



# IOCH

## Immunization and Other Child Health Project

### **Vaccination Coverage Survey in the IOCH Supported 91 Municipalities April 2002**

**Survey Report No. 65**

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## Acronyms

BCC	Behavior Change Communication
BCG	Bacillus of Calmette and Guerin
BINP	Bangladesh Integrated Nutrition Project
CES	Coverage Evaluation Survey
COSAS	Coverage Survey Analysis System
DPT	Diphtheria, Pertussis and Tetanus
EPI	Expanded Programme on Immunization
FIC	Fully Immunized Children
FWC	Family Welfare Center
IOCH	Immunization and Other Child Health
MNT	Measles, Neonatal and Tetanus
Mahallah	Smaller localities (smaller than a village, the urban equivalent of a para)
MOHFW	Ministry of Health and Family Welfare
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
TTBA	Trained Traditional Birth Attendant
UTBA	Untrained Traditional Birth Attendant
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 plus history. In the calculation process, first the rate of validity is calculated based on cards only, then this rate is applied to history cases too. 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 1<sup>st</sup> 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 1<sup>st</sup> dose - 6 weeks old; minimum DPT/Polio interval - 4 weeks; minimum age for Measles vaccine - 38 weeks old.

**Dropout** cases refer to the children/women who have initially received at least one dose of any antigen and then failed to receive the subsequent doses to get fully immunized. Dropout rate implies the inability of the EPI to follow-up and protect the cohort of children initially reached out.

**Program access** is measured by the percentage of children surveyed who received DPT 1<sup>st</sup> 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

To improve routine EPI and polio eradication activities, the Expanded Program on Immunization (EPI), Directorate General of Health Services (DGHS), Government of Bangladesh, decided to conduct district and city corporation wise coverage evaluation surveys (CES) in early 2002. UNICEF supported this initiative by contracting out 75 coverage evaluation surveys- one for each of the 64 districts, one for each of the 4 city corporations and 7 surveys for the Bangladesh Integrated Nutrition Project (BINP) upazilas, to two local consulting firms. To supplement these surveys, the Government and the partners requested IOCH to conduct additional 7 coverage evaluation surveys in urban areas. Accordingly, IOCH conducted a coverage evaluation survey in the IOCH supported 91 municipalities in April 2002.

### Objectives

The overall objective of the survey was to assess the level of immunization coverage in the IOCH supported 91 municipalities. The specific objectives were to:

- a) assess the level of routine immunization coverage of the children (12-23 months) and find out the reasons for non-immunization and partial immunization;
- b) assess the level of TT immunization coverage among mothers who had live births in the previous year, and find out the reasons for non-immunization and partial immunization;
- c) assess the coverage levels of OPV and Vitamin A administered during the 10<sup>th</sup> NID campaign;
- d) investigate antenatal and delivery practices, and decision making process for immunization; and
- e) understand importance of education on selected health care practices.

### Coverage levels for the routine immunization of children

**Access:** Based on crude data (card plus history), 92% of the children 12-23 months received at least one dose of antigen (DPT 1<sup>st</sup> dose in this case) from routine immunization sessions. 8% children did not receive a dose of any antigen.

**Crude coverage between 12-23 months:** 93% of the children received BCG, 85% received three doses of OPV, 85% received three doses of DPT and 75% received measles vaccine. 75% children were fully immunized.

**Valid coverage between 12-23 months:** 92% children received BCG, 75% received three doses of OPV, 75% received three doses of DPT and 72% received measles vaccine. 65% children were fully immunized.

**Valid coverage by 12 months:** 92% children received BCG, 73% received three doses of OPV, 73% received three doses of DPT and 67% received measles vaccine. 61% were fully immunized.

**Dropout rates:** Although access to child immunization was high (92% for DPT1), the dropout rates for different antigens were high too. There was 8% dropout from DPT1 to DPT2 and 19% from DPT1 to measles.

**Invalid doses:** There were a number of invalid doses due to early immunization and/or inadequate interval between the doses. About 5% of the DPT1 doses were administered before 6 weeks, and 4% measles doses before 38 weeks of age of the children. In addition, 3% of the DPT2 doses and 2% of the DPT3 doses were invalid as they were given before the 4 weeks interval between the doses.

**Missed opportunities:** Total missed opportunities (uncorrected plus corrected) for different antigens ranged from 1 to 9 cases (out of 210). However, the prevalence of uncorrected missed opportunities for different antigens was low, ranging from 0 to 2%. The composite index for total missed opportunities was as high as 37, reflecting poor quality of screening during vaccination sessions.

**Immunization coverage by sex:** There was no significant sex differential in child immunization. Male children's access to immunization as measured by coverage of DPT1 was only 1 percentage point higher than that of the female children (93% vs. 92%). Similarly, 77% of the male children were fully immunized (crude data); while the corresponding figure for female children was 73%, two percentage points lower than the male children.

**EPI Card retention:** 92% of the children interviewed were ever given EPI cards; however, EPI cards were available in 60% of the cases at the time of interview. EPI card retention rate was 65% only, which means that 35% of the EPI cards were lost.

**Sources of immunization services:** Child immunization services in this area were mostly provided by the GOB/municipal outreach centers (40%), followed by GOB hospitals (35%) and NGO clinics (22%). Private clinics provided immunization to 3% of the cases only.

**Reasons for non-immunization and partial immunization of the children:** The primary reasons for non-immunization of the children included: lack of faith in immunization (38%), sickness of the mothers (19%), and mothers were too busy to take the children to vaccination sessions (13%). The primary reasons for partial immunization or dropouts were: sickness of the children (32%), fear of adverse reaction (14%) and mothers were too busy (14%).

#### **Coverage levels for the routine TT immunization of mothers**

**TT coverage:** Access to TT immunization for the mothers who had live births in the last year was fairly high. About 94% of the mothers received TT1. The corresponding figures for TT2, TT3 and TT4 were 93%, 65% and 46% respectively. Only 22% of the mothers received TT5, which provide lifelong protection against tetanus. About 6% of the mothers never received any TT vaccine.

**TT immunization dropout rates:** TT immunization dropout rates were high. The dropout rate for TT2 to TT3 was 31%. The corresponding rates for TT3 to TT4 and TT4 to TT5 were

29% and 53% respectively. The dropout rate for TT1 to TT5 was as high as 77%, indicating that 77% of the mothers who received first dose of TT did not complete 5 doses TT immunization schedule.

**Invalid TT doses:** A considerable proportion of TT doses were invalid as they were administered before the minimum required interval between the doses. 26% of the TT3 doses were given before 6 months interval between TT2 and TT3, and as such were invalid. Over half of the TT4 doses (59%) were invalid, since they were given before one year interval between TT3 and TT4; similarly 48% of the TT5 doses were invalid for the same reason.

**TT card retention:** 89% of the mothers (who had live births in the last year) were ever given TT cards; however, TT cards were available in 41% of the cases at the time of interview. TT card retention rate was 46% only, which means that 54% of the TT cards were lost.

**Protection against tetanus at birth:** Of the mothers who had live births in the previous year, 89% of newborn babies were found protected against tetanus, indicating that 11% of the newborn babies were still not protected against tetanus at birth.

**Sources of TT immunization services:** Majority of the TT immunization services were provided by GOB/municipal outreach centers (42%), followed by the GOB hospitals (38%) and NGO clinics (15%). Private clinics provided immunization service to 5% of the cases only.

#### **Coverage levels for the 10<sup>th</sup> National Immunization Campaign**

**OPV and Vitamin A coverage:** During the 10<sup>th</sup> NIDs, 98% of the children < 5 years received OPV in both the rounds; while 99% received in each of the rounds. Vitamin A capsules were given to 95% of the eligible children (12 – 59 months old). Besides, Vitamin A capsules were administered wrongly to 7 ineligible children (out of 210) who were <1 year of age.

**Sources of OPV during the 10<sup>th</sup> NIDs:** Most of the children received OPV from NID sites during both the rounds of the 10<sup>th</sup> NIDs. Only 3% of the children in the 1<sup>st</sup> round and 4% in the 2<sup>nd</sup> round received OPV at home during child-to-search.

**Sources of information of the 10<sup>th</sup> NID campaign:** The major sources of information of the 10<sup>th</sup> NID campaign were television (43%), followed by mosque miking (39%) and relatives and neighbors (29%). The other sources of information included GOB/municipal health workers (20%), volunteers (18%) and mobile miking (13%).

**Reasons for not receiving vaccines from the NID sites of the 10<sup>th</sup> NIDs:** The most important reasons for not receiving OPV from the NID sites of the 10<sup>th</sup> NIDs were: lack of information about NID campaign (33% for 1<sup>st</sup> round and 8% for 2<sup>nd</sup> round), parents were too busy to take their children to NID sites (22% for 1<sup>st</sup> round and 25% for 2<sup>nd</sup> round), and sickness of the child (22% for 1<sup>st</sup> round).

**Antenatal checkup:** 40% of the mothers did not receive any antenatal check-up during their last pregnancies. Mother's education seems to have positive association with antenatal checkup. About half of the uneducated mothers (48%) never received antenatal checkup

during their last pregnancies; while the corresponding figures for the mothers with education of SSC or higher was 29%.

