, tendency for over reporting, underestimated target etc.) routine EPI coverage data is generally unreliable^{5,7,8} and does not provide specific information for such areas as those surveyed.

To evaluate the multi-antigen campaign (MNT campaign), NID and routine EPI program WHO recommended 30 cluster sample survey was conducted by UNICEF through an independent agency called MRC-MODE Ltd. Selected unions under Five Upazilas of Maulvi Bazar district (please see map and **Annex 3**) were taken as an unit and 30 clusters were chosen through random sampling method.

Objectives

The overall objective of the survey was to assess the level of immunization coverage in selected unions of Maulvi Bazar district. The specific objectives were to:

- a) assess the level of immunization coverage of the children (12-23 months) and to find out the reasons for non immunization and partial immunization
- b) assess the level of immunization coverage among women of 15-49 years of age irrespective of their marital status and to find out the reasons for non immunization and partial immunization
- c) assess the coverage levels of OPV and vitamin A administered during the sixth NID campaign and
- d) assess the coverage levels for OPV, measles and TT vaccine provided during the September 1999 multi-antigen (MNT) campaign.

Methodology and its Limitations

The survey followed the WHO recommended 30-cluster survey method¹, which has been widely used in many developing countries to assess immunization coverage. It is relatively simple and can be done at low cost. (The detailed survey methodology and its limitations are presented in **Annex A**). Briefly, the immunization information is collected on a randomly selected group of 210 children/women from 30 clusters (7 children/women per cluster) in a given community. It gives an estimate of immunization coverage to within +/- 10 percentage points of the true population proportion with 95% statistical confidence, assuming a design effect of 2.

In this survey 7 children between 12-23 months (children born between February 8, 1998 to February 7, 1999) were selected from each cluster to ascertain their routine vaccination status. **Annex B** describes how the dates of eligibility of different antigens in routine immunization were determined for children. The multi-antigen (MNT) campaign was conducted in September 1999 (12th to 21st September). The sixth NID campaign was conducted between November 2-10, 1999 and December 2-8, 1999 in two rounds respectively. Children born between November 2, 1994 and November 1, 1999 were selected for collecting information on NIDs and OPV vaccination coverage in the MNT campaign. Whereas children born between September 13, 1996 and December 12, 1998 were selected to collect information on measles coverage achieved during the MNT campaign. Seven women between 15-49 years of age, irrespective of their marital status were selected to ascertain their tetanus toxoid vaccination status both for routine immunization and the MNT campaign.

The 30 clusters (villages) were chosen randomly by UNICEF in collaboration with IOCH from a list of the populations of mouzas and villages in the Bangladesh Population Census 1991. These clusters are identified in **Annex C** and their location is shown on the following map. The WHO standard questionnaire was used in this survey for documenting the routine immunization status of children and women. Separate questionnaires were used for collecting the data on the NID and MNT campaigns.

MRC-MODE Ltd, a local consulting firm with proven experience in conducting similar surveys, was hired through a competitive bidding process by UNICEF to collect the information from field. EPI Project, UNICEF and IOCH provided training and other technical assistance for the orientation of the surveyors. Data collection period was from February 10-22, 2000. There was one supervisor for a team of five data collectors. The supervisors were assigned to accompany one interviewer and to check the filled questionnaire of the rest of the interviewers every day. Field guides from local areas were selected for identification of the mouza and village.

All the checked and completed questionnaires were handed over to UNICEF and then to IOCH. Data entry and analysis was done by IOCH using COSAS 4.3³ and “EPI Info” programs. The final report was prepared by the Monitoring and Evaluation Unit, IOCH/MSH Project.

Limitations of the 30-cluster survey method

Although the 30-cluster survey method is relatively simple, it has several limitations² that can be grouped into two types:

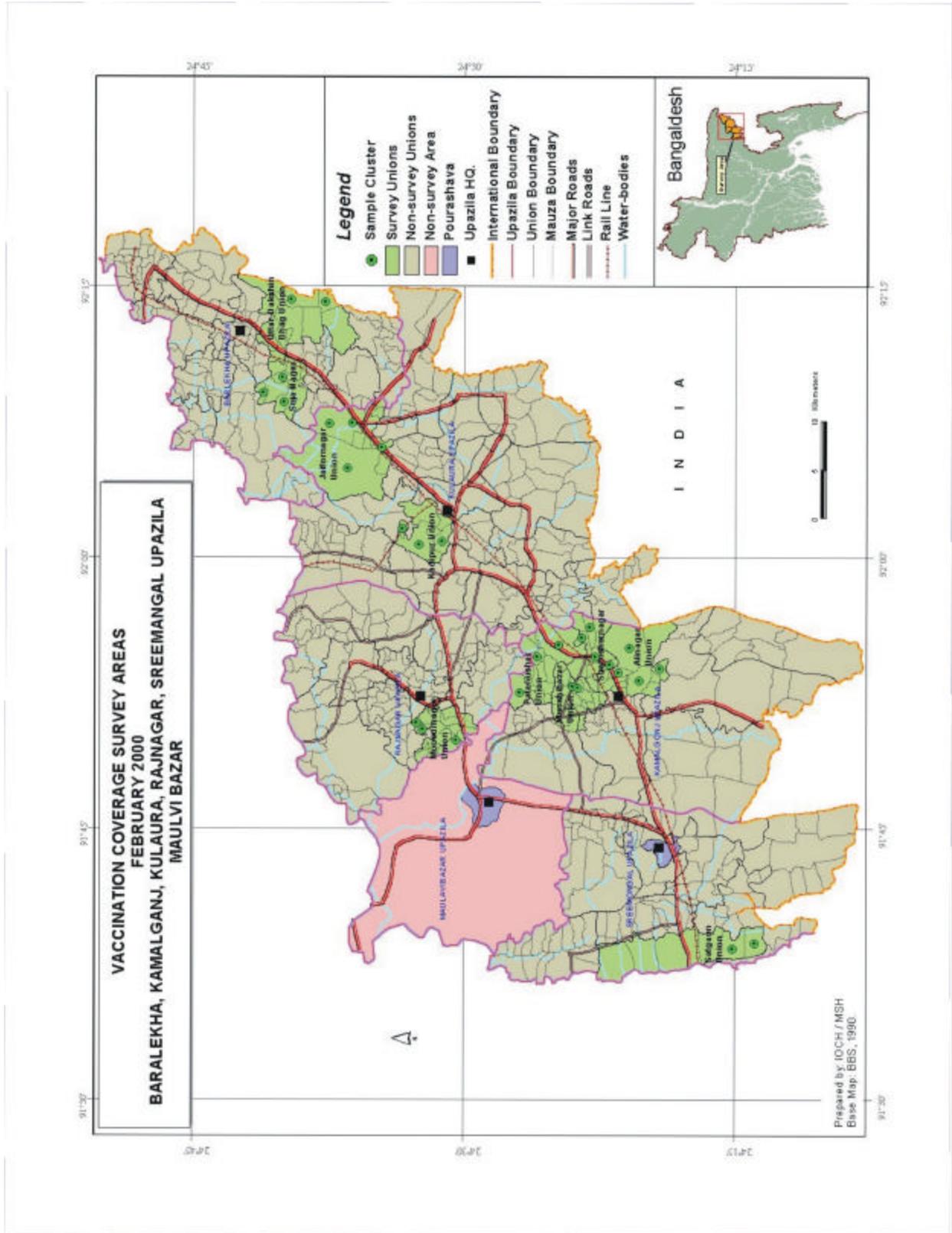
Linked to the sampling method:

