IOCH

# Immunization and Other Child Health Project

# Vaccination Coverage Survey of the Noakhali Municipality - January 2000

**Survey Report No. 8**

**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**

House 1, Road 23, Gulshan 1, Dhaka 1212, Bangladesh
Tel: 8828596, 8829279, 8813611, 8813410
Fax: 880-2-8826229
E-mail: ioch@citechco.net

July 2000

# Table of Contents

## List of Tables



## List of Charts

# Acronyms

| | |
|---|---|
| BCC | Behaviour Change Communication |
| BCG | Bacillus of Calmette and Guerin |
| CES | Coverage Evaluation Survey |
| COSAS | Coverage Survey Analysis System |
| DMA | Data Management Aid |
| DPT | Diphtheria, Pertussis and Tetanus |
| EPI | Expanded Program on Immunization |
| IOCH | Immunization and Other Child Health |
| MNT | Measles and Neonatal Tetanus |
| Mouza | Smallest administrative unit (usually larger than a village) |
| MSH | Management Sciences for Health |
| NGO | Non Governmental Organization |
| NID | National Immunization Day |
| OPV | Oral Polio Vaccine |
| TT | Tetanus Toxoid |
| UNICEF | United Nations Childrens Fund |
| Upazila | Sub district (previously known as Thana) |
| UPHCP | Urban Primary Health Care Project |
| 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 1$^{st}$ doses and Measles vaccine or with less than four weeks interval in the case of DPT or Polio vaccines are classified as "invalid" doses.

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

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

**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 centre 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

Between January 17-19, 2000 a coverage evaluation survey was conducted by IOCH in Noakhali municipality, to assist (inter alia) an imminent international Urban EPI Review.

## Objectives

The principal objectives of the survey were to assess:
a) the levels of immunization coverage of children (12-23 months);
b) the levels of TT immunization coverage in women of child bearing age (15-49 years);
c) the OPV and Vitamin A coverage levels achieved during the sixth round of NIDs conducted in Nov-Dec 1999; and
d) the measles and OPV coverage achieved during the September 1999 MNT campaign.

**Coverage Levels for the Routine Immunization of Children**

*Access:* 94% of the children had 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, 5% of the children did not receive any immunization.

*Crude coverage between 12-23 months:* 94% of the children received BCG, 87% received three doses of OPV, 87% received three doses of DPT and 76% were vaccinated against measles.

*Valid coverage between 12-23 months:* 94% of the children received BCG, 67% received three doses of OPV, 67% received three doses of DPT and 70% received measles vaccine.

*Valid coverage by 12 months:* 94% of the children received BCG, 65% received three doses of OPV, 66% received three doses of DPT and 65% received measles vaccine.

*Reasons for non-immunization and partial immunization of children:* The main reasons for non-immunization and partial immunization were the lack of knowledge by the parents/caretakers about the importance of immunization and in particular the need to return for subsequent doses. The mother's preoccupation with other work, fear of side reactions and sickness of the child or mother were also important factors in reducing immunization coverage.

*Problems detected:* Although access to immunization was fairly high, there was a moderately high drop out rate (8% from DPT1 to DPT3 and 19% from DPT1 to measles vaccine) and a number of invalid doses due to early immunization (14% for DPT1 and 9% for measles vaccine). A small percentage of uncorrected missed opportunities occurred at the immunization sessions (range 0% -3% for different antigens). Childhood immunization cards were preserved in only 64% of the cases and they were lost in another 28% cases.

**Coverage Levels for the TT Immunization of Women**

69% of women of childbearing age (15-49 years) had received a first dose of TT. Only 28% had received the five doses of TT vaccine. 31% of the women living in Noakhali municipality did not receive any TT immunization.

*Reasons for non-immunization and partial immunization of the women:* The major reasons cited for non-immunization were that the women were unaware of the need for immunization and some of them had no faith in immunization. Whereas the major reason for partial immunization was that they were unaware of the need to return for subsequent doses.

**Coverage Levels in the sixth NID Campaign**

The coverage figures were seemingly good with 85% of children below the age of 5 years receiving both doses of OPV during the sixth NIDs. It still means however that there were many 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 should have two doses of OPV during each NID campaign in order for Bangladesh to achieve its goal of being a "Polio free country".

*Reasons for non-immunization in the sixth NID campaign:* The main causes for non-immunization during NIDs were that parents were not aware of the campaign or they did not know where the NID immunization sites were.