***Delivery Practices:*** Over half of the deliveries (57%) were attended by untrained traditional birth attendants (UTBA) or neighbors and relatives. Only one-third of the deliveries (32%) were attended by graduate doctors or midwives/nurses; while another 11% of the deliveries were attended by trained traditional birth attendants (TTBA). Uneducated women were less likely to have their delivery attended by qualified doctors or midwives and nurses. In most of the cases (98%), new blades or sterilized blades/scissors were used in cutting the umbilical cords of the newborn babies. Over one-fourth of the mothers (29%) did not apply anything at the cut of umbilical cord of their newborn babies. However, 52% of the mothers applied antibiotic powder/ ointment/cream/liquid medicine. Unhygienic practices, i.e. using soil/soil with oil or oil at the cut of the umbilical cord were reported by 14% mothers. It was found that uneducated mothers were less likely to use antibiotic powder/ointment/cream to treat the cut of the umbilical cord of newborn babies, compared to the mothers with education of SSC and higher. Deliveries attended by qualified doctors or midwives/nurses were apparently less likely to use oil, soil or soil with oil at the cut of umbilical cord than those delivered by TBAs, neighbors and relatives. However, these data should be interpreted cautiously, since many other confounding variables, such as economic condition, husband's education, family's health care practices, etc. may effect this particular health care practice. (Because of absence of data, we could not control these variables for this analysis)

***Decision making process for child immunization:*** For two-third of the cases, fathers and mothers jointly took decision regarding immunization of their children; while mother alone took decision in one-fourth of the cases. However, grand parents and other relatives played an important role in this matter accounting for 7% of the cases. It was found that women with education of SSC and higher were more likely to take decision either themselves alone or jointly with their husbands regarding immunization of their children, compared to uneducated ones.

***Immunization status and mother's education:*** The uneducated mothers were less likely to get their children fully immunized. 61% of the children of the uneducated mothers were fully immunized (crude data); while the corresponding figures were 94% for the mothers with education of SSC and 100% for the mothers with education of HSC and higher.

### **Problems detected**

Access to child immunization in the slums of the selected municipalities was good (92% for DPT1); but this high access dropped to 75% for fully immunized children because of high dropout rates of different antigens. (Dropout rate for DPT1 to DPT3 was 8% and DPT1 to measles was 19%). Such high dropout rates imply inability of the EPI program to follow-up and protect the cohort of children initially reached out.

Similarly, access to TT immunization for the mothers who had live births in the past year was high, since 89% of the newborn children were protected at birth. 94% of the mothers interviewed received the first dose of TT; but TT dropout rate was very high (77% for TT1 to TT5), resulting in very low coverage of TT5 (22%), which provides lifelong protection

against tetanus. A sizable proportion of newborn babies (11%) were found unprotected against tetanus at birth.

There were also too many invalid doses in child immunization (5% for DPT1 and 4% for measles), which further reduced the crude full immunization coverage of 75% to 65% when validity of doses was taken into account. Total missed opportunities for different antigens were also high (6 for BCG and 9 for measles). Like child immunization, a very high proportion of TT doses were invalid (26% for TT3, 59% for TT4 and 48% for TT5). These high rates of invalid doses and missed opportunities reflect service providers' inability to screen the clients properly.

EPI card (child immunization card) and TT card play an important role in ensuring good quality of immunization services. It helps the mothers to adhere to immunization schedule, as well as assists the service providers to screen the children for specific doses of specific antigens. Unfortunately, the retention rates of both the EPI card and TT card were very low, 65% and 46% respectively.

Mothers have a poor understanding of full immunization. Over half of the mothers (57%) could not mention how many times their children were required to be taken to EPI center to get fully immunized. Similarly, 81% mothers (who had live births in the past year) did not know how many TT doses were required for a woman for lifelong protection against tetanus.

Lack of faith in immunization as a reason for non-immunization of children was reported by majority of the parents, which indicates that the wrong perception about immunization still persists in the community. While sickness of the children, fear of adverse reaction and mothers preoccupation with other work resulted in high drop out rate and consequently contributed to low full immunization coverage.

4% of the children < 5 years in the 1<sup>st</sup> round and 6% in the 2<sup>nd</sup> round did not receive OPV from the NID sites of the 10<sup>th</sup> NID campaign. In spite of intensive communication activities during NIDs, lack of information of NID campaign as a reason for not receiving OPV from NID site was still reported by 33% in the 1<sup>st</sup> round and 8% in the 2<sup>nd</sup> round.

5% of the children of 12 – 59 months did not receive Vitamin A during the 10<sup>th</sup> NIDs. Besides, Vitamin A capsules were also administered wrongly to 7 ineligible children (out of 210) who were <1 year of age.

### **Suggested solutions**

1. Programmatic strategies must be undertaken to reduce the existing high dropout rates in both child immunization and TT immunization. The program should focus on quality of counseling of mothers/women (on immunization) by the service providers. The service providers at the first contact must counsel the mothers/women properly to motivate her to return and to get herself and/or her child fully immunized.
2. Program managers and field supervisors should ensure that EPI sessions are held as per plan, and at a regular and adequate interval (more than 28 days).

3. The service providers should be given refresher training to improve their technical skills on counseling of mother/women on immunization.
4. In order to reduce existing high rate of invalid doses and missed opportunities, emphasis should be given on screening of clients for both child and TT immunization. The service providers should be given refresher training to improve their technical skills on screening of clients for immunization
5. The pregnant mothers should be motivated (by the service providers and/or by the BCC activities through mass media) to receive the required number of TT doses necessary to protect their newborn babies.
6. Mothers should be explained (by the service providers) the benefits and importance of EPI cards/ TT cards for immunization of themselves and their children.
7. Mothers should be asked to preserve the EPI card safely until their children are 5 years old, and to bring the cards with them whenever they comes to the clinic/ EPI center for immunization of their children. They should also be asked to carefully preserve their TT cards, and to bring the cards with them whenever they come to clinic/ EPI center for TT immunization.
8. In the case of loss of EPI card/TT card, it should be provided over and over, and the history of the earlier vaccinations accurately recorded again and again, if necessary.
9. During IPC between the mothers and the service providers and/or at the first contact, the mothers should be clearly explained the importance of full immunization of children and women, and of the immunization schedule for full immunization for both children and women.
10. The program should strengthen BCC activities to inform the community of importance of immunization in general, and to motivate the mothers to get themselves and their children fully immunized. Very selective and focused mass media campaign may also be conducted to achieve this end.
11. Area specific innovative strategies suitable to local situation have to be undertaken during the next NIDs to reach to the left out children.
12. More attention should be given to high risk areas and traveling population during next NIDs.
13. Communication activities need to be strengthened through mass media, such as television, as well as through IPC by the health workers, to inform the communities of the next NID campaign.
14. Parents should be encouraged to attend the fixed NID sites/centers and discouraged to wait for home visits by the service providers during child-to-child search.
15. For distribution of Vitamin A capsules during NID, special attention should be given to the exact age group to limit shortage (through better screening for age) and no Vitamin A capsule should be given to the parents to administer them to their children either at NID site or in their homes.

## **Introduction**

To improve routine EPI and polio eradication activities, the Expanded Program on Immunization (EPI), Directorate General of Health Services (DGHS), Government of Bangladesh, decided to conduct district and city corporation wise coverage evaluation surveys (CES) in early 2002. UNICEF supported this initiative by contracting out 75 coverage evaluation surveys- one for each of the 64 districts, one for each of the 4 city corporations and 7 surveys for the Bangladesh Integrated Nutrition Project (BINP) upazilas, to two local consulting firms. To supplement these surveys, the Government and the partners requested IOCH to conduct additional 7 coverage evaluation surveys in urban areas as follows:

- i) one coverage evaluation survey for the slums of Dhaka City Corporation;
- ii) one coverage evaluation survey for homeless and street children of Dhaka City Corporation;
- iii) one coverage evaluation survey for the slums of Chittagong City Corporation;
- iv) one coverage evaluation survey for the slums of Khulna and Rajshahi City Corporations;
- v) one coverage evaluation survey for the major municipalities (IOCH supported 91 municipalities); and
- vi) two coverage evaluation surveys for the peri-urban areas (Tejgaon Circle) of Dhaka City Corporation.

Accordingly, IOCH conducted a coverage evaluation survey in the IOCH supported 91 municipalities in April 2002.

## **Objectives**

The overall objective of the survey was to assess the level of immunization coverage in the IOCH supported 91 municipalities. The specific objectives were to:

- a) assess the level of routine immunization coverage of the children (12-23 months) and find out the reasons for non-immunization and partial immunization;
- b) assess the level of TT immunization coverage among mothers who had live births in the previous year, and find out the reasons for non-immunization and partial immunization;
- c) assess the coverage levels of OPV and Vitamin A administered during the 10<sup>th</sup> NID campaign;
- d) investigate antenatal and delivery practices, and decision making process for immunization; and
- e) understand importance of education on selected health care practices.

## **Methodology**

The survey employed the WHO recommended 30-cluster survey method<sup>1</sup>, which has been widely used in many developing countries to assess immunization coverage. It is relatively simple and can be done at low cost. Briefly, the immunization information is collected on a randomly selected group of 210 children/women from 30 clusters (seven 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. Based upon prior experience with immunization coverage surveys, 30 clusters are generally thought to be necessary to yield sufficiently reliable estimate.

In this survey, seven children between 12-23 months born between March 23, 2000 and March 23, 2001 were selected from each cluster to ascertain their routine vaccination status. The 10<sup>th</sup> NID campaign was conducted on 27 January 2002 (first round) and 10 March, 2002 (second round) throughout the country, including the urban areas. Seven children born between 15 March 1997 and 26 January 2002 were selected from each cluster for collecting information on NIDs. Also, seven women who had live births between 23 March 2001 and 23 March 2002 were selected from each cluster to ascertain their tetanus toxoid vaccination status for routine immunization. In addition to the information on immunization and NIDs, information on several social, antenatal and delivery indicators was collected from the mothers interviewed.

Thirty clusters (mahallahs/blocks/sub-blocks) were chosen randomly from a list of populations of the selected municipalities. The list of the selected clusters is given in **Annex A** and their location is shown on the following map. The WHO recommended standard coverage evaluation questionnaires were 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 campaign, as well as social and health care indicators.