- As an inherent bias in the sampling technique in 30 clusters, bigger villages are more likely to be selected as a cluster. The survey leaves out scattered small villages with poor access to services. It also does not reflect the lack of uniformity in service availability or the behavior of particular populations.
- There is a wide confidence interval (+/- 10%). It means that if the result shows 41% of children received a valid dose of measles before 12 months of age, then the “true” figure of measles immunization of children could be anywhere between $(41-10) = 31\%$ and $(41+10) = 51\%$. This type of survey is useful when the coverage is low but is less relevant to assess higher coverage or to compare surveys – unless there is a big difference between two surveys.
- To be relevant the analysis of valid data must apply to a relatively high percentage of available cards.

Linked to the implementation:

- The selection of the index house is key. Too often the proper method is not followed because the surveyors do not make the effort to number all the houses from their location to the end of the village along the direction indicated by the bottle or by the pencil.
- If a household includes an eligible child who is not at home for a few hours, the surveyor often does not return later on but skips the house and substitutes another child. This is, of course, an incorrect procedure that introduces a bias.

It is also important to remember that this survey coverage data gives little information about the current program as it documents the activities of a year earlier.



Results

General information

210 children were surveyed. 52% of them were boys and 48% were girls. 65% of them live in a building or tin shade house. Only 10% of the infants were away of their home for more than 2 months in their first year of life. Childhood immunization is being provided by outreach centers in 96% of cases. Only 1% of immunization is provided by NGOs. The remaining 3% is provided at the home of the child. Survey findings show that all of the immunization centers are within half an hour's walking distance of the children's home. 211 women were surveyed. 9% of them were unmarried at the time of the survey. 71% of the women live in a building/tin shade house. 9% of the women were away for more than 2 months at one time from their normal residence. 49% of the women knew that the TT vaccine could be given to unmarried women and 51% knew that TT vaccine could be given to non-pregnant women.

A. Routine Immunization coverage of children

Coverage Levels (card plus history data of COSAS analysis)

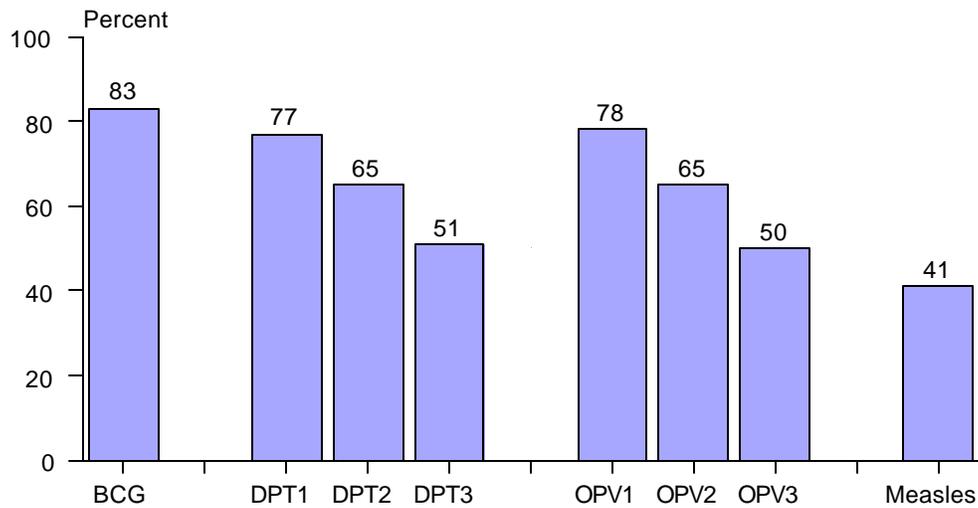
Table 1 shows the coverage levels of children between 12-23 months and their vaccination status at 12 months of age. The crude data figures for the 12-23 month age group indicate that 65% of the children received three doses of OPV, 65% received three doses of DPT and 61% were vaccinated against measles. The valid coverage levels are however considerably lower (except BCG), only 55% of children received three doses of OPV, 56% received three doses of DPT and 52% were vaccinated against measles. Significantly 16% of the children surveyed had not been immunized at all and were therefore not reached by the routine EPI program.

Table 1: Routine Immunization coverage levels of the children

	Coverage (%) Immunization of 12 - 23 month age group		Coverage (%) Immunized by 12 months
	Crude data (Access)	Valid data	Valid data
BCG	83%	83%	83%
Polio 1	84%	81%	78%
Polio 2	75%	67%	65%
Polio 3	65%	55%	50%
DPT 1	83%	79%	77%
DPT 2	75%	67%	65%
DPT 3	65%	56%	51%
Measles	61%	52%	41%
Zero dose	16%		

Table 1 shows little or no difference between the valid data of immunization of the 12-23 months age group and the valid data by 12 months except for measles coverage (52% versus 41%). **Chart 1** shows the actual coverage for children of less than 12 months.