Vitamin A capsules were given to 91% of the eligible children on the second round of the sixth NID campaign.

**Coverage Levels in the September 1999 MNT Campaign**

15% of the eligible children received measles vaccine and 36% received a dose of OPV during MNT campaign. The lower than the expected figures may have been affected by poor recall as the survey took place three months after the campaign.

**Suggested solutions**

The survey indicates a need for appropriate information being given to the 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 immunization sessions, the number of doses required) and promoting the details of the NID and MNT campaigns. The women of childbearing age require more education about how to prevent neonatal tetanus with 5 doses of TT vaccine. 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 counselling parents about EPI.

## Introduction

In Noakhali municipality, EPI vaccination is carried out by a variety of private and public providers at fixed (hospitals, clinics, dispensaries, etc.) and at outreach sites. The doses provided are supposed to be reported to the Municipal health authority on a monthly basis. After compilation, the data is submitted to the Civil Surgeon's office that aggregates it with other district results and sends it on to 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[5,8]. There are also clear indications that the health situation in most of the urban areas is worse than in the rural areas[5,7,8,10,12,13]. IOCH therefore decided to carry out a survey based on the WHO recommended EPI 30 cluster survey method[1] to obtain data on the status of the immunization coverage of the children and women living in Noakhali municipality, as well as on the operational profile of the provision of immunization services. In January 2000, this survey was conducted in Noakhali municipality with the objectives mentioned below. The preliminary results were made available for the International Urban EPI Review that began at the end of January 2000.

## Objectives

The overall objective of the survey was to assess the level of immunization coverage in the Noakhali municipality. The specific objectives were to:

a) assess the level of immunization coverage of children (12-23 months) and find out the reasons for non-immunization and partial immunization
b) assess TT immunization coverage among women of 15-49 years of age irrespective of their marital status and find out reasons for non-immunization and partial immunization
c) assess the coverage levels of OPV and Vitamin A during the sixth round of NIDs, and
d) assess the coverage levels achieved during the MNT campaign conducted in September 1999.

## Methodology and its Limitations

The survey followed the WHO recommended 30-cluster survey method[1], 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 from 30 clusters (7 children 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 January 9, 1998 to January 8, 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. Seven women (between 15-49 years of age, irrespective of their marital status) were selected to ascertain their tetanus toxoid vaccination status. Another 7 children of 0-59 months of age (children born between January 9, 1995 and January 8, 2000) were selected for information about the vaccinations they received during the MNT and NID campaigns.

The 30 clusters were chosen randomly from a cumulative list of the populations of Noakhali municipality from census report. These 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 child and women immunization status. A separate questionnaire was used for collecting data for the NID/MNT campaigns.

"Data Management Aid" (DMA) a local consulting firm with proven experience in conducting similar surveys was hired through a competitive bidding process to collect the information. DMA recruited the surveyors and supervisors. It also provided two days orientation (one day in the office and another day in the field - actually doing a test survey in a slum area in Dhaka City) for the surveyors and supervisors. IOCH/MSH provided technical support for their orientation. In the field there was a team of two surveyors (male/female) of DMA assigned to one cluster per day. They collected information by checking vaccination cards and also by interviewing parents/care takers. One supervisor was assigned to two teams of surveyors. IOCH had its own team in the field for quality control. At the end of each day the quality control team collected all the forms from the surveyors and they then randomly identified two sample respondents from each of the target groups in each cluster and re-interviewed them on the following day to check the quality of data collected. On that evening, discussions took place with the concerned interview team to resolve any inconsistencies.

All checked questionnaires were handed over to IOCH after completion. Data entry and analysis was done by IOCH using COSAS 4.3[3] and "EPI Info" programs. The provisional data was shared with the International Urban EPI Review Team in January 2000. The final report was prepared by the Monitoring and Evaluation Unit, IOCH/MSH Project.

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

Although the survey's method is relatively simple it has several limitations[2] 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 usually 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 for example, shows 65% of children in Noakhali municipality received valid measles immunization, then the "true" figure of measles immunization could be anywhere between (65-10) = 55% and (65+10) = 75%. 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 survey findings.
- 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 at the centre of the mouza to the end of the mouza 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 too 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.


