



# IOCH

## Immunization and Other Child Health Project

**Vaccination Coverage Survey in the  
Rangpur Municipality – May 2000**

**Survey Report No. 15**

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## Table of Contents

	Page No.
List of Tables and List of Charts	3
Acronyms	4
Terminology	5
<b>Executive Summary</b>	<b>6</b>
Introduction	8
Objectives	8
Methodology and its Limitations	9
Results	
General information	12
Routine immunization coverage levels of children	13
Routine TT immunization coverage levels of women	16
Child to child search activity after first round of seventh NID campaign	17
Discussions	19
<b>Conclusions and Recommendations</b>	<b>20</b>
Reference and Resource Materials	22
Annexures	
Annex A: EPI Cluster Survey design (extracts from an article written by Anthony G Turner, Robert J Magnani and Muhammed Shuaib)	23
Annex B: Illustration of when children surveyed first became eligible for different vaccines	24
Annex C: List of selected clusters	25
Acknowledgements	26

## **List of Tables**

**Table 1:** Routine Immunization coverage levels of the children

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

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

**Table 4:** Reasons for non-immunization of OPV during seventh NID campaign

## **List of Charts**

**Chart 1:** Availability of documentation of immunization

**Chart 2:** Sources of childhood and TT immunization

**Chart 3:** Immunization coverage among children less than 12 months old

**Chart 4:** Drop out rates for childhood immunization

**Chart 5:** Routine immunization coverage levels for TT of the women (15-49 years)

**Chart 6:** Drop out rates for TT immunization

**Chart 7:** Sources of information of first round of the seventh NID campaign

## Acronyms

BCC	Behavior Change Communication
BCG	Bacillus of Calmette and Guerin
CES	Coverage Evaluation Survey
COSAS	Coverage Survey Analysis System
DPT	Diphtheria, Pertussis and Tetanus
EPI	Expanded Program on Immunization
FWC	Family Welfare Center
IOCH	Immunization and Other Child Health
Mahallah	Smaller localities (smaller than a village)
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
THC	Thana Health Complex
TT	Tetanus Toxoid
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<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.

**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

Between May 17-24, 2000, a coverage evaluation survey was conducted by IOCH in Rangpur municipality as a part of ongoing evaluation of EPI program with the following objectives,

### Objectives

The principal objectives of the survey were to assess:

- a) the levels of routine immunization coverage of children (12-23 months);
- b) the levels of TT immunization coverage in women of child bearing age (15-49 years) regardless of their marital status and
- c) the effectiveness of child to child search program conducted after first round of seventh NIDs

### Coverage Levels for the Routine Immunization of Children

*Access:* 93% of the children received at least one dose of antigen (DPT 1<sup>st</sup> dose in this case) from routine immunization sessions based on crude data (card plus history). However, 7% of the children did not receive any immunization.

*Crude coverage between 12-23 months:* 93% children received BCG, 81% received three doses of OPV, 81% received three doses of DPT and 73% received measles vaccine.

*Valid coverage between 12-23 months:* 93% children received BCG, 75% received three doses of OPV, 75% received three doses of DPT and 72% received measles vaccine.

*Valid coverage by 12 months:* 93% children received BCG, 71% received three doses of OPV, 71% received three doses of DPT and 65% received measles vaccine.

*Source of immunization and distance of immunization center:* Childhood immunization is provided by EPI outreach centers in 36% of the cases, 48% from Government hospitals and the remaining from other sources. EPI vaccination center is within half-an-hour walking distance from client's residence in 89% of the cases.

*Reasons for non-immunization and partial immunization of children:* The main reasons for non-immunization and partial immunization were the lack of knowledge of the parents/caretakers about the importance of immunization and in particular the need to return for the subsequent doses. 'Sickness of the child' was also cited by some parents as reasons for non-compliance to immunization schedule.

*Problems detected:* although access to immunization was fairly high, there was high drop out rate (13% from DPT1 to DPT3 and 22% from DPT1 to Measles vaccine) and a small number of invalid doses due to early immunization (2% for DPT1 and 2% for Measles vaccine). Prevalence of uncorrected missed opportunities was very low (range 0% to 1% for different antigens). Child immunization cards were available in only 65% of the cases and were lost in another 27% of cases.