Chart 1: Immunization coverage among children less than 12 months old

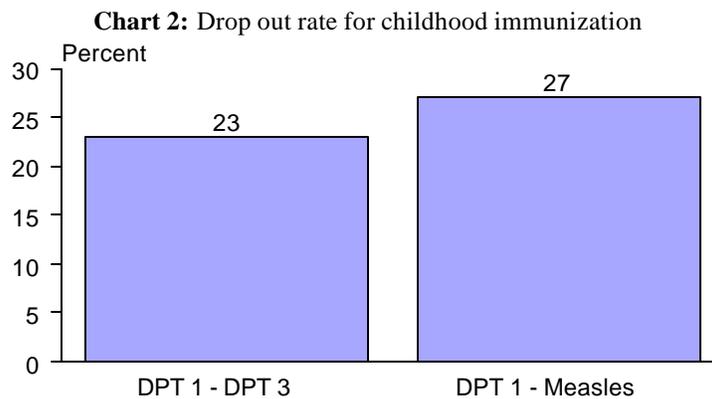


Program access [(percent of children surveyed who received DPT 1st dose (crude data - by card or history)].

Access to immunization was fairly good as 83% of children received a 1st dose of DPT.

Program continuity (dropout rate)

Crude data for antigens received by 12-23 months of age is used for calculating the dropout rate. In this survey, the DPT1 to DPT3 dropout rate was 23% and DPT 1 to measles drop out rate was 27% (**Chart 2**).

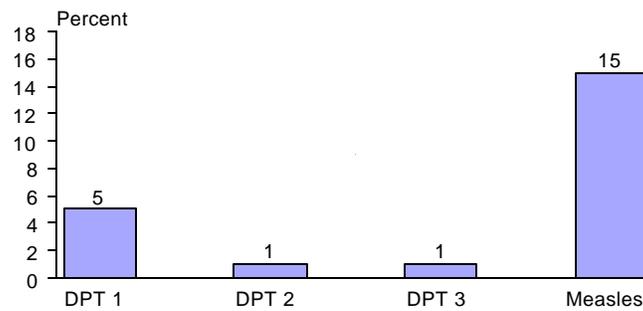


Program quality

Adherence to the immunization schedule – invalid doses

Adherence to the immunization schedule is generally considered to be the major indicator of program quality. The data indicates that the provider's performances reduced the coverage of DPT1 from an initial access of 83% measured by crude data to a coverage of 79% (valid data) for children between 12-23 months of age. A similar trend is seen for the other antigens (except for BCG). 5% of children received an invalid dose⁴ of DPT1 and 15% received an invalid dose of measles vaccine. 1% children received a DPT second dose less than 4 weeks after the first dose of DPT and another 1% children received DPT third dose less than 4 weeks after the second dose of DPT (**Chart 3**).

Chart 3: Invalid doses of immunization provided to the children



BCG vaccination

83% of the children surveyed received BCG vaccine based on card plus history data. 78% of the children were found with a BCG scar but 6% did not produce a visible scar.

Missed opportunities of immunization

The prevalence of uncorrected missed opportunities for immunization was low (range 0% for DPT1 to 2% for Measles vaccine). The overall Measles coverage would therefore be 2% higher than the survey finding if there had been no missed opportunities.

Availability of documentation of immunization

Child immunization cards were available in only 42% of the cases and were lost in another 36% cases.

Reasons for non-immunization and partial immunization of children

Table 2 shows that parents of children cited the following reasons for non-immunization a) unaware of the need for immunization (85%); b) fear of side reactions (3%) and c) child ill and not brought to the immunization session (6%). Whereas the major reasons cited by parents for partial immunization were: a) unaware of need for subsequent doses (49%), b) unaware of need for immunization (24%) and c) fear of side reactions (5%).

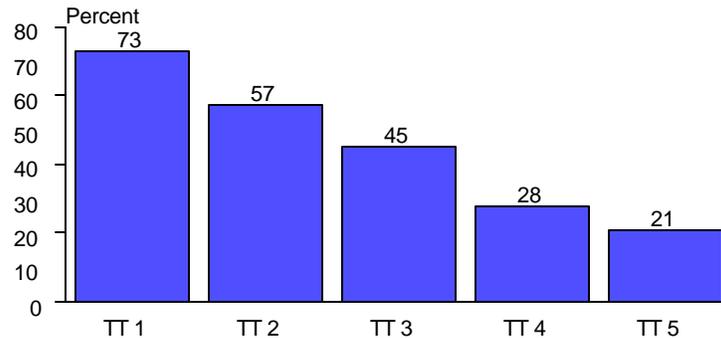
Table 2: Reasons for non-immunization and partial immunization of the children

Reasons	Not immunized	Partially immunized
Unaware of need for immunization	85%	24%
Unaware of need for subsequent dose(s)	-	49%
Place and/or time of immunization unknown	3%	-
Fear of side reactions	3%	5%
Postponed until another time	-	3%
Time of immunization inconvenient	3%	-
Vaccinator absent	-	1%
Mother too busy	-	1%
Child ill, not brought	6%	7%
Others (related to obstacles)	-	10%

B. Routine TT immunization coverage levels of the women

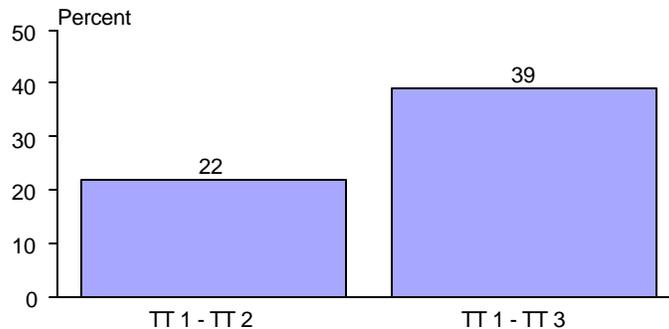
73% of the women had access to a first dose of TT vaccine (based on crude data). 57% of the women received two or more doses of TT vaccine. Only 21% had received all the 5 required doses (**Chart 4**). 27% of the women surveyed had not received any doses of TT vaccine.