URBAN EPI COVERAGE SURVEY AREAS
NOAKHALI MUNICIPALITY
Chandan pur
Fatepur
Maijdee
Ward 1
Laxminarayan
Modhusudan pur
Guptaranko
Krishnarampur
Jaykrishnapur
Lawyear's colony
Harinarayanpur
Ward 2
Fakirpur
Uzzalpur
Sahapur
Kashirampur
Ayubpur
Madha karimpur
Tajmahatabpur
Sreepur
Sonapur
Ward 3
Narayanpur
Laxmipur
Mohabbatpur
Jalial
Sollabatia
Legend
Sample Cluster
Survey Area
Ward Boundary
Mahallah Boundary
Rail Line
Roads
Bangladesh
Prepared by IOCH/MSH, Base Map: BBS,1996

# Results

## A. Routine Immunization coverage of children

### Coverage Levels (card plus history data of COSAS analysis)

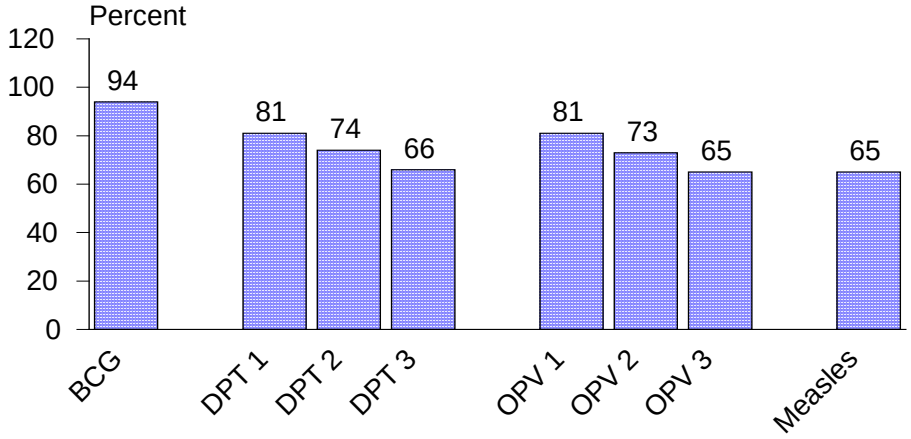
**Table 1** shows the coverage levels of children between 12-23 months and their vaccination status at 12 months of age. The crude data figures for the 12-23 month age group indicate that 87% of the children received three doses of OPV, 87% received three doses of DPT and 76% were vaccinated against measles. The valid coverage levels are however considerably lower (except BCG), only 67% of children received three doses of OPV, 67% received three doses of DPT and 70% were vaccinated against measles. The reasons for this and other comments on the coverage levels are given below. 5% of the children had not been immunized at all by 23 months and were therefore not reached by the routine EPI program.

**Table 1:** Routine immunization coverage levels of children (card plus history data)

| | Coverage (%) Immunized by 23 months | | Coverage (%) Immunized by 12 months Valid data |
|---|---|---|---|
| | Crude data (Access) | Valid data | |
| BCG | 94% | 94% | 94% |
| Polio 1 | 94% | 81% | 81% |
| Polio 2 | 91% | 74% | 73% |
| Polio 3 | 87% | 67% | 65% |
| DPT 1 | 94% | 81% | 81% |
| DPT 2 | 91% | 74% | 74% |
| DPT 3 | 87% | 67% | 66% |
| Measles | 76% | 70% | 65% |
| Zero dose | 5% | | |

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

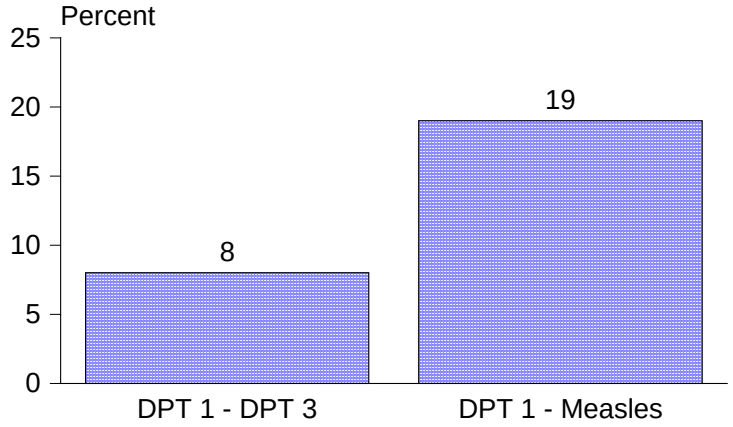
**Chart 1:** Immunization coverage among children less than 12 months old (card plus history data)



**Program access** [(percent of children surveyed who received DPT 1st dose (crude data - by card or history)]
Access to immunization was very good. 94% of the children received a 1st dose of DPT.