The data for the survey were collected by the experienced Field Investigators of the Survey Team and selected Polio Eradication Facilitators of the IOCH. All the surveyors were trained and were adequately supervised in the field during data collection to ensure quality and completeness of the data. The data were collected over a week, between March 27, 2002 and March 31, 2002. Data processing and analysis were done by the Monitoring and Evaluation Unit of the IOCH using COSAS 4.41<sup>2</sup> and EpiInfo. The final report was produced by the Monitoring and Evaluation Unit of the IOCH/MSH.

## **Limitations**

### **Limitations of the 30-cluster survey method**

Although the 30-cluster survey method is relatively simple, it has several limitations<sup>2</sup> that can be grouped into two types:

#### **Linked to the sampling method:**

- As an inherent bias in the sampling technique in 30 clusters, bigger mouzas are more likely to be selected as a cluster. The survey leaves out scattered small mouzas with poor access to services. It also does not reflect the lack of uniformity in service availability or the behavior of particular populations.

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<sup>2</sup> COSAS (Coverage Survey Analysis System) is a dedicated software for analyzing coverage evaluation survey data

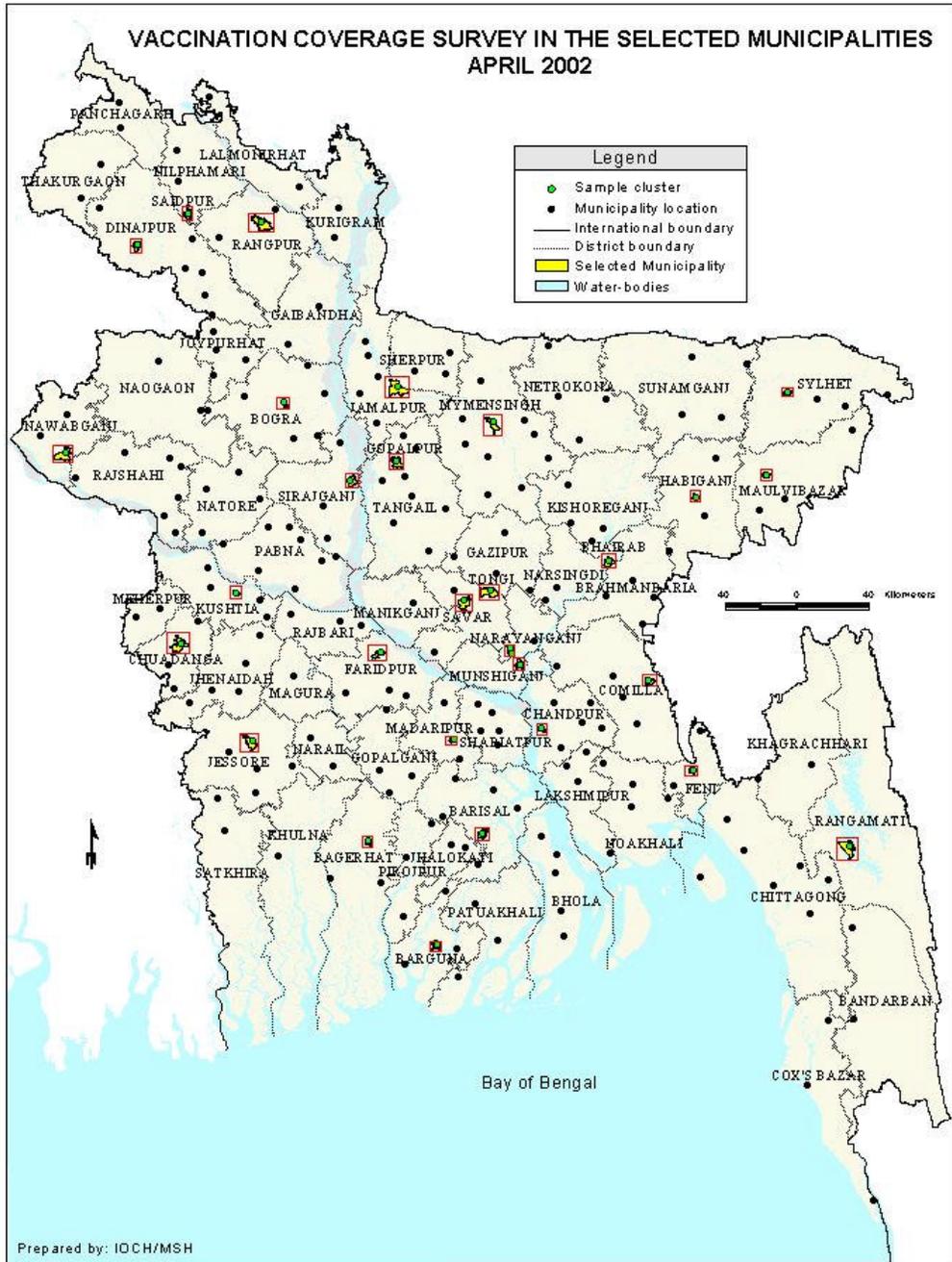
- There is a wide confidence interval (+/- 10%). It means that if the result shows 56% of children received a valid dose of measles before 12 months of age, then the “true” figure of measles immunization of children could be anywhere between  $(56-10) = 46\%$  and  $(56+10) = 66\%$ . This type of survey 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 mouzas 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.

VACCINATION COVERAGE SURVEY IN THE SELECTED MUNICIPALITIES  
APRIL 2002



## Results

### Routine immunization coverage levels for children

Table 1 shows the coverage levels of children between 12-23 months of age and their vaccination status at 12 months of age. The crude data figures for the 12-23 month age group show that 92% of the children had access to immunization services (as measured by the coverage of DPT1), 85% of the children received three doses of OPV and DPT and 75% were vaccinated against measles. 75% of the children were fully immunized; while 8% of the children never received any dose of vaccine

**Table 1: Routine immunization coverage levels for children**

Name of the Vaccine	Coverage (%) Immunization of 12-23 months age group		Coverage (%) Immunized by 12 months of age
	Crude data (Access)	Valid data	Valid data
BCG	93	92	92
OPV1	92	88	87
OPV2	89	82	81
OPV3	85	75	73
DPT1	92	88	87
DPT2	89	82	81
DPT3	85	75	73
Measles	75	72	67
Fully immunized	75	65	61
Zero Dose	8	-	-

The valid data figures for the 12-23 month age group show relatively lower coverage for all antigens (excepting BCG) than the crude ones. 75% of the children received three doses of OPV and DPT, and 72% were vaccinated against measles. 65% of the children were fully immunized. The valid coverage of full immunization (FIC) was 10 percentage points lower than that of the crude one (65% vs. 75%), reflecting poor quality of vaccination services. Overall, 61% of the children were fully immunized by valid doses by the age of 12 months.

### *Immunization coverage levels by gender*

Routine immunization coverage levels for different antigens by gender are shown in Table 2. It indicates that there was no significant sex differential in immunization of children. Male children's access to immunization as measured by coverage of DPT1 was only 1 percentage point higher than that of the female children (93% vs. 92%). Similarly, 77% of the male children were fully immunized (crude data); while the corresponding figure for female children was 73%, two percentage points lower than the male children.

**Table 2: Routine immunization coverage levels by gender**

Name of the vaccine	Coverage % Immunization of 12-23 months age group				Coverage % Immunized by 12 months	
	Crude data (Access)		Valid data		Valid data	
	Male (%)	Female (%)	Male (%)	Female (%)	Male (%)	Female (%)
BCG	93	92	93	92	92	92
OPV1	93	92	92	83	90	83
OPV2	89	90	83	80	82	80
OPV3	86	83	75	75	73	73
DPT1	93	92	92	83	90	83
DPT2	89	90	83	80	82	80
DPT3	86	83	75	75	73	73
Measles	77	73	68	69	70	64
Fully immunized	77	73	61	62	63	59
Zero dose	7	8	-	-	-	-

***Invalid doses and missed opportunities***

Table 3 shows that there were a number of invalid doses due to early immunization and/or inadequate interval between the doses. About 5% of the DPT1 doses were administered before 6 weeks, and 4% measles doses before 38 weeks of age of the children. In addition, 3% of the DPT2 doses and 2% of the DPT3 doses were invalid as they were given before the 4 weeks interval between the doses.

**Table 3: Invalid doses of immunization provided to the children**

Antigens	Percentage
DPT1	5
DPT2	3
DPT3	2
Measles	4

Table 4 shows missed opportunities for different antigens. Total missed opportunities (both corrected and uncorrected) for different antigens were quite high, ranging from 1 to 9 cases out of 210. Prevalence of uncorrected missed opportunities for different antigens ranged from 0 to 2%. The composite index for total missed opportunities was as high as 37, reflecting poor quality of screening during vaccination sessions.