Chart 4: Routine immunization coverage levels for TT of the women (15 – 49 years)



The dropout rate from first dose of TT vaccine to second dose of TT vaccine was 22% and the dropout rate from first dose of TT vaccine to third dose of TT vaccine was 39% (**Chart 5**). Survey findings indicate that no women missed an opportunity for a first dose of TT immunization during their antenatal check-ups. Only 25% of the women had TT immunization cards and they were lost in another 18% cases.

Chart 5: Drop out rate for TT immunization



Reasons for non-immunization and partial immunization of women

Table 3 indicates that the major reasons cited for non-immunization of women were: a) unaware of the need for immunization (77%) and b) fear of side effects (9%). Whereas the major reasons cited for partial immunization were: a) health worker did not specify the date to return for the next dose (40%) and b) unaware of need for immunization (30%).

Table 3: Reasons for non-immunization and partial immunization for TT of the women

Reasons	Non immunized	Partially immunized
Unaware of need for immunization	77%	30%
Health worker did not specify the date to return for the next dose	5%	40%
Place and/or time of immunization unknown	2%	3%
Fear of side reactions	9%	8%
No faith in immunization	2%	-
Time of immunization inconvenient	-	1%
Mother too busy with household works	2%	-
Women ill, not brought to EPI center	2%	-
Next dose is not yet due	-	14%
Others (related to obstacles)	2%	4%
No response	-	1%

C. Coverage Levels in the sixth NID Campaign

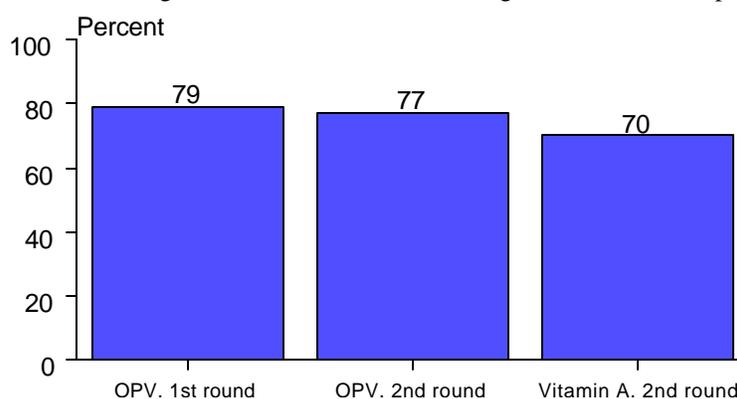
OPV Coverage

79% of children below 5 years of age received OPV during the first round and 77% during the second round of the sixth NID campaign (**Chart 6**).

High potency Vitamin A coverage

During the second round of the sixth NID campaign a high potency vitamin A capsule was also administered to 70% of the children between one and five years of age (**Chart 6**).

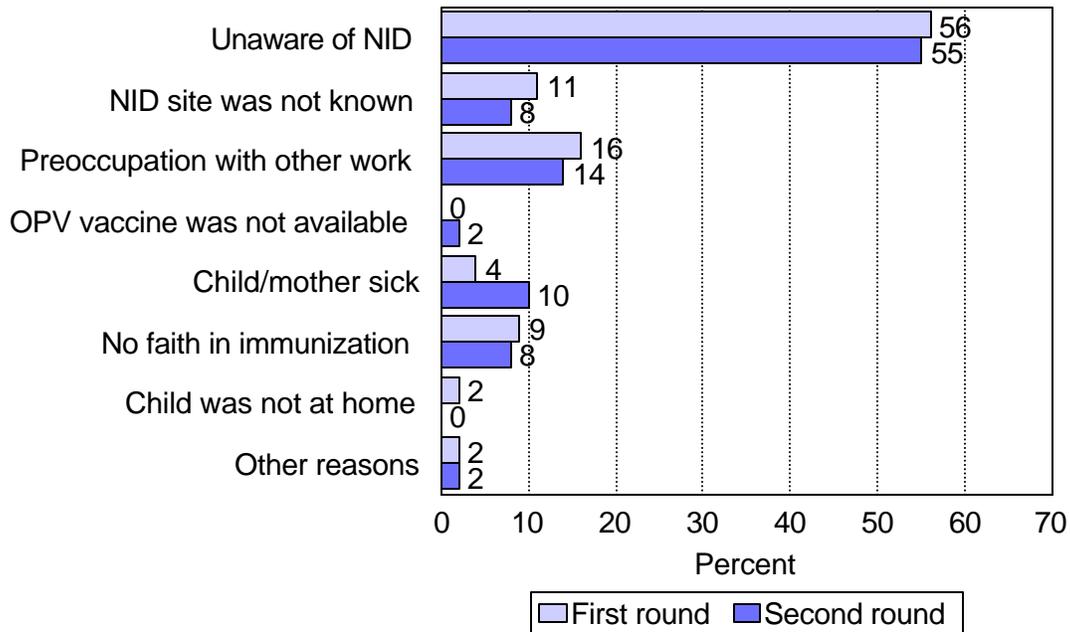
Chart 6: Coverage of OPV and Vitamin A during the sixth NID campaign



Reasons for non-immunization of OPV

About 21-23% of the eligible children did not have OPV during the sixth NIDs. The main reasons invoked for not being immunized (first and second round) were the lack of knowledge of the campaign and preoccupied with other work. These together with the other reasons are shown in **Chart 7**.