### **Coverage Levels for the Routine TT Immunization of women**

64% of women of childbearing age (15-49 years) had received a first dose of TT. Only 20% women had received the five doses of TT vaccine. 36% of the women had not received any immunization. TT immunization cards were available in only 18% of the cases and were lost in another 37% cases.

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

### **Coverage Levels for the seventh NID Campaign and status of child to child search**

In Rangpur Municipality, the NID coverage figures were fairly good. 84% children received a dose of OPV during the first round of seventh NID campaign. Second round NID performance was not evaluated. The main reasons for most of the non-immunization cases during the first round of NIDs were that the parents were either unaware of NID or vaccine was not available at the immunization site. Miking and television were the main source of information about the campaign. Effectiveness of other printed/mass media as a source of information and motivation was very low.

Only 63% of the households were visited following the first round of seventh NID campaign. This activity ensured vaccination of 65% of the children who were not vaccinated during the day of NID. Unfortunately 28% of the non-immunized children during first round of NID, were not vaccinated as the house visit was not done by health worker. 7% of the children could not be vaccinated even by house visit as the child was not at home. All the households were properly marked by the health workers during child to child search.

### **Suggested solutions**

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

Child to child search for OPV vaccination after first round of NID was found to be effective in vaccinating the unvaccinated children with a dose of OPV. But, 37% of the households were not visited during the week following the day of NID. This is an administrative issue and to be dealt accordingly.

## **Introduction**

The routine EPI program in the municipalities is carried out by a variety of private and public providers at fixed (hospitals, clinics, dispensaries, etc.) and at outreach sites. NGOs and private practitioners also provide immunization services in many places. The doses of immunization provided are supposed to be reported to the municipal Health authority either at the end of each immunization session (if it is provided by municipality) or on a monthly basis. After compilation, the data is submitted to the concerned Civil Surgeon's office that aggregates it with other Upazila EPI results within that district and sends it on to the EPI HQ in Dhaka.

For many reasons (e.g. immunization provided to children older than the target age group, tendency for over reporting, underestimated target etc.) routine EPI coverage data is generally unreliable<sup>5,7,8</sup>. There are also clear indications that the health situation in most of the urban areas are worse than in the rural areas<sup>5,7,8,10,11</sup>.

IOCH therefore decided to carry out a survey based on the WHO recommended EPI 30 cluster survey method<sup>1</sup> to obtain data on the status of the immunization coverage of the children and women living in Rangpur municipality as well as on the effectiveness of child to child search activity conducted after NID day to vaccinate the children who were not vaccinated during the day of NID. Rangpur municipality was taken as a unit and 30 clusters were chosen through random sampling method (please see map).

## **Objectives**

The overall objective of the survey was to assess the level of immunization coverage in Rangpur Municipality. 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 women of 15-49 years of age irrespective of their marital status and find out the reasons for non immunization and partial immunization
- c) assess the effectiveness of child to child search program conducted after first round of seventh NID campaign.

## Methodology and its Limitations

The survey followed 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. (The detailed survey methodology and its limitations are presented in **Annex A**). Briefly, the immunization information is collected on a randomly selected group of 210 children/women from 30 clusters (7 children/women per cluster) in a given community. It gives an estimate of immunization coverage to within +/- 10 percentage points of the true population proportion with 95% statistical confidence, assuming a design effect of 2.

In this survey 7 children between 12-23 months (children born between May 18, 1998 to May 17, 1999) were selected from each cluster to ascertain their routine vaccination status. **Annex B** describes how the dates of eligibility of different antigens in routine immunization were determined for children. The first round of seventh NID campaign was conducted on April 23, 2000 in urban areas. Children born between April 27, 1995 and April 26, 2000 were selected for collecting information on NIDs and child to child search. 14 children of this age group were chosen from each cluster to evaluate child to child search activity. Seven women between 15-49 years of age, irrespective of their marital status were selected to ascertain their tetanus toxoid vaccination status for routine immunization.