**Table 4: Missed opportunities by antigens**

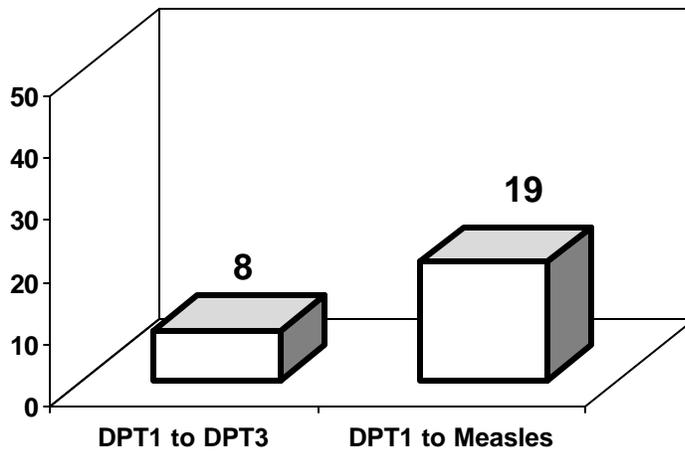
Name of the vaccine	Uncorrected		Corrected		Total
	Number	Percent	Number	Percent	
BCG	4	2	2	1	6
DPT1	3	1	4	2	7
DTP2	2	1	1	1	3
DPT3	0	0	1	1	1
OPV1	3	1	4	2	7
OPV2	2	1	1	1	3
OPV3	0	0	1	1	1
Measles	3	1	6	3	9
Index*					37

*\* The idea is to propose one composite index reflecting the quality of screening during vaccination sessions.*

***Dropouts of child immunization***

Figure 1 shows that the dropout rates for different antigens were considerably high. The dropout rate for DPT1 to DPT3 was 8% and DPT1 to measles was 19%. These high dropout rates reflect inadequate counseling of parents by the service providers on completion of immunization schedule.

**Figure 1: Drop-out rates for child immunization**



***EPI card retention***

Table 5 shows that 92% of the children interviewed were ever given EPI cards; however, EPI cards were available in 60% of the cases at the time of interview. EPI card retention rate was 65% only, which means that 35% of the EPI cards were lost.

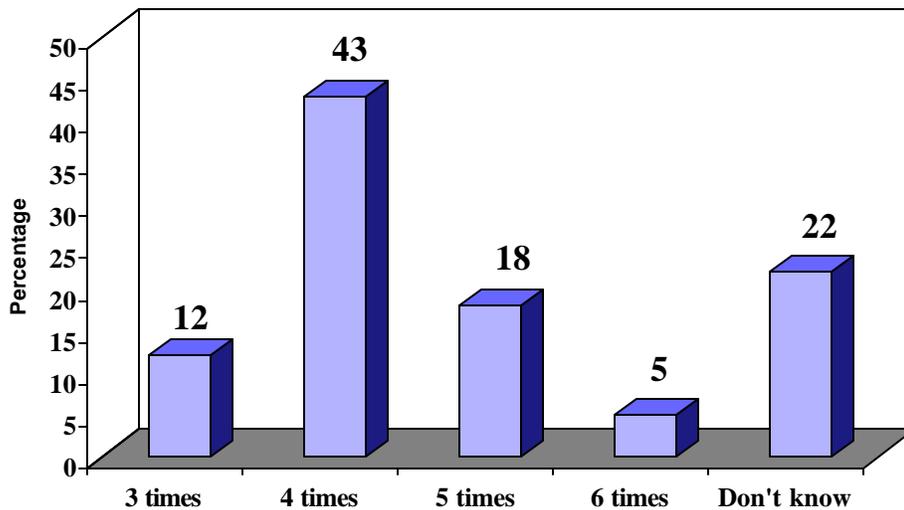
**Table 5: EPI Card availability and retention**

Card Status	Number	Percentage
EPI card available	126	60
EPI card ever given	194	92
EPI card retention	126	65

***Knowledge about required visit to immunization center for full immunization***

Figure 2 shows mothers' knowledge about required visits to immunization center for getting a child fully immunized. It shows that only 43% of the mothers could mention correctly the number of times (i.e. 4 times) a child is required to visit immunization center to get fully immunized.

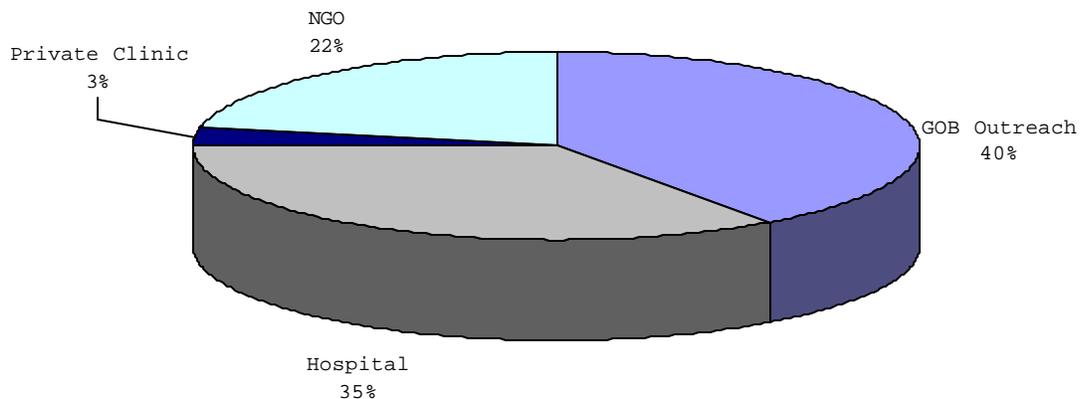
**Figure 2: Knowledge about required visits to immunization centers for full immunization**



***Sources of immunization services***

Child immunization services in this area were mostly provided by the GOB/municipal outreach centers (40%), followed by GBO hospitals (35%) and NGO clinics (22%). Private clinics provided immunization to 2% of the cases only (Figure 3).

**Figure 3: Sources of child immunization services**



***Reasons for non-immunization and partial immunization of the children***

Table 6 presents reasons for non-immunization and partial immunization (dropouts) of children. The primary reasons for non-immunization of the children, as reported by the parents, included: lack of faith in immunization (38%), sickness of the mothers (19%), and mothers were too busy to take the children to vaccination sessions (13%). The primary reasons for partial immunization or dropouts were: sickness of the children (32%), fear of adverse reaction (14%) and mothers were too busy (14%).

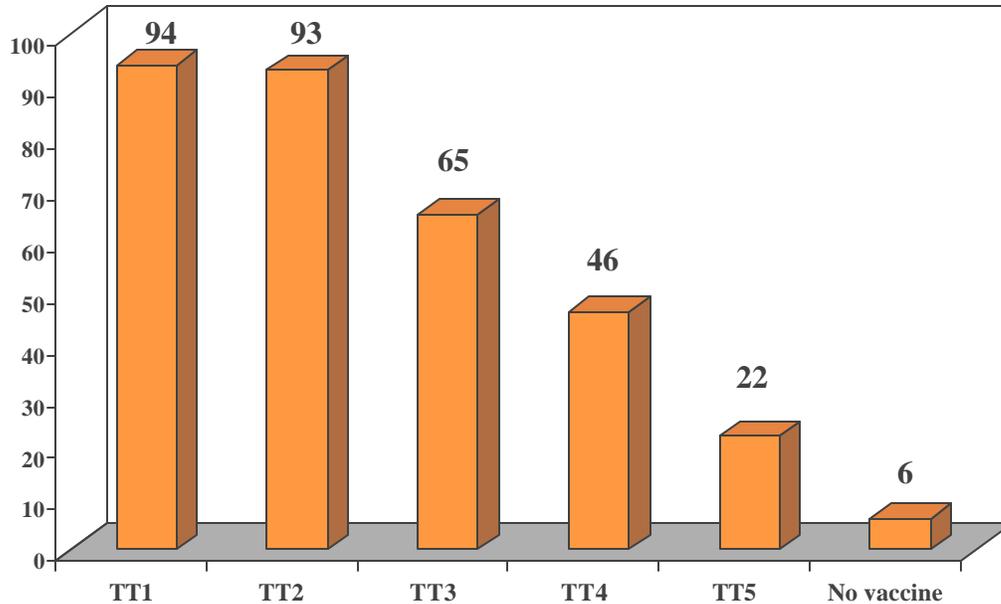
**Table 6: Reasons for non-immunization and partial immunization of the children**

<b>Reasons for non-immunization or partial immunization</b>	<b>Non-immunized (%) (N=16)</b>	<b>Partially immunized (%) (N=36)</b>
Did not know about need of immunization	6	-
Did not know when to return for 2 <sup>nd</sup> /3 <sup>rd</sup> dose.	-	8
Did not know about importance of Measles vaccine	-	6
Did not know about place and time of immunization	-	6
Child was sick, and not taken to immunization center	6	16
Child was sick, and was taken to immunization center but not given by vaccinator	6	16
Fear of adverse reaction	6	14
Future plan to vaccinate the child	-	3
No faith in immunization	38	-
Too busy to take the child	13	14
Mother was sick	19	-
Thought vaccinator would come to the house	6	-
Forgot about date of subsequent doses	-	14
Had to pay money for vaccine	-	3

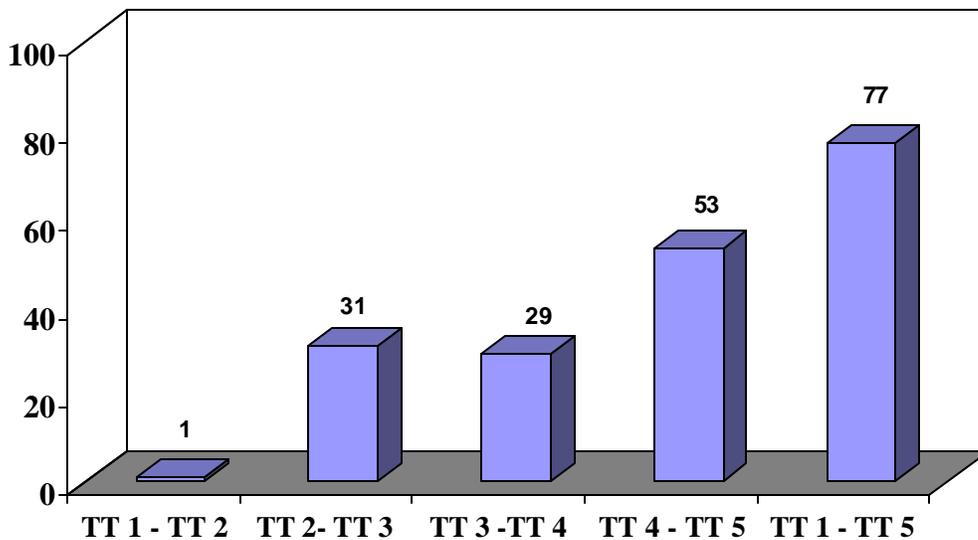
### Routine TT immunization coverage levels for the mothers

Figure 4 shows routine TT immunization coverage levels for the mothers who had live births in the previous year. It shows a considerably high access to TT (94% for TT1), but very low full immunization coverage (22% for TT5). About 94% of the mothers interviewed received TT1; while the corresponding figures for TT2, TT3 and TT4 were 93%, 65% and 46% respectively. Only 22% of mothers received TT5, which provides lifelong protection against tetanus. Of the mothers interviewed, 6% never received any TT vaccine.