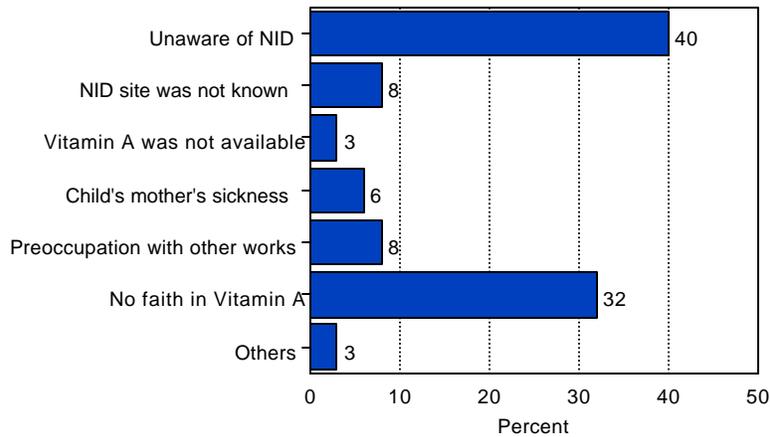
Chart 7: Reasons for non-immunization during the sixth NIDs



Reasons for not receiving Vitamin A

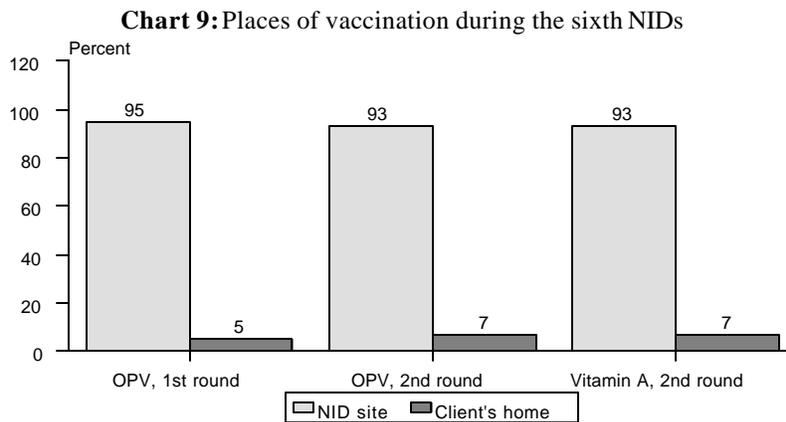
Chart 8 indicates that the major reasons given by parents for their child not having the vitamin A capsule were: a) unaware of NID (40%) and b) no faith in Vitamin A capsule (32%).

Chart 8: Reasons for not receiving Vitamin A capsule during the second round of the sixth NIDs



Places of vaccination during the sixth NIDs

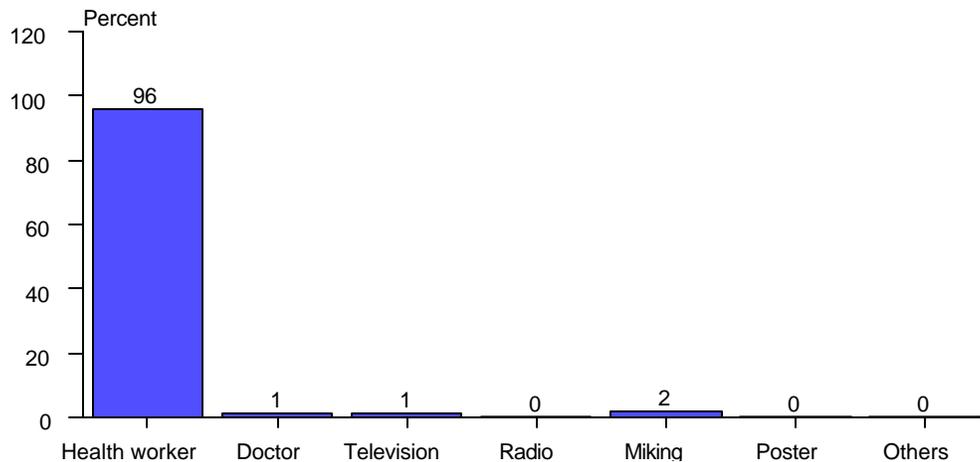
Chart 9 indicates that 95% children received OPV vaccine from the NID vaccination sites and 5% at their home during the first round. The places of immunization were almost the same during the second round. 93% of children received vitamin A from the NID site and 7% children received it at home.



Source of information for NID

Almost all of the respondents cited the Health Worker as their source of information. It is apparent from the survey that here in these unions - radio, television, poster and miking were found to be not effective in the dissemination of the NID message (**Chart 10**).

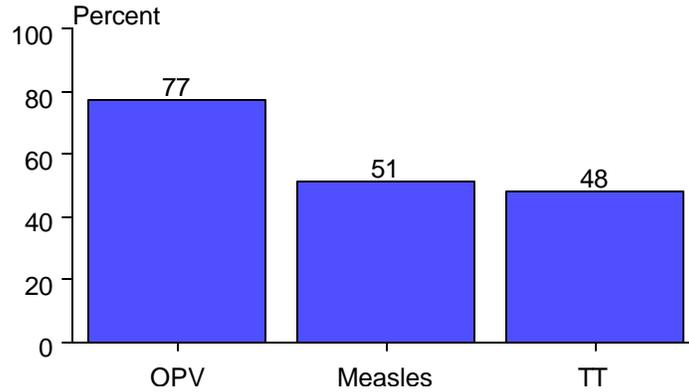
Chart 10: Sources of information about the sixth NID campaign



D. Coverage Levels in the MNT Campaign conducted in September 1999

The MNT campaign was conducted in September 1999. 51% of the eligible children received measles vaccine during that campaign. 77% of the children received a dose of OPV and 48% of the eligible women received a dose of TT (**Chart 11**). All these results might have been affected by a recall bias as the data was collected about five months after the campaign

Chart 11: Coverage levels achieved during the MNT campaign



Reasons for not accepting OPV and measles vaccine during the MNT campaign

The majority of the parents of the children who were not immunized for OPV and/or measles vaccine were either unaware of the MNT campaign or did not have faith in immunization. These together with other reasons are shown in **Chart 12 and 13**.