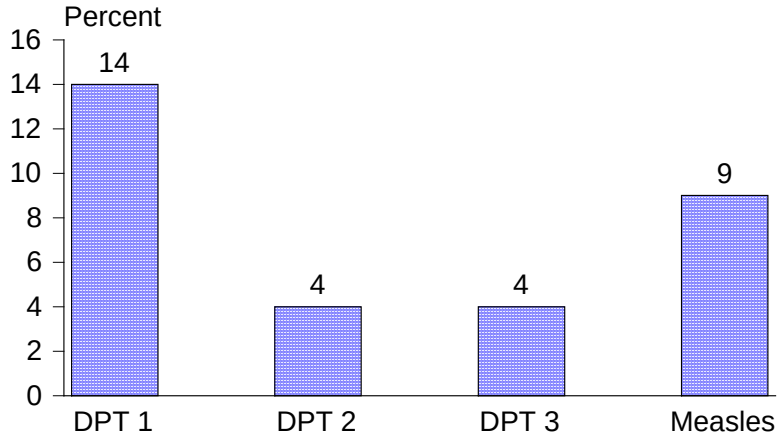
**Program continuity** (dropout rate)
Crude data for antigens received by 12-23 months of age is used for calculating the dropout rate. In this survey, the DPT1 to DPT3 dropout rate was 8% and DPT1 to measles dropout rate was 19% (**Chart 2**).

**Chart 2:** Drop out rate for childhood immunization




**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 94% measured by crude data to a coverage of 81% (valid data) for children between 12-23 months of age. A similar trend is seen for the other antigens (except BCG). 14% of children received an invalid dose[4] of DPT1 and another 9% received an invalid dose of measles vaccine. Nine children (4%) received DPT second dose less than 4 weeks after the first dose of DPT. Another eight children (4%) received DPT third dose less than 4 weeks after the second dose of DPT (**Chart 3**).

**Chart 3:** Invalid doses of immunization provided to children



**BCG vaccination**

94% children surveyed received BCG vaccine based on card plus history data. 85% of the children were found with a BCG scar. 10% of the children with BCG vaccine did not produce a visible scar. 14% of the children received BCG vaccine before 6 weeks of age.

**Missed opportunities of immunization**

The prevalence of uncorrected missed opportunities for immunization was low (range 0% for DPT2 to 3% for measles vaccine). The overall measles coverage would therefore be 3% higher than the survey finding if there had been no missed opportunities.

**Availability of documentation of immunization**

Childhood immunization cards were preserved in only 64% of the cases and they were lost in another 28% 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 (75%); b) family problem including sickness of mother (25%) and c) fear of side reactions (25%). Whereas the major reasons cited by parents for partial immunization were: a) unaware of need to return for second and third dose (57%), and b) child ill and not brought to immunization session (17%).

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

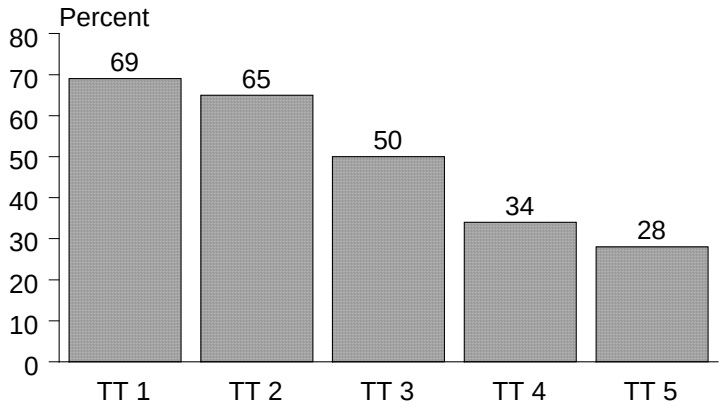
| Reasons | Non immunized | Partially immunized |
|---|---|---|
| Don't feel need for immunization | 75% | 7% |
| Unaware of need to return for 2nd or 3rd dose | - | 57% |
| Place and/or time of immunization unknown | 8% | - |
| Fear of side reactions | 25% | 2% |
| Wrong ideas about contraindications | 8% | - |
| Other reasons related to lack of information | - | 14% |
| No faith in immunization | 8% | 2% |
| Time of immunization inconvenient | 8% | - |
| Place of immunization too far | 8% | 2% |
| Vaccine not available | - | 5% |
| Vaccinator absent | 8% | 2% |
| Mother too busy | 8% | 7% |
| Family problem, including illness of mother | 25% | 7% |
| Child ill, not brought | - | 17% |
| Child ill, brought but not given immunization | - | 7% |
| Other reasons related to obstacles | 8% | 5% |