**Figure 4: Routine TT immunization coverage levels for the mothers**



**Figure 5: TT Immunization drop-out rates of the mothers**



### ***TT immunization dropout rate***

Figure 5 shows a very high TT immunization dropout rate. The dropout rate from TT2 to TT3 was 31%. The corresponding rates for TT3 to TT4, and TT4 to TT5 were 29% and 53% respectively. The dropout rate for TT1 to TT5 was as high as 77%, indicating that 77% of the mothers who received first dose of TT did not complete 5 doses TT immunization schedule.

### ***Invalid TT doses***

Table 7 shows that a very high proportion of TT doses were invalid as they were administered before the minimum required interval between the doses. One-fourth of the TT3 doses were given before 6 months interval between TT2 and TT3, and as such were invalid. Over half of the TT4 doses (59%) were invalid, since they were given before one year interval between TT3 and TT4; similarly, 48% of the TT5 doses were also invalid for the same reason.

**Table 7: Interval between TT1 and TT2, TT2 and TT3, TT3 and TT4, and TT4 and TT5 dose**

Interval between doses	<1 months		1 months+		<6 months		6 months+		<1 year		1 year +		Total	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%
TT1-TT2	4	2	192	98	-	-	-	-	-	-	-	-	196	100
TT2-TT3	-	-	-	-	35	26	100	74	-	-	-	-	135	100
TT3-TT4	-	-	-	-	-	-	-	-	57	59	40	41	97	100
TT4-TT5	-	-	-	-	-	-	-	-	22	48	24	52	46	100

### ***Age distribution of mothers never receiving TT***

About 94% of mothers had received first dose of TT indicating good access to TT immunization. However, 6% of mothers never received any TT vaccine. Table 8 shows age distribution of the mothers who had never received any dose of TT. It shows that all the mothers who were over 35 years of age received at least one dose of TT; while 3% to 12% of the mothers of different age groups under 36 years never received any dose of TT.

**Table 8: Age distribution of mothers who never received any dose of TT**

Age group	Received		No received		Total	
	#	%	#	%	#	%
15-19	29	97	1	3	30	14
20-25	108	95	6	5	114	54
26-30	39	93	3	7	42	20
31-35	15	88	2	12	17	8
36-45	7	100	-	-	7	4
Total	198	94	12	6	210	100

### ***Protection against tetanus at birth***

Mothers interviewed were asked about the TT vaccination status during the last pregnancy. The new born was considered protected against neo -natal tetanus if the mother had received required number of valid doses of TT vaccine before the delivery of last child for protection against neo-natal tetanus. Of the mothers interviewed, 89% of newborn were found protected against tetanus. It indicates that a large number of newborn babies (11%) were still not protected against tetanus at birth (Table 9).

**Table 9: Children born protected against tetanus**

<b>Status of children born protected</b>	<b>Number</b>	<b>Percentage</b>
Protected	186	89
Not Protected	24	11

### ***Knowledge about full TT immunization***

Over two-third of the mothers (69%) did not have any idea about the number of TT doses required for a woman to get fully immunized; while 12% had wrong idea about the number of TT doses required for full immunization. However, 19% mothers could correctly mention that a woman was required to receive 5 doses of TT vaccine for full immunization for lifelong protection against tetanus (Table 10).

**Table 10: Knowledge about number of TT doses required for full immunization**

<b>Number of TT doses</b>	<b>Number</b>	<b>Percentage</b>
<5 doses	23	11
5 doses	39	19
>5 doses	3	1
Don't know/ no idea	145	69

### ***TT card retention***

Table 11 shows that 89% of the mothers (who had a live birth during last one year) were ever given TT cards; however, TT cards were available in 41% of the cases at the time of interview. TT card retention rate was 46% only, which means that 54% of the TT cards were lost.

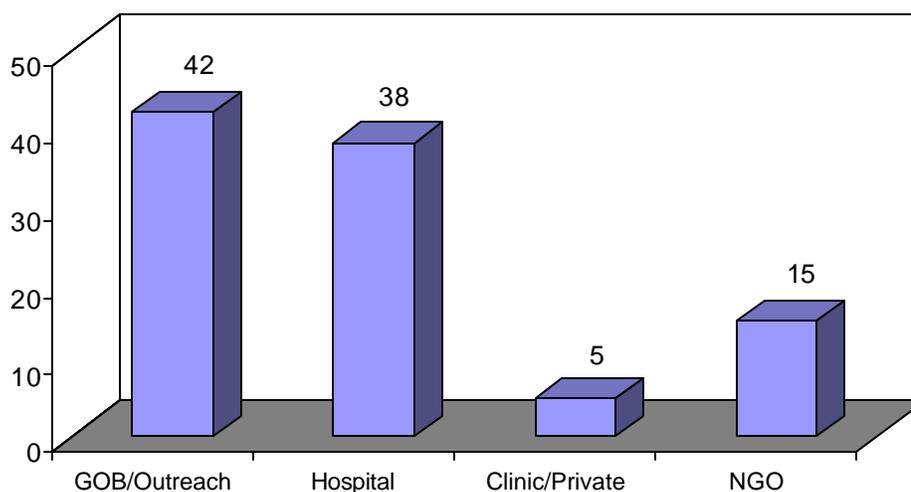
**Table 11: TT card availability and retention**

<b>Card Status</b>	<b>Number</b>	<b>Percentage</b>
TT card available	86	41
TT card ever given	187	89
TT card retention	86	46

### ***Sources of TT immunization services***

Majority of the immunization services were provided by GOB/municipal outreach centers (42%), followed by the GOB hospitals (38%) and NGO clinics (15%). Private clinics provided immunization service to 5% of the cases only.

**Figure 6: Sources of TT immunization services**



### **Coverage levels of the 10<sup>th</sup> National Immunization Campaign-2002**

During the 10<sup>th</sup> NIDs, 98% of the children < 5 years received OPV in both the rounds; while 99% received in each of the rounds. Vitamin A capsules were given to 95% of the eligible children (12 – 59 months old) during the 10<sup>th</sup> NIDs (Table 12). Besides, Vitamin A capsules were administered wrongly to 7 ineligible children (out of 210) who were <1 year of age.

**Table 12: Coverage levels of the 10th NID Campaign**

Round	OPV (%)	Vit "A" (%)
1 <sup>st</sup> round	99	95
2 <sup>nd</sup> round	99	-
Both rounds	98	-
Any round	100	-

### ***Sources of OPV during the NIDs***

Table 13 shows that most of the children received OPV from NID sites during both the rounds of the 10<sup>th</sup> NIDs. However, 3% of the children in the 1<sup>st</sup> round and 4% in the 2<sup>nd</sup> round received OPV at home during child-to-search.

**Table 13: Sources of OPV during the 10<sup>th</sup> NIDs**

Sources of OPV	1 <sup>st</sup> Round		2 <sup>nd</sup> Round	
	#	%	#	%
NID site	201	97	198	95
Child to child search	7	3	8	4
Mobile Team	-	-	1	0.5
Total	208	100	207	100

***Reasons for not receiving vaccines from the NID sites of the 10<sup>th</sup> NIDs***

The most important reasons for not receiving OPV from the NID sites of the 10<sup>th</sup> NIDs were: lack of information about NID campaign (33% for 1<sup>st</sup> round and 8% for 2<sup>nd</sup> round), parents were too busy to take their children to NID sites (22% for 1<sup>st</sup> round and 25% for 2<sup>nd</sup> round), and sickness of the child (22% for 1<sup>st</sup> round) (Table 14).