Chart 12: Reasons for not receiving OPV during the MNT campaign

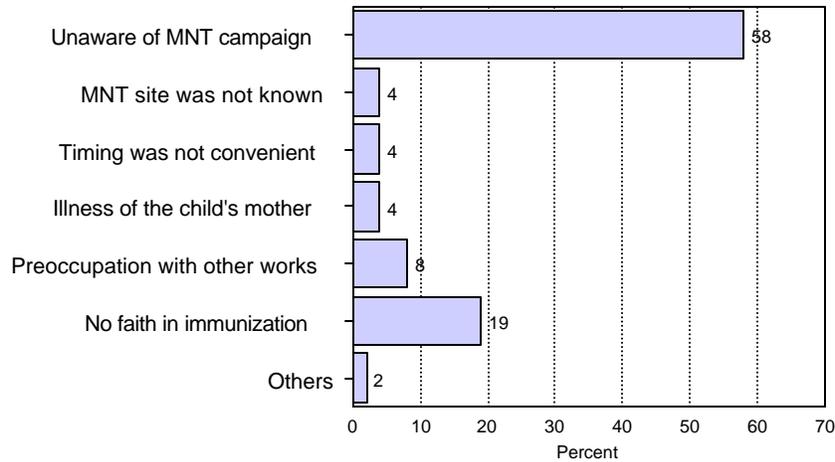
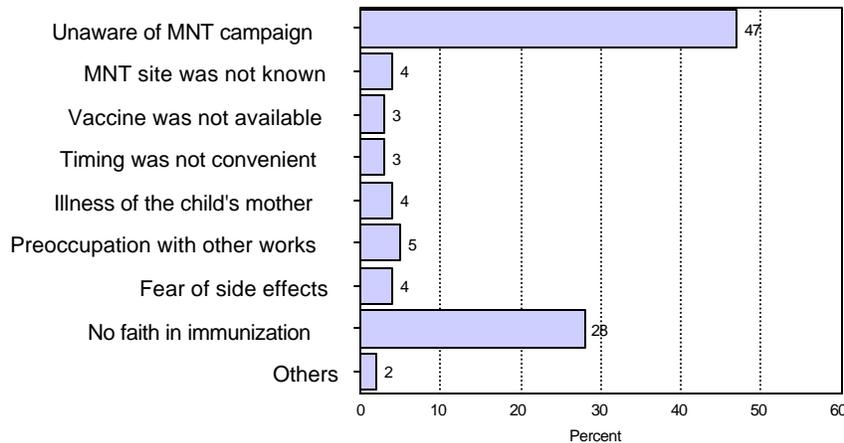


Chart 13: Reasons for not receiving measles vaccine during the MNT campaign



Reasons for not having TT vaccine during MNT campaign

More than two thirds of the women (67%) who were not vaccinated for TT were unaware of the MNT campaign. Another 14% women were unaware of the need for TT vaccine. These together with other reasons are shown in **Table 4**.

Table 4: Reasons for not having TT vaccine during the MNT campaign

Reasons	TT Vaccine
Unaware of MNT campaign	67%
Unaware of need for TT vaccine	14%
Vaccine was not available	1%
Timing was not convenient	3%
Sickness of the women	4%
No faith in immunization	11%
Others	1%

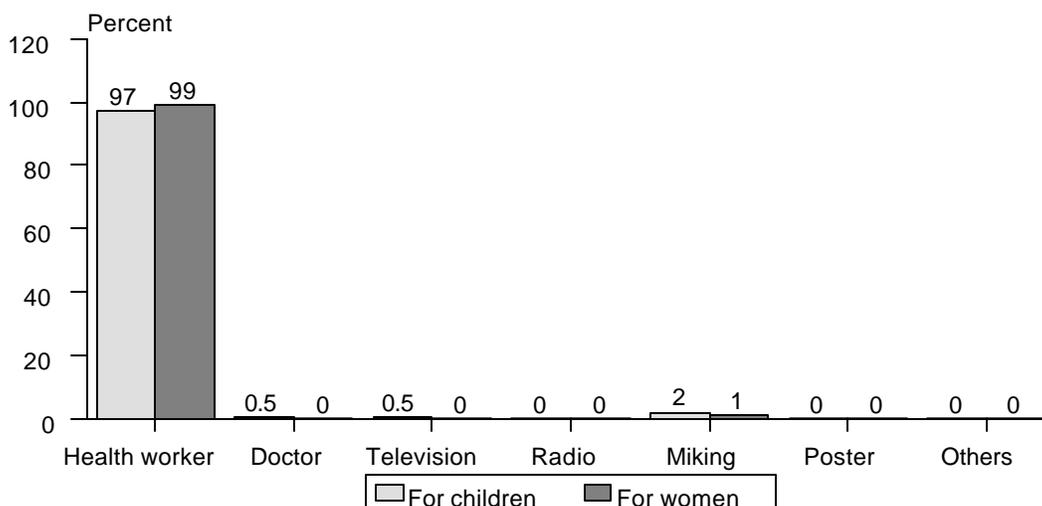
Source of vaccination during MNT campaign

98% of the children received OPV and measles vaccine from the MNT site and 2% received it at their homes. Almost all of the women (96%) received TT vaccine from the MNT site. A small percentage received it from a family planning center (3%).

Source of information of MNT campaign

Chart 14 indicates that health workers were the single most important source of information for MNT campaign both for children and women. None of the respondents mentioned radio or poster as a source of MNT information.

Chart 14: Source of information about the MNT campaign



Discussion

The survey showed that 83% of the children of 12-23 months of age had access to routine immunization. But the promising start was eroded by a high dropout rate (e.g. 23% from DPT1 to DPT3 and 27% from DPT1 to measles vaccine) and by the number of the invalid doses (5% for DPT1 and another 15% for measles vaccine). Significantly, 16% of the children had not been immunized at all. This is indicative of the poor quality of the immunization services. Child immunization cards were available in only 42% of the cases and were lost in another 36% of cases. Only 25% of the women had TT immunization cards and another 18% women had lost their cards. The absence of cards has got serious implications as it may mean that when a child comes to the immunization session for the second or subsequent doses, the vaccinators will have to immunize without accurately knowing the date of birth of the child and the date of previous immunization. This is another factor likely to increase the number of invalid doses given.

It is a fairly good achievement that 79% of the children between 0-5 years of age surveyed received a dose of OPV during the first round and 77% received OPV during the second round of the sixth NID campaign. But these figures still mean that there were a significant number of children who did not receive any dose or only one dose of OPV. This occurred at a time when the goal of each of the NID campaigns is to vaccinate each and every child under five years of age with two doses of OPV.

The coverage levels in the MNT campaign were not very satisfactory. 77% of the children received OPV, 51% received measles vaccine and 48% of the eligible women received one dose of TT vaccine during this campaign. But, these figures may not represent the true situation and the campaign's achievements as the data was collected from parent's statements about five months after the campaign.