The 30 clusters (mouzas/mahallahs) were chosen randomly by IOCH from a list of the populations of mouzas and mahallahs in Rangpur municipality from the Bangladesh Population Census 1991. The list of selected clusters is given in **Annex C** and their location is shown on the following map. The WHO standard questionnaire was used in this survey for documenting the routine immunization status of children and women. Separate questionnaires were used for collecting the data of NID and child to child search activity conducted after first round of seventh NID campaign.

Data was collected by IOCH monitoring team. Data collection period was from May 17-24, 2000. Data entry and analysis was done by IOCH using COSAS 4.3<sup>3</sup> and “EPI Info” programs. The final report was prepared by the Monitoring and Evaluation Unit, IOCH/MSH Project.

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

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

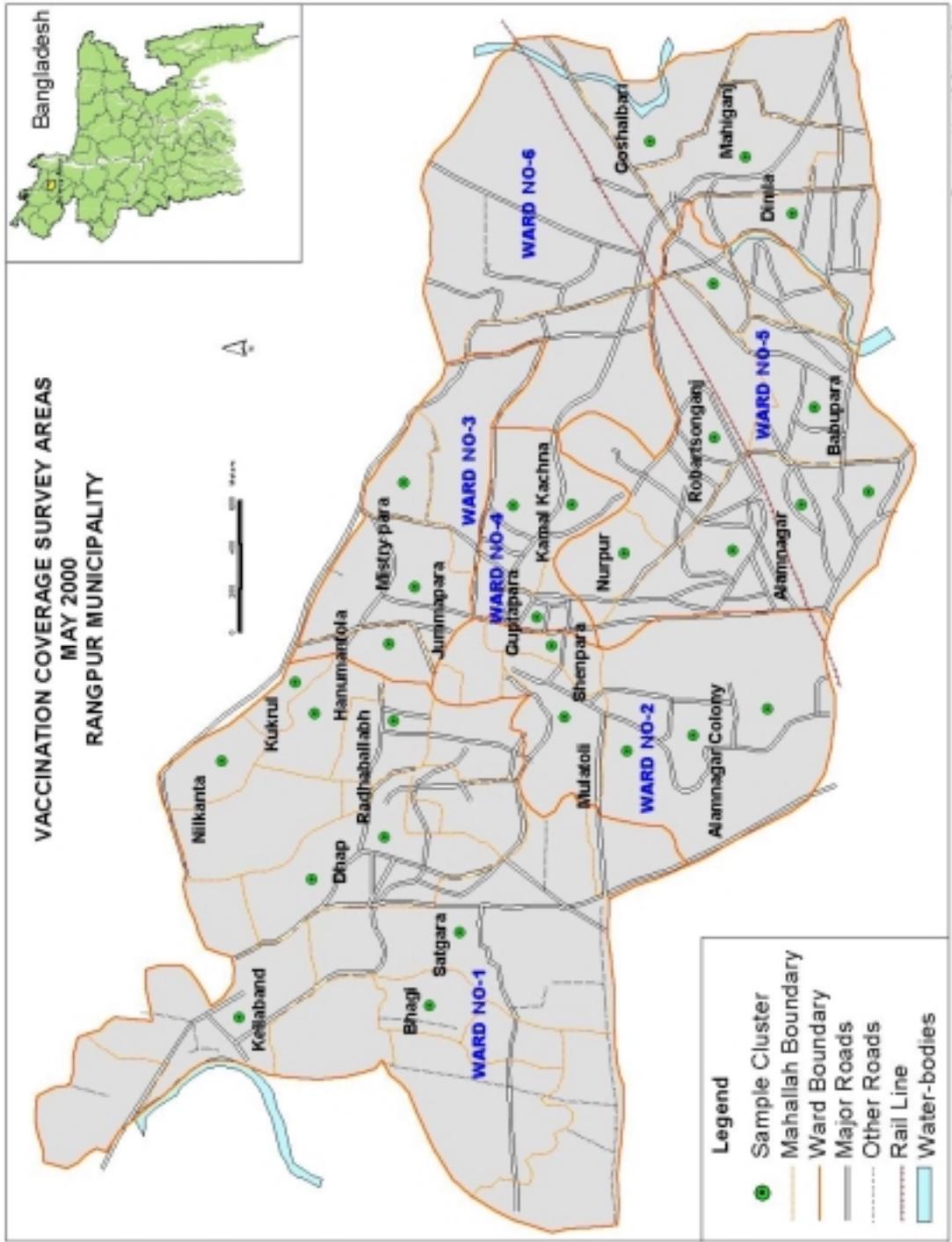
#### Linked to the sampling method:

- 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.
- There is a wide confidence interval (+/- 10%). It means that if the result shows 65% 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  $(65-10) = 55\%$  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 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.



## Results

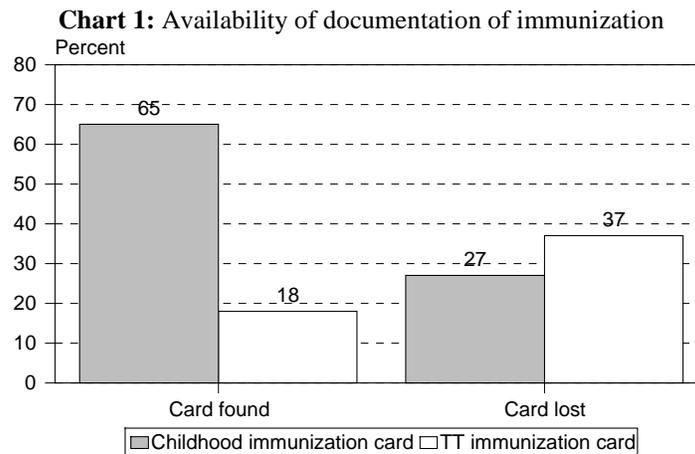
### General information

210 children were surveyed. 54% of them were boys and 46% were girls. 18% of the infants were away of their home for more than 2 months in their first six months of life. 99% of them live in a building or tin shade house. Survey findings show that 89% of the immunization centers are within half an hour walking distance of the children's home, 9% were located between half an hour to one hour walking distance and in 2% of the cases it was located more than one hour walking distance.

219 women were surveyed. 18% of the women interviewed were unmarried at the time of the survey. 13% of the women were away from their normal residence for more than 2 months at one time within last two years. 99% of the women live in a building or tin shade house. Immunization centers were within half an hour walking distance in 87% of the cases, 12% within half an hour to one hour walking distance and 1% centers were more than one hour walking distance.

### Availability of documentation of immunization

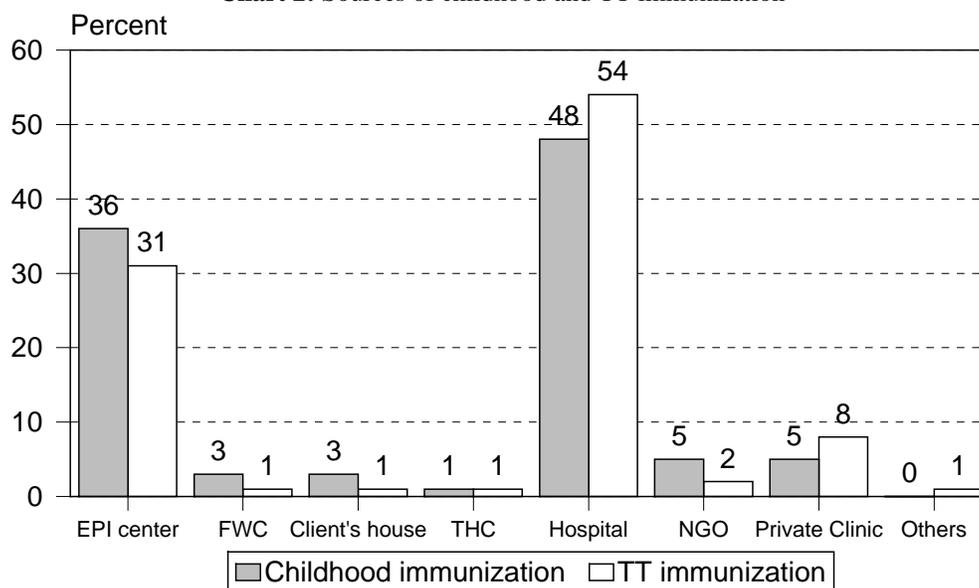
Child immunization cards were available in 65% of the cases and were lost in another 27% cases. Only 18% of the women surveyed had TT immunization cards and were lost in another 37% cases (**Chart 1**).