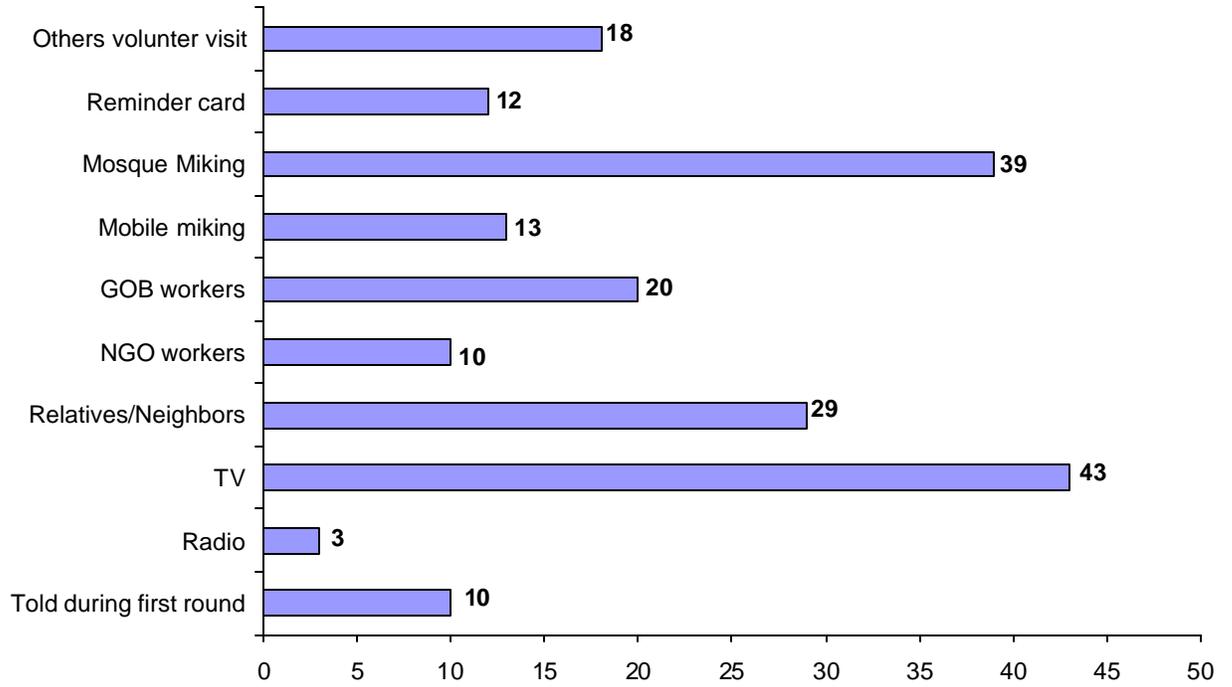
**Table 14: Reasons for non-immunization of OPV during the 10<sup>th</sup> NIDs**

Reasons	1 <sup>st</sup> Round (%) (N=9)	2 <sup>nd</sup> Round (%) (N=12)
Did not know about NID	33	8
Parents were too busy	22	25
Traveling on NID day	11	8
Child sick not taken	22	-
Child sick not given	-	8
Child already vaccinated	-	8
Religious/social barrier	-	18
Others	12	25

***Sources of information of the 10<sup>th</sup> NID Campaign***

The major sources of information of the 10<sup>th</sup> NID campaign were television (43%), followed by mosque miking (39%) and relatives and neighbors (29%). The other sources of information included GOB/municipal health workers (20%), volunteers (18%) and mobile miking (13%).

**Figure 7: Sources of information about the 10<sup>th</sup> NID campaign**



## Mothers' profile, antenatal and delivery practices

### Mothers' age and education

Half of the mothers were <25 years of age; while only 4% were over 34 years. Over one-third of the mothers (37%) were uneducated; while 18% of the mothers had education of SSC level or higher (Table 15).

**Table 15: Mothers' characteristics, antenatal and delivery practices**

Variable	Percent	Variable	Percent
<b>Mother's Age:</b>		<b>Instruments used for cutting umbilical cord:</b>	
<20 years	9	New blade	15
20-24 years	41	Sterilized blade	75
25- 29years	27	Sterilized scissor	8
30-34 years	19	Others	2
35 years+	4	Total	100
Total	100		
<b>Mother's education:</b>		<b>Medicine/powder applied at the cut of umbilical cord:</b>	
No education	37	Antibiotic powder	25
I-V	24	Ointment/cream	4
VI-X	21	Soil/Soil with oil	3
S.S.C	8	Oil	11
H.S.C	10	Liquid medicine	23
Total	100	Others	5
		Nothing used	29
<b>At least one antenatal check up received during the last pregnancy:</b>		Total	100
Received	60		
Not received	40	<b>Decision to immunize the child was taken by:</b>	
Total	100	Father-Mother jointly	65
<b>Delivery attended by:</b>		Mother	23
MBBS Doctor	19	Father	5
Mid wife/Nurse	13	Grand parents	5
TTBA	11	Others	2
UTBA	39	Total	100
Relative/Friends/Neighbor	18		
Total	100		

### ***Antenatal Checkup***

60% of the mothers received at least one antenatal check-up during their last pregnancies. Mother's education seems to have positive association with antenatal checkup. About half of the uneducated mothers (48%) never received antenatal checkup during their last pregnancies; while the corresponding figures for the mothers with education of SSC or higher was 29% (Table 15 & 16).

**Table 16: Mothers never receiving antenatal checkup by education**  
N=210

Mother 's education	Never received ANC checkup	
	#	%
No education	37	48
I-V	22	44
VI-X	14	32
S.S.C	5	29
H.S.C +	5	29
<b>Total</b>	<b>83</b>	<b>40</b>

### ***Delivery practices***

Over half of the deliveries (57%) were attended by untrained traditional birth attendants (UTBA) or neighbors and relatives. Only one-third of the deliveries (32%) were attended by graduate doctors or midwives/nurses; while another 11% of the deliveries were attended by trained traditional birth attendants (TTBA). Uneducated women were less likely to have their delivery attended by qualified doctors or midwives and nurses. Among the uneducated women, only 14% deliveries were attended by qualified doctors and/or midwives and nurses; while the corresponding figure was 52% for the women with education of SSC and 77% for the women with education of HSC and higher (Table 16 & 17).

**Table 17: Type of persons who attended deliveries by mothers' Education**

Mother's education	MBBS Doctor		Mid wife /Nurse		TTBA		UTBA		Relative/Friend /Neighbor		Total	
	#	%	#	%	#	%	#	%	#	%	#	%
No education	5	6	6	8	8	10	35	46	23	30	77	100
I-V	5	10	5	10	10	20	23	46	7	14	50	100
VI-X	9	20	11	25	3	7	16	37	5	11	44	100
S.S.C.	7	40	2	12	3	18	3	18	2	12	17	100
H.S.C. +	13	59	4	18	0	0	4	18	1	5	22	100
<b>Total</b>	<b>39</b>	<b>19</b>	<b>28</b>	<b>13</b>	<b>24</b>	<b>11</b>	<b>81</b>	<b>39</b>	<b>38</b>	<b>18</b>	<b>210</b>	<b>100</b>

In most of the cases (98%), new blades or sterilized blades/scissors were used in cutting the umbilical cords of the newborn babies. Non-sterilized old blades or other instruments were used (for cutting umbilical cords) for 2% cases only (Table 15). It seemed that there was no specific pattern of relationship between the instrument used to cut the umbilical cord and the type of persons who attended the delivery or mothers' education (Table 18 & 19).

**Table 18: Instruments used for cutting the umbilical cords of newborn babies by type of persons who attended deliveries**

Instruments	MBBS Doctor		Mid wife/ Nurse		TBA		UTBA		Relative/Friend /Neighbor		Total	
	#	%	#	%	#	%	#	%	#	%	#	%
New blade	0	0	1	4	2	9	6	8	19	51	28	15
Sterilized blade	15	60	19	79	21	91	72	89	15	41	142	75
Sterilized scissor	9	36	4	17	0	0	2	2	0	0	15	8
Others	1	4	0	0	0	0	1	1	3	8	5	2
Total	25	100	24	100	23	100	81	100	37	100	190	100

**Table 19: Instruments used for cutting the umbilical cord of newborn babies by mothers' education**

Instruments	No education		I-V		VI-X		S.S.C		H.S.C+		Total	
	#	%	#	%	#	%	#	%	#	%	#	%
New blade	14	19	6	13	5	12	1	8	2	12	28	15
Sterilized blade	52	72	40	83	28	68	10	84	12	70	142	75
Sterilized scissor	2	3	2	4	8	20	0	0	3	18	15	8
Others	4	6	0	0	0	0	1	8	0	0	5	2
Total	72	100	48	100	41	100	12	100	17	100	190	100

Over one-fourth of the mothers (29%) did not apply anything at the cut of umbilical cord of their newborn babies. However, 52% of the mothers applied antibiotic powder/ointment/cream/liquid medicine. Unhygienic practices, i.e. using soil/soil with oil or oil at the cut of the umbilical cord were reported by 14% mothers (Table 15). Table 20 shows that uneducated mothers were less likely to use antibiotic powder/ointment/cream to treat the cut of the umbilical cord of newborn babies, compared to the mothers with education of SSC and higher (Table 20).

**Table 20: Medicine/powder applied at the cut of umbilical cord of newborn babies by mothers' education**

Medicine applied	No education		I-V		VI-X		S.S.C		H.S.C+		Total	
	#	%	#	%	#	%	#	%	#	%	#	%
Antibiotic powder	14	18	6	12	14	32	6	35	13	59	53	25
Ointment/cream	2	3	3	6	0	0	2	11	1	5	8	4
Liquid medicine	17	22	16	32	6	14	4	24	5	22	48	23
Soil/Soil with oil	4	5	2	4	0	0	0	0	0	0	6	3
Oil	8	10	5	10	8	18	1	6	2	9	24	11
Others	7	9	3	6	1	2	0	0	0	0	11	5
Nothing used	25	33	15	30	15	34	4	24	1	5	60	29
Total	77	100	50	100	44	100	17	100	22	100	210	100

Table 21 shows that the deliveries attended by qualified doctors or midwives/nurses were apparently less likely to use oil, soil or soil with oil at the cut of umbilical cord than those delivered by TBAs, neighbors and relatives. However, these data should be interpreted cautiously, since many other confounding variables, such as economic condition, husband's education, family's health care practices, etc. may effect this particular health care practice. (Because of absence of data, we could not control these variables for this analysis)

**Table 21: Medicine/powder applied at the cut of umbilical cord of new- born babies by type of persons who attended deliveries**

Medicine applied	MBBS Doctor		Mid wife/ Nurse		TTBA		UTBA		Relative/Friend /Neighbors		Total	
	#	%	#	%	#	%	#	%	#	%	#	%
Antibiotic powder	21	54	5	18	3	13	19	23	5	13	53	25
Ointment /cream	1	3	1	4	1	4	3	4	2	5	8	4
Soil/Soil with oil	0	0	0	0	1	4	0	0	5	13	6	3
Oil	0	0	1	4	4	17	14	17	5	13	24	11
Liquid medicine	10	26	13	45	8	33	14	17	3	9	48	23
Others	0	0	1	4	1	4	4	5	5	13	11	5
Nothing used	7	17	7	25	6	25	27	34	13	34	60	29
Total	39	100	28	100	24	100	81	100	38	100	210	100

***Decision making process for child immunization***

For two-third of the cases, fathers and mothers jointly took decision regarding immunization of their children; while mother alone took decision in one-fourth of the cases. Father was reported to be a sole decision maker in 5% cases only. However, grand parents and other relatives played an important role in this matter accounting for 7% of the cases (Table 15). Table 22 indicates that women with education of SSC and higher were more likely to take decision either themselves alone or jointly with their husbands regarding immunization of their children, compared to uneducated ones.