Conclusions and Recommendations

Coverage levels for routine immunization of children

Access to routine immunization and low full immunization

This survey found that the access to routine immunization for children in the unions surveyed was fairly good with 83% of the children receiving a first dose of DPT, but this percentage was not maintained for subsequent immunizations. This important shortcoming can be mainly attributed to the lack of knowledge on the importance of full immunization leading to high drop out rates and also but to a lesser extent to the number of invalid doses and uncorrected missed opportunities.

The dropout rates

The high drop out rates could be reduced to acceptable levels by:

- providing better counseling to parents/caretakers about the importance of each child receiving all the required antigens before 12 months. They also require advise about when and where they should take their child for the next dose. Most children will need to attend 4 immunization sessions. 49% of the children dropped out simply because their parents/caretakers did not know that they were required to return to the EPI center for subsequent doses.
- undertaking appropriate Behavior Change Communication (BCC) activities through the mass media and service providers to increase awareness of the need for children to receive all the doses of each of the antigens.
- providing refresher training and orientation to the service providers for counseling parents. It is apparent from the results of the survey that they lack the relevant technical skills and/or motivation for counseling. Some parents reported that they had never received any immunization information from a health worker and others complained that they had not been spoken to at all.

Invalid doses

A number of children received invalid doses of vaccine because they received them before the minimum age recommended for each of the antigens or before the minimum interval that should occur between the doses. This indicates the poor quality of screening, inadequate technical knowledge and/or lack of motivation of the service providers. This situation may be improved by:

- providing appropriate refresher training to the service providers to emphasize proper screening and filling of vaccination cards, to remind them about the correct ages and intervals for immunizations and checking for BCG scar at the time of measles immunization
- strengthening the support given to the service providers through supervision;
- emphasizing the need to retain and use vaccination cards by parents.

Children not being immunized

16% of the children were not immunized at all. The main reason was that the parents were unaware of the need for immunization (85%). This situation may be improved by:

- undertaking appropriate BCC activities to reach this still un-reached population and to increase the awareness of the parents for the need for their children to be vaccinated

Missed Opportunities

The rate of uncorrected missed opportunities EPI centers was low (range 0% BCG–2% measles). The missed opportunities could however still be further reduced by:

- checking children's immunization records at each immunization session and immunizing them for doses if eligible
- providing appropriate training to the service providers

Coverage levels for TT vaccination

Access to TT vaccine (TT1) was reasonable but the rate of drop out after the second dose was very high. The coverage of 73% for TT1 reduced to 21% for TT5 and 27% had not been immunized at all. A woman of reproductive age needs to receive 5 doses of TT at appropriate intervals to acquire immunity for rest of her reproductive life. TT coverage is likely to be improved by:

- checking the TT status of all women between 15-49 years at antenatal check ups and at routine child immunization sessions to see whether the mother or female caretaker is eligible for any dose of TT and giving a dose of TT if it is required
- undertaking appropriate BCC activities to increase awareness of the women of childbearing age of the need for 5 doses of TT vaccinations
- providing refresher training to the service providers of the TT vaccination requirements

Coverage levels for the sixth round of NIDs

The coverage levels of the sixth NID campaign were at a reasonably satisfactory level (79% receiving a dose on first round and 77% on second round); but it still means that there were children who received only one dose of OPV or were not immunized at all. This occurred at a time when every child under five years old should receive a dose of OPV in each NID campaign in order for Bangladesh to achieve its goal of being a “polio free country”. Improvements might be made by:

- increasing and improving the BCC activities to ensure that each parent/caretaker is aware that each and every child must receive polio vaccine during both rounds of each NID campaign planned in 2000;
- paying particular attention to immunization in remote areas, where there is a shortage of health staff and in those areas known to have low OPV coverage in earlier NIDs.

Coverage levels for MNT campaign

The coverage levels of the MNT campaign were low (77% children received OPV, 51% received measles vaccine and 48% women received a dose of TT vaccine). However the data was collected five months after the campaign. This may have affected people's recall and therefore influenced the coverage figures negatively. Improvements might be made by:

- providing appropriate BCC activities to inform parents/caretakers of the campaign and make them aware of the importance of vaccination for their children

Reference and Resource materials

1. WHO EPI Mid Level Managers module: Evaluate Vaccination Coverage (WHO/EPI/MLM/91.11)
2. Anthony G Turner, Robert J Magnani and Muhammad Shuaib, “A not quick as quick but much cleaner alternative to the Expanded Programme on Immunization (EPI) cluster survey design”, International Journal of Epidemiology, 1996, volume 25, Issue No. 1, pages 198-203.
3. COSAS 4.3 version manual, WHO, November 1991.
4. Training manual on EPI for the field workers of Ministry of Health and Family Planning, 4th edition, 1997.
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Annex - A

The following are extracts from **Anthony G Turner, Robert J Magnani and Muhammad Shuaib's** article entitled ***"A not quick as quick but much cleaner alternative to the Expanded Programme on Immunization (EPI) cluster survey design"*** published in the *International Journal of Epidemiology* in 1996, volume 25, Issue No. 1, pages 198-203.

The standard EPI Cluster Survey Design

"The sample design for the EPI Cluster Survey is a two stage design involving the selection of 30 primary sampling units or 'clusters' (usually village or other area units), from which 210 children with a target age range (usually 12-23 months) are chosen, seven children per cluster. The sample size of 210 children (per domain or stratum) is mandated by the desire to estimate the level of immunization coverage to within +/- 10 percentage points of the true population proportion with 95% statistical confidence, assuming a design effect (i.e. *deff*) of 2.0. Based upon prior experience with immunization coverage surveys (primarily in the US), 30 clusters are generally thought to be necessary to yield sufficiently reliable estimate."