***** Almost but not all mothers /caretakers provided answers. *Multiple answers were accepted.*

**B. <u>Routine TT immunization coverage of women</u>**

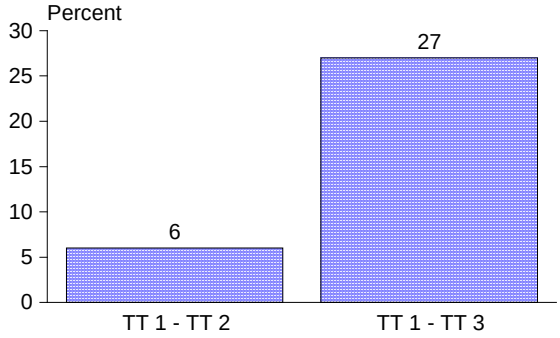
69% of the women had access to a first dose of TT vaccine (based on crude data). 65% of the women received two or more doses of TT vaccine. Only 28% had received all the 5 required doses (**Chart 4**). 31% of the women surveyed had not received any doses of TT vaccine.

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




The dropout rate from first dose of TT vaccine to second dose of TT vaccine was 6% and the dropout rate from first dose of TT vaccine to third dose of TT vaccine was 27% (**Chart 5**). Survey findings indicate that 2% women missed an opportunity for first dose of TT immunization during their antenatal check-ups. Only 18% of the women had TT immunization cards.

**Chart 5:** Drop out rate for TT immunization




**Reasons for non-immunization and partial TT immunization of women**

**Table 3** indicates that the major reasons cited for non-immunization of women were as follows: a) unaware of the need for immunization (84%), b) no faith in immunization (12%) and c) fear of side reaction (7%). Whereas the major reasons cited for partial immunization of women were as follows: a) unaware of need to return for subsequent doses (74%), b) did not feel need for immunization (15%) and c) fear of side reactions (9%).

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

| Reasons | Not Immunized | Partially Immunized |
|---|---|---|
| Don't feel need for immunization | 84% | 15% |
| Unaware of need to return for subsequent doses | - | 74% |
| Place and/or time of immunization unknown | 8% | 2% |
| Fear of side reactions | 7% | 9% |
| Next dose is not yet due | - | 4% |
| Wrong ideas about contraindications | 5% | - |
| Other reasons related to lack of information | 15% | 7% |
| No faith in immunization | 12% | 4% |
| Other reasons related to lack of motivation | 2% | 4% |
| Place of immunization too far | 2% | 2% |
| Other reasons related to obstacles | 2% | - |