**Table 22: Decision making for immunization of children by mothers' education**

Mother's education	Father and mother jointly		Mother		Father		Grand Parents		Others		Total	
	#	%	#	%	#	%	#	%	#	%	#	%
No education	33	52	22	34	5	8	1	2	2	4	63	100
I-V	33	69	11	23	0	0	3	6	1	2	48	100
VI-X	28	64	6	14	5	11	4	9	1	2	44	100
S.S.C	12	70	4	24	0	0	1	6	0	0	17	100
H.S.C +	20	90	2	10	0	0	0	0	0	0	22	100
<b>Total</b>	126	65	45	23	10	5	9	5	4	2	194	100

***Knowledge about required visit to EPI center for full immunization***

Two-third of the mothers (57%) did not know how many times their children were required to be taken to EPI center to get fully immunized. Only 43% of the mothers could correctly mention that a child was required to be taken to the EPI center 4 times for full immunization. The table 23 shows that the uneducated women were less likely to know how many times a child was required to be taken to EPI center to get fully immunized.

**Table 23: Knowledge about required visits to immunization center for full immunization of children by mothers' education**

Mother's education	3 times		4 times (Correct answer)		5 times		6 times		Don't know		Total	
	#	%	#	%	#	%	#	%	#	%	#	%
No education	12	16	25	32	14	18	1	1	25	33	77	100
I-V	8	16	20	40	8	16	1	2	13	26	50	100
VI-X	4	9	25	57	8	18	3	7	4	9	44	100
S.S.C	1	6	7	41	3	18	2	12	4	23	17	100
H.S.C +	1	5	13	59	4	18	3	13	1	5	22	100
<b>Total</b>	26	12	90	43	37	18	10	5	47	22	210	100

***Vaccination status of the children and their mothers' education***

Three-fourth of the children were fully immunized (as per crude data). Table 24 shows that the uneducated mothers were less likely to get their children fully immunized. 61% of the children of the uneducated mothers were fully immunized (crude data); while the corresponding figures were 94% for the mothers with education of SSC and 100% for the mothers with education of HSC and higher.

**Table 24: Vaccination status of the children by mothers' education**

Mother's education	Total children	All doses received	
	#	#	%
No education	77	47	61
I-V	50	37	74
VI-X	44	36	82
S.S.C	17	16	94
H.S.C+	22	22	100
Total	210	158	75

## Discussions

Access to child immunization in the selected municipalities was good (92% for DPT1); but this high access dropped to 75% for fully immunized children because of high dropout rates of different antigens. (Dropout rate for DPT1 to DPT3 was 8% and DPT1 to measles was 19%). This crude coverage reduced to 65% when validity of doses was taken into account. It further reduced to 61% when valid coverage by 12 months was estimated. This large difference between crude coverage and valid coverage could be well explained by invalid doses. A number of invalid doses were provided before the minimum required age or before required interval between the doses. 5% of the DPT1 doses and 4% of measles doses were provided before the required minimum age. Missed opportunities for different antigens were also considerably high. (Total missed opportunity for BCG and measles were 6 and 9 cases respectively with a composite total index of 37) These high rates of dropouts, invalid doses and missed opportunities reflect on the quality of services negatively.

There was no significant sex differential in immunization of children. Male children's access to immunization as measured by coverage of DPT1 was only 1 percentage point higher than that of the female children (93% vs. 92%). Similarly, 77% of the male children were fully immunized (crude data); while the corresponding figure for female children was 73%, only two percentage points lower than the male children.

Although 92% of the children were ever given EPI, the retention rate of EPI cards (child immunization cards) was 65% only. Similarly, TT card retention rate was 46% only. Such a low retention rate of EPI cards/TT cards negatively affect the quality of EPI services provided by the health workers. Level of knowledge of the mothers with regard to full immunization was poor. Over half of the mothers (57%) could not mention how many times their children were required to be taken to EPI center to get fully immunized; while 81% mothers did not know how many times a woman was required to receive TT vaccine for lifelong protection against tetanus.

Lack of faith in immunization as a reason for non-immunization of children was reported by 38% of the parents, which indicate that the wrong perception about immunization still persists in the community. While sickness of the children, fear of adverse reaction and preoccupation of the parents with other work resulted in high drop out rate and consequently contributed to low full immunization coverage.

Access to TT immunization for the mothers who had live births in the previous year was high (94% of the mothers interviewed received TT1); but TT dropout rate was also high, resulting in very low coverage of TT5 (22%), which provides lifelong protection against tetanus. The dropout rate TT1 to TT5 was as high as 77%, indicating that 77% of the mothers who received first dose of TT did not complete 5 doses TT immunization schedule.

A considerable proportion of TT doses were invalid as they were administered before the minimum required interval between the doses. One-fourth of TT3 doses were given before 6 months interval between TT2 and TT3, and as such were invalid. Over half of the TT4 doses (59%) were invalid, since they were given before one year interval between TT3 and TT4; similarly, 48% of the TT5 doses were also invalid for the same reason.

Of the mothers who had live births in the previous year, 89% of newborn babies were found protected against tetanus, indicating that a large number of the newborn babies were not protected against tetanus at birth.

During the 10<sup>th</sup> NIDs, 98% of the children < 5 years received OPV in both the rounds; while 99% received in each of the rounds. Vitamin A capsules were given to 95% of the eligible children (12 – 59 months old). Besides, Vitamin A capsules were administered wrongly to 7 ineligible children (out of 210) who were <1 year of age.

Most of the children received OPV from NID sites during both the rounds of the 10<sup>th</sup> NIDs. Only 3% children in the 1<sup>st</sup> round and 4% in the 2<sup>nd</sup> round received OPV at their residences during child-to-child search.

The most important reasons for not receiving OPV from the NID sites of the 10<sup>th</sup> NIDs were: lack of information about NID campaign (33% for 1<sup>st</sup> round and 8% for 2<sup>nd</sup> round), parents were too busy to take their children to NID sites (22% for 1<sup>st</sup> round and 25% for 2<sup>nd</sup> round), and sickness of the child (22% for 1<sup>st</sup> round).

The major sources of information of the 10<sup>th</sup> NID campaign were television (43%), followed by mosque miking (39%) and relatives and neighbors (29%). The other sources of information included GOB/municipal health workers (20%), volunteers (18%) and mobile miking (13%).

40% of the mothers did not receive any antenatal check-up during their last pregnancies. Mother's education seems to have positive association with antenatal checkup. About half of the uneducated mothers (48%) never received antenatal checkup during their last pregnancies; while the corresponding figures for the mothers with education of SSC or higher was 29%.

Over half of the deliveries (57%) were attended by untrained traditional birth attendants (UTBA) or neighbors and relatives. Only one-third of the deliveries (32%) were attended by graduate doctors or midwives/nurses; while another 11% of the deliveries were attended by trained traditional birth attendants (TTBA). Uneducated women were less likely to have their delivery attended by qualified doctors or midwives and nurses.

In most of the cases (98%), new blades or sterilized blades/scissors were used in cutting the umbilical cords of the newborn babies. Non-sterilized old blades or other instruments were used (for cutting umbilical cords) for 2% cases only.

Over one-fourth of the mothers (29%) did not apply anything at the cut of umbilical cord of their newborn babies. However, 52% of the mothers applied antibiotic powder/ointment/cream/liquid medicine. Unhygienic practices, i.e. using soil/soil with oil or oil at the cut of the umbilical cord were reported by 14% mothers. It was found that uneducated mothers were less likely to use antibiotic powder/ointment/cream to treat the cut of the umbilical cord of newborn babies, compared to the mothers with education of SSC and higher.

Deliveries attended by qualified doctors or midwives/nurses were apparently less likely to use oil, soil or soil with oil at the cut of umbilical cord than those delivered by TBAs, neighbors and relatives. However, these data should be interpreted cautiously, since many other confounding variables, such as economic condition, husband's education, family's health care practices, etc. may effect this particular health care practice. (Because of absence of data, we could not control these variables for this analysis).

For two-third of the cases, fathers and mothers jointly took decision regarding immunization of their children; while mother alone took decision in one-fourth of the cases. However, grand parents and other relatives played an important role in this matter accounting for 7% of the cases. It was found that women with education of SSC and higher were more likely to take decision either themselves alone or jointly with their husbands regarding immunization of their children, compared to uneducated ones.

Mother's education was found to be associated with immunization status of their children. The uneducated mothers were less likely to get their children fully immunized. 61% of the children of the uneducated mothers were fully immunized (crude data); while the corresponding figures were 94% for the mothers with education of SSC and 100% for the mothers with education of HSC and higher.