"In the standard design, clusters are chosen from a list of primary sampling units (i.e. villages, urban communities, census enumeration areas etc.) through systematic random sampling with probability proportional to estimated size (*ppes*). The latest estimates of cluster population sizes, which are assumed to be proportional to the number of children in the target age group in each cluster, are typically used as measures of size. The 30 clusters so chosen are then visited by survey field staff who carry out the second stage of sample selection and conduct the household interviews. "

"The original EPI design called for sample children to be chosen randomly from a list of all eligible children in each sample cluster. However, because the creation of lists of households and children tends to be time consuming, costly, and unfeasible in some settings, this procedure is only infrequently used in actual practice. Instead, one of several simplified second stage sampling procedures is commonly used. In one variant, children are selected by first choosing a random direction from a central location in a village or community (e.g. by spinning a bottle). The number of households in that direction to the edge of the community is then counted, and one household is randomly chosen to be the first sample household. Subsequent households are chosen by visiting the nearest neighboring households until information has been gathered on seven children. In a yet simpler variant, a direction from a central starting point is randomly chosen as described above and households are contacted as the interviewer moves in the chosen direction until the required information has been gathered for seven children."

"The second stage sampling methods described above are 'quota sampling procedures' and some of the problems resulting from the use of this approach have been noted over the years."

"First, quota sampling does not ensure that every eligible member of the target population has a known, non-zero chance of being selected. Hence, the standard EPI design, as it is usually applied, is not a true probability sample design."

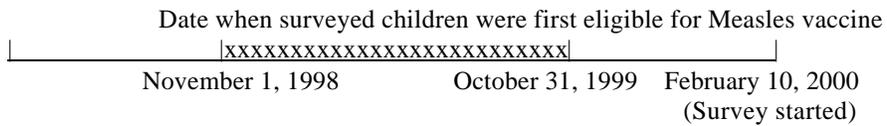
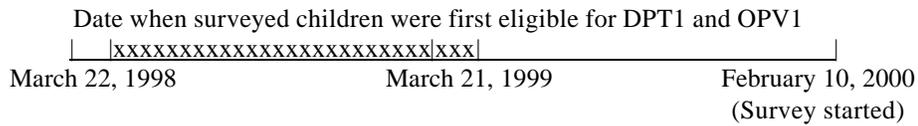
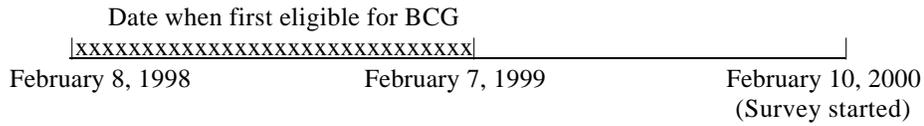
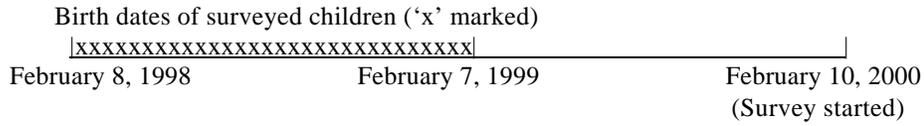
"A second problem concern sampling weights. However, since measures of size in sampling frames are often inaccurate due to census errors and changes in population since the census was taken, application of the standard EPI Cluster Survey method does not automatically result in a self weighting sample. The survey data must be weighed in order to yield unbiased estimates. However, since selection probabilities are not known in most EPI Cluster Survey applications, sampling weights can not be calculated."

"Thirdly, a computer simulation study demonstrates that the EPI Cluster Survey based upon quota sampling at the second stage of sample selection is considerably more prone to sampling bias than conventional cluster sampling, particularly where immunized children are 'pocketed' within clusters. "

"Finally, there is the issue of how second stage sample selection should proceed in surveys with multiple measurement objectives."

Annex B

The following illustration describes when children surveyed first became eligible for different vaccines:



Annex C

EPI Coverage Survey in Maulvi Bazar district List of clusters identified for survey

Upazila	Union	Mouza	Village	Population	Cumulative population	Cluster number
Baralekha	Sujanagar	Athnikandi (Part)	Uttar Patna	437	1820	1
		Jallar Haor (Part)	Jallar Haor (Part)	520	7404	2
		Sujanagar	Sujanagar	3258	15882	3
	Uttar-Dakshin Bhag	Gauranagar(2nd part)	Matgodan	267	18884	4
		B&C Kechhrigul (Part)	Hatijali	399	24959	5
Kamalganj	Alinagar	Alinagar T.g.	Alinagar T.g	4034	31837	6
		Gobindapur	Kumudpur	1113	36844	7
		Sreenathpur	Sreenathpur	1783	42532	8
		Tilakpur chak	Chitalia	3520	50272	9
		Dakhin Ramchandrapur	Dakhin Ramchandrapur	731	53846	10
		Ramesharpur	Rupshapur	641	60083	11
	Patanushar	Brindabanpur	Falidkona	394	65535	12
		Patanushar	Patanushar	2042	721145	13
		Sreesurja	Tilaghar	519	77336	14
	Shamshernagar	Badardeul	Kesuluti	802	83087	15
		Hazinagar	Satijergram	1329	88830	16
		Shamsernagar T.g	Shamsernagar bazar	2010	94833	17
			Dayachara	2179	100702	18
Kulaura	Jaifarnagar	Champakalta	Champakalta	682	106341	19
		Jangirai	Jangirai	2811	113111	20
			Belagaon	4203	117899	21
		Shahapur	Shahapur	2158	124510	22
	Kadirpur	Chhakapan (Part)	Chhakapan	1189	129681	23
		Kawla Rashi	Uchail	184	134812	24
		Uttar Kawla	Kadipur	376	140952	25
Rajnagar	Mansurnagar	Bhadiar punji	Bhadiarpunji (Bnamali)	651	146519	26
		Kadamhata	Kadamhata	1238	152416	27
		Mansurnagar	Tarachunga	886	158135	28
Sreemangal	Satgaon	Amrailchara T.g	Amrailchara T.g	3130	166644	29
		Hooglr chara T.g	Hooglrchara T.g	1907	170002	30

Acknowledgements

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1. Vaccination Coverage Survey of the Teknaf and Ukhia Upazilas- February 2000. Survey Report No. 01, August 2000
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Technical Report

1. Joint National/International Review of EPI Program in Urban Areas of Bangladesh—23 January – 3 February 2000. Technical Report No. 01, July 2000

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