** Multiple answers were accepted*

## C. Coverage Levels in the sixth NID Campaign

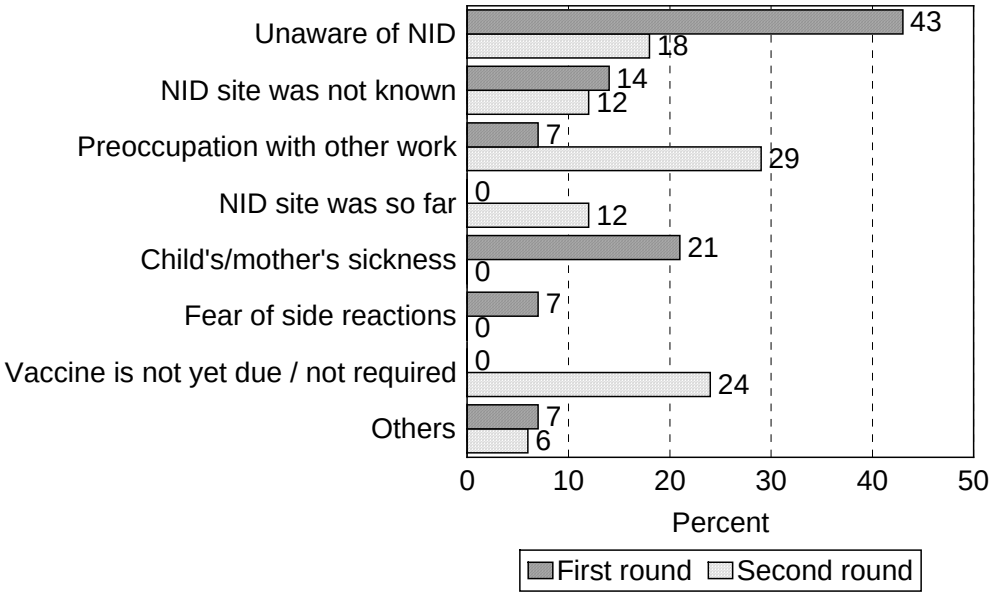
### OPV coverage

94% of children below 5 years of age received OPV during the first round and 92% during the second round of the sixth NID campaign. 85% of the children received OPV in both rounds of the NID campaign.

### Reasons for non-immunization of OPV

The main reason invoked for not being immunized at the NIDs was the lack of knowledge of the campaign. This together with the other reasons is shown in **Chart 6**.

**Chart 6:** Reasons for non-immunizations during the sixth NIDs



**High potency Vitamin A coverage**

During the second round of the sixth NID campaign a high potency vitamin A capsule was also administered to 91% of the children between one and five years.

**Reasons for not receiving Vitamin A**

**Table 4** indicates the major reasons given by the 19 parents for their child not having the vitamin A capsule: a) vitamin A is not yet due or required for their child (47%) and b) preoccupation with other work (26%).

**Table 4:** Reasons for not accepting the Vitamin A capsule during the sixth NIDs

| Reasons | Percent |
|---|---|
| Unaware of NID | 5% |
| NID site was not known | 5% |
| Vitamin A capsule was not available | 5% |
| Vitamin A dose is not yet due / not required | 47% |
| Preoccupation with other work | 26% |
| Others | 11% |

**Places of immunization during the sixth NIDs**

The majority of the children received the OPV and Vitamin A capsules from the NID vaccination sites (**Table 5**). A few however, were vaccinated and received Vitamin A during the house-to-house search conducted after the NID.

**Table 5:** Places of immunization during the sixth NIDs

| | | NID site | Home | Bus stand | Railway station |
|---|---|---|---|---|---|
| OPV | 1st round | 97% | 2% | 0.5% | 1% |
| | 2nd round | 96% | 3% | 0.5% | 1% |
| Vitamin A Capsule | 2nd round | 97% | 2% | 0.5% | 0.5% |

## D. Coverage Levels in the MNT Campaign

### Coverage levels

The MNT campaign was conducted in Noakhali municipality in September 1999. 15% of eligible children received measles vaccine during that campaign. 36% of children received a dose of OPV. The result might be affected by a recall bias, as the data was collected more than three months after the MNT campaign.

### Reasons for non-immunization

**Table 6** indicates that the majority of parents of the children who were not immunized for OPV and/or measles were either unaware of the MNT campaign or did not know where was the MNT site.

**Table 6:** Reasons for non-immunization during the MNT Campaign

| Reasons | Measles vaccine | OPV vaccine |
|---|---|---|
| Unaware of MNT | 37% | 47% |
| MNT site was not known | 32% | 40% |
| Child's/mother's sickness | 1% | 1% |
| Preoccupation with other work | 1% | 1% |
| MNT site was too far | 2% | - |
| Vaccine was not available | 7% | - |
| Vaccine is not yet due / not required | 12% | 8% |
| Others | 9% | 4% |

### Places of vaccination during the MNT campaign

**Table 7** shows that the majority of the children who received OPV and the measles vaccine during the MNT campaign, received it from MNT vaccination sites.

**Table 7:** Places of immunization during the MNT Campaign

| | MNT site | Home |
|---|---|---|
| OPV | 97% | 3% |
| Measles | 86% | 14% |

# Discussion

The survey showed that 94% of the children had access to routine immunization and that is a significant achievement for Noakhali municipality. 14% had received a valid BCG vaccination before 6 weeks of age, which is a testimony of some parent's awareness of the need for vaccinating their children at the earliest opportunity. But the promising start was eroded by the moderately high dropout rate (e.g. 8% from DPT1 to DPT3 and 19% from DPT1 to Measles vaccine) and by the number of invalid doses (14% for DPT1 and another 9% for measles vaccine). 5% of the children had not been immunized at all. Immunization cards of children were found in 64% of cases during the survey and another 28% of the cards were lost. Only 18% of the women had TT immunization card. 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.