## Conclusions and Recommendations

Access to child immunization in the IOCH supported 91 municipalities was good (92% for DPT1); but this high access dropped to 75% for fully immunized children because of high dropout rates of different antigens. (Dropout rate for DPT1 to DPT3 was 8% and DPT1 to measles was 19%). Such high dropout rates imply inability of the EPI program to follow-up and protect the cohort of children initially reached out.

Similarly, access to TT immunization for the mothers who had live births in the past year was high, since 89% of the newborn children were protected at birth. 94% of the mothers interviewed received the first dose of TT; but TT dropout rate was very high (77% for TT1 to TT5), resulting in very low coverage of TT5 (22%), which provides lifelong protection against tetanus.

- *Programmatic strategies must be undertaken to reduce the existing high dropout rates in both child immunization and TT immunization. The program should focus on quality of counseling of mothers/women (on immunization) by the health workers. The health workers at the first contact must counsel the mother/women properly to motivate her to return and to get herself and/or her child fully immunized. He/she must:*
  - *explain to mother the importance of full immunization, and concept of 8 doses and 4 visits required for full immunization of a child;*
  - *tell women of reproductive age the benefit and importance of full TT immunization and the concept of 5 dose TT schedule for lifelong protection against tetanus;*
  - *issue an EPI card/TT card dully filled out and explain the mother/women the importance of keeping the EPI card/TT card in safe and bringing it on the next due date;*
  - *tell the mother/women clearly when she should come back for next doses, and inform her that the date is written in the EPI card/ TT card so that she can check it if forgets the date;*
  - *inform mothers/women of possible side effects of injection and how it should be handled;*
  - *pay attention to the hospitality at the clinic/EPI center, and to supportive environment.*
- *Program managers and field supervisors should ensure that EPI sessions are held as per plan, and at a regular and adequate interval*
- *The service providers should be given refresher training to improve their technical skills on counseling of mothers/women on immunization*

There were also too many invalid doses in child immunization (5% for DPT1 and 4% for measles), which further reduced the crude full immunization coverage of 75% to 65% when validity of doses was taken into account. Total missed opportunities for different antigens were also high (6 for BCG and 9 for measles). Like child immunization, a very high proportion of TT doses were invalid (26% for TT3, 59% for TT4 and 48% for TT5). These

high rates of invalid doses and missed opportunities reflect service providers' inability to screen the clients properly.

- ❑ ***Emphasis should be given on screening of clients for immunization to avoid or reduce invalid doses and missed opportunities. The service providers must:***
  - *screen properly each and every child/ woman to decide his/her eligibility for a specific dose of specific antigen;*
  - *check EPI card/ EPI register/ TT card or any other record to decide on the eligibility of a particular dose of specific antigen(s);*
  - *if a child/woman is found not eligible for a dose today, ask him/her to return at a specified date; and explain the reason to her/ mother clearly and patiently.*
  - *check if there is any missed opportunity for other antigen.*
- ❑ ***The service providers should be given refresher training to improve their technical skills on screening of clients for immunization.***

A large number of newborn babies (11% of the total new born babies) were found unprotected against tetanus at birth.

- ❑ ***The pregnant mothers should be motivated to receive the required number of TT doses necessary to protect their newborn babies.***

EPI card (child immunization card) and TT card play an important role in ensuring good quality of immunization services. It helps the mothers to adhere to immunization schedule, as well as assists the service providers to screen the children for specific doses of specific antigens. Unfortunately, the retention rates of both the EPI card and TT card were very low, 65% and 46% respectively.

- ❑ ***Mothers should be explained the benefits and importance of EPI cards/ TT cards for immunization of themselves and their children.***
- ❑ ***Mothers should be asked to preserve the EPI card safely until the child is 5 years old, and to bring the card with them whenever they come to the clinic/ EPI center for immunization.***
- ❑ ***Mothers should also be asked to carefully preserve their TT cards, and to bring their TT cards with them whenever they come to clinic/ EPI center for TT immunization.***
- ❑ ***In the case of loss of EPI card/TT card, it should be provided over and over, and the history of the earlier vaccinations accurately recorded again and again, if necessary.***

Mothers have a poor understanding of full immunization. Over half of the mothers (57%) could not mention how many times their children were required to be taken to EPI center to get fully immunized. Similarly, 81% mothers (who had live births in the past year) did not know how many TT doses were required for a woman for lifelong protection against tetanus.

- ❑ ***During IPC between the mothers and the service providers and/or at the first contact, the mothers should be clearly explained the importance of full immunization of children and women, and of the immunization schedule of full immunization for both children and women.***

Lack of faith in immunization as a reason for non-immunization of children was reported by majority of the parents, which indicates that the wrong perception about immunization still persists in the community. While sickness of the children, fear of adverse reaction and mothers preoccupation with other work resulted in high drop out rate and consequently contributed to low full immunization coverage.

- ***The program should strengthen BCC activities to inform the community of importance and benefits of immunization in general, and to motivate the mothers to get their children fully immunized in particular. Very selective and focused mass media campaign, in addition to IPC by health workers, may also be conducted to achieve this end.***

4% of the children <5 years in the 1<sup>st</sup> round and 6% in the 2<sup>nd</sup> round did not receive OPV from the NID sites of the 10<sup>th</sup> NID campaign. In spite of intensive communication activities during NIDs, lack of information of NID campaign as a reason for not receiving OPV from NID site was still reported by 33% in the 1<sup>st</sup> round and 8% in the 2<sup>nd</sup> round.

- ***Area specific innovative strategies suitable to local situation have to be undertaken during the next NIDs to reach to the left out children.***
- ***More attention should be given to high risk areas and traveling population***
- ***Communication activities need to be strengthened through mass media, such as television, as well as through IPC by the health workers and volunteers during next NIDs.***
- ***Parents should be encouraged to attend the fixed NID sites/center and discouraged to wait for home visits (by the health workers) during child-to-child search.***

5% of the children of 12 – 59 months did not receive Vitamin A during the 10<sup>th</sup> NIDs. Besides, Vitamin A capsules were also administered wrongly to 7 ineligible children (out of 210) who were <1 year of age.

- ***Appropriate BCC activities, suitable to local situations, need to be carried out to educate the community of the benefits of Vitamin A capsules during the next NIDs.***
- ***Special attention should be given to:***
  - ***the exact age group to limit shortage (better screening for age); and***
  - ***no Vitamin A capsules should be given to the parents to administer them to their children either at NID site or in their homes.***

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**Annex-A****List of Selected Clusters for the Survey**

<b>District</b>	<b>Pourasava</b>	<b>Word #</b>	<b>Mahalla</b>	<b>HH</b>	<b>Pop.</b>	<b>Cluster No.</b>
Narayanganj	Narayanganj	1	B.K. Road (Shitalakshya)	790	5110	1
	Narayanganj	7	Khandari para	832	4683	2
Rangpur	Rangpur	2	Alam nagar colony	2769	15915	3
Mymensingh	Mymensingh	2	Shanki para	1182	6678	4
Barishal	Barishal	2	Amanath ganj	1738	9783	5
Tangi	Tangi	2	Bohram	2254	11110	6
Comilla	Comilla	2	Islampur	532	3198	7
Jessore	Jessore	1	Kadam tala	348	1905	8
C. Nawabgonj	C. Nawabgonj	3	Halua banda	288	1615	9
Dinajpur	Dinajpur	3	Uttar Balubari	1008	5569	10
Bogra	Bogra	4	Latif pur (part A)	741	4290	11
Dhaka	Savar	1	Pora bari	181	921	12
Tangail	Gopalpur	1	Kona bari bazar	289	1799	13
Jamalpur	Jamalpur	3	Purba fulbari	398	2021	14
Sylhet	Sylhet	3	Kasta garh	131	863	15
Sirajganj	Sirajganj	8	Mirpur daskhin Gram	324	1744	16
Nilphamari	Saidpur	2	Niyamat pur	791	4327	17
Chandpur	Chandpur	2	Maddya Sree ramdi	2034	10260	18
Kushtia	Kushtia	1	Kamalapur	457	2583	19
Kishorganj	Bhairab	1	Bhairabpur	3598	20515	20
Faridpur	Faridpur	3	Daskhin Alipur	1055	5790	21
Chuadanga	Chuadanga	1	Bagan para	217	1242	22
Bagherhat	Bagherhat	3	Pashim Dasani	186	970	23
Rangamati	Rangamati	1	Reserve bazar	1685	83000	24
Madaripur	Madaripur	3	Ghat majhi	91	569	25
Munshiganj	Munshiganj	3	Dari char	198	1178	26
Habiganj	Habiganj	1	Umed nagar	519	3291	27
Moulvi bazaar	Moulvi bazaar	2	Muslim Quarter	253	1353	28
Feni	Feni	3	Feni college	265	1345	29
Barguna	Barguna	2	Dashkin barguna	248	1313	30

**Annex- B**

**List of Never Vaccinated Children Identified by Clusters**

<b>Word #</b>	<b>Pourasava</b>	<b>Mahalla</b>	<b>HH</b>	<b>Pop.</b>	<b>Cluster No.</b>	<b>Never Vaccinated Children</b>
7	Narayanganj	Khandari para	832	4683	2	1
2	Tangi	Bohram	2254	11110	6	1
1	Jessore	Kadam tala	348	1905	8	1
1	Savar	Pora bari	181	921	12	3
1	Gopalpur	Kona bari bazar	289	1799	13	1
3	Jamalpur	Purba fulbari	398	2021	14	1
3	Sylhet	Kasta garh	131	863	15	3
1	Kushtia	Kamalapur	457	2583	19	1
1	Chuadanga	Bagan para	217	1242	22	1
3	Bagherhat	Pashim Dasani	186	970	23	1
1	Habiganj	Umed nagar	519	3291	27	2

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