Although 85% of the children surveyed between 0 – 5 years in the Noakhali municipality were given 2 doses of OPV during the sixth round of NIDs. But, this figure still means that there were children who did not receive any 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.

# Conclusions and Recommendations

## Coverage levels for routine immunization of children

### Access to routine immunization

This survey found that the access to routine immunization for children in the Noakhali municipality was very good. 94% children received the 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 the high drop out rates and also to a lesser extent to the number of invalid doses and uncorrected missed opportunities.

### The dropout rates

The high dropout rates may be reduced to an acceptable level[5,6,9,11] by:

- providing better counseling to parents/caretakers about the importance of each child receiving all the required antigens before 12 months. They also require advice about when and where they should take their child for the next dose. Most children will need to attend 4 immunization sessions. 57% of the children dropped out simply because their parents/care takers did not know that they were required to return to the EPI center for subsequent doses. Another 17% of the children were not taken for immunization because the child was ill. Parents therefore need to be advised that minor illness is not a contraindication to vaccination.
- 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 and women of child bearing age about immunization. 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 talked to at all.

### Invalid doses

A number of the 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, more than 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 and to remind them about the correct ages and intervals for immunizations
- strengthening the support given to the service providers through supervision;
- emphasizing the need to retain and use vaccination cards.

**Missed Opportunities**

The rate of uncorrected missed opportunities for immunizations was low (range varied from 0% and 3%). 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 low and the rate of drop out after the second dose was very high. The coverage of 69% for TT1 reduced to 28% for TT5 and 31% had not been immunized at all. A woman of reproductive age needs to receive 5 doses of TT to acquire immunity for rest of her reproductive life. TT coverage is likely to be improved by:

- checking 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 child bearing 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 satisfactory level (85% receiving both doses) but it still means that a significant number of children did not receive two doses of OPV. This occurred at a time when every child under five years should receive two doses 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 under 5 years must receive polio vaccine during both rounds of each NID campaign planned in 2000;
- paying particular attention to immunizing the poor populations.

# 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.

5. Expanded Program on Immunization, Ministry of Health and Family Welfare, 1997, 1998, 1999 National Coverage Evaluation Survey report, Dhaka.

6. Needs assessment study of field workers involved in the Expanded Program on Immunization, Executive report, November 1991, Pages 2, 8, 11.

7. Progotir Pathey, October 1998, UNICEF, Dhaka.

8. Stanley O. Foster, 1996, Information for action: Using data to improve EPI impact, BASICS, Dhaka.

9. Henry Perry, Robert Weierbach, Iqbal Hossain, Rafiq-ul Islam, 1997, Immunization coverage in Zone – 3 of Dhaka City, Bangladesh, Working paper No. 25, Dhaka: ICDDR'B.

10. Henry Perry, The BASICS Project Experience in supporting EPI and Child Survival Activities in Bangladesh, 1994-1999. A report presented to USAID/Bangladesh in June 1999.

11. Therese Blanchet, Perceptions of childhood diseases and attitudes towards immunization among slum dwellers, Dhaka, June 1989. AID Contract No. DPE-5927-C-50698-00.

12. Unpublished data of immunization coverage: UPHC Project survey among urban poor group living in cities, 1999.

13. Mitra and associates: UFHP NGO impact assessment survey, 1998.

## 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. ……."

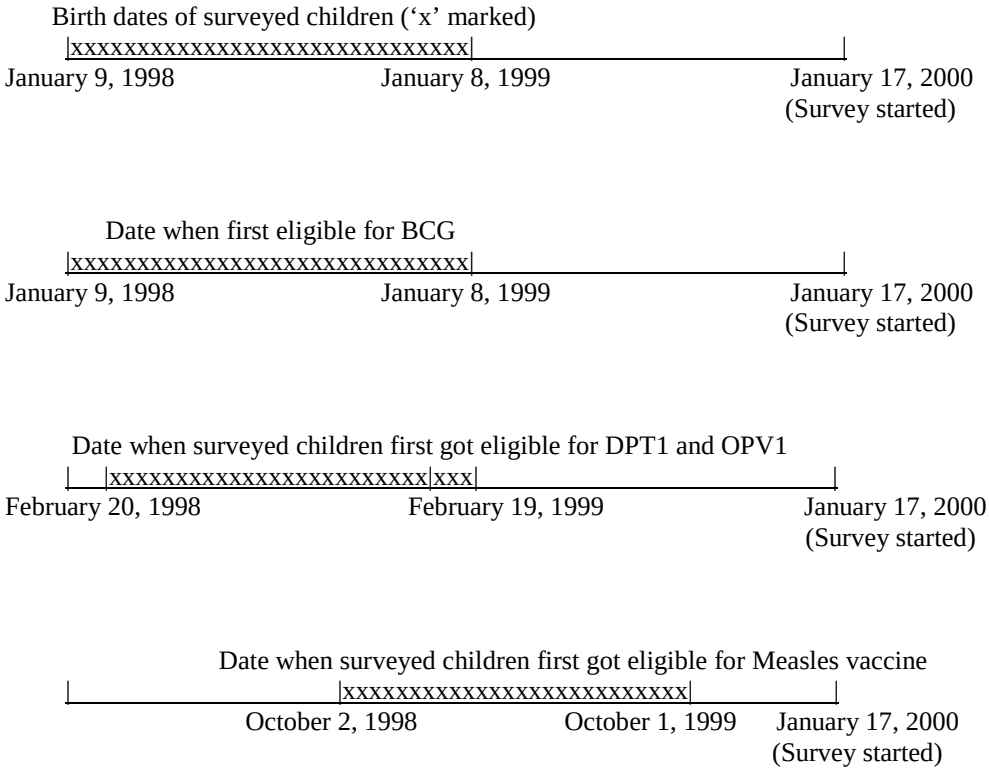
"A second problem concern sampling weights. …….. However, since measures of size in sampling frames are often inaccurate due to census errors and changes in population since the census was taken, application of the standard EPI Cluster Survey method does not automatically result in a self weighting sample. 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

Immunization and Other Child Health Project/Management Sciences for Health
EPI Coverage Survey in the urban areas of Bangladesh
List of clusters identified for survey
Area: Noakhali Municipality

| Mouza/locality | Population | Cluster No. |
|---|---|---|
| Modhusudan pur | 618 | 1 |
| Anantapur | 180 | 2 |
| West Fatepur | 761 | 3 |
| Chandan pur | 765 | 4 |
| East Maijdee | 12488 | 5 |
| Laxminarayan | 7009 | 6 |
| Krishnarampur | 3595 | 7 |
| Jaykrishnapur | 1187 | 8 |
| Fakirpur | 2830 | 9 |
| Alipur | 736 | 10 |
| Harinarayanpur | 1212 | 11 |
| Mojduri | 1008 | 12 |
| Rajarampur | 911 | 13 |
| Guptaranko | 1400 | 14 |
| Lawyear's colony | 1399 | 15 |
| Gopi ransankar | 2889 | 16 |
| Sahapur | 1551 | 17 |
| Ayubpur | 705 | 18 |
| Uzzalpur | 869 | 19 |
| Kashirampur | 666 | 20 |
| Tajmahatabpur | 1230 | 21 |
| Madha karimpur | 3086 | 22 |
| Sreepur | 1689 | 23 |
| Sonapur | 5937 | 24 |
| Narayanpur | 159 | 25 |
| Laxmipur | 74 | 26 |
| Sollabatia | 374 | 27 |
| Jalial | 1143 | 28 |
| Mohabbatpur | 2863 | 29 |
| Lalpur | 346 | 30 |

## Acknowledgements

**Coordinator of survey:**
Md. Mafizur Rahman, Monitoring and Evaluation Specialist, IOCH/MSH

**Digital map prepared by:**
Mr. Din Mohammed, Monitoring and Evaluation Assistant, IOCH/MSH

**Data analyzer:**
Md. Mafizur Rahman, Monitoring and Evaluation Specialist, IOCH/MSH
Mr Biplob Banerjee, Polio Eradication Facilitator, IOCH/MSH

**Report prepared by:**
Dr. Bikash Ranjan Roy

**Report reviewed and edited by:**
Dr. Pierre Claquin, Chief of Party, IOCH/MSH
Md. Mafizur Rahman, Monitoring and Evaluation Specialist, IOCH/MSH
Ms. Virginia Reekie

**Cover photo:**
Moumina Dorgabekova / Image Jinn