### Sources of immunization

Childhood immunization is being provided mostly by EPI outreach centers (36%) and from Government hospitals (48%). Similarly TT immunization is being provided mostly by EPI Outreach centers (31%) and from Government Hospitals (54%). In rest of the cases immunization is being provided by different sources (**Chart 2**).

**Chart 2: Sources of childhood and TT immunization**



### A. Routine Immunization coverage of children

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

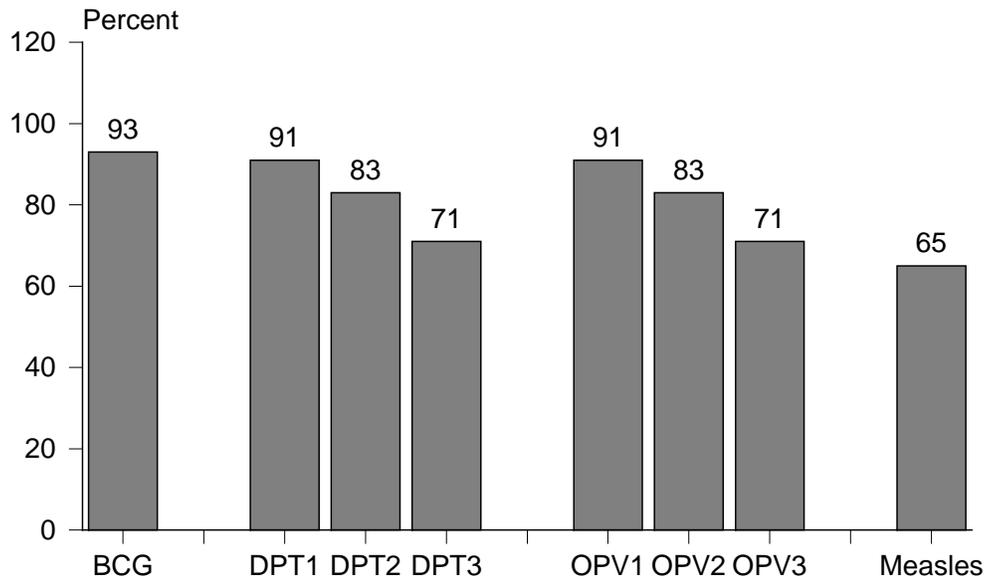
**Table 1** shows the coverage levels of children between 12-23 months and their vaccination status at 12 months of age. The crude data figures for the 12-23 month age group indicate that 81% of the children received three doses of OPV, 81% received three doses of DPT and 73% were vaccinated against measles. The valid coverage levels are however considerably lower for DPT/OPV 2nd does and 3rd doses. 75% of the children received three doses of OPV, 75% received three doses of DPT and 72% were vaccinated against measles. Only 7% of the children surveyed had not been immunized at all and were therefore not reached by the routine EPI program.

**Table 1:** Routine Immunization coverage levels of the children

	Coverage (%) Immunization of 12 - 23 month age group		Coverage (%) Immunized by 12 months Valid data
	Crude data (Access)	Valid data	
BCG	93%	93%	93%
Polio 1	93%	91%	91%
Polio 2	89%	84%	83%
Polio 3	81%	75%	71%
DPT 1	93%	91%	91%
DPT 2	89%	84%	83%
DPT 3	81%	75%	71%
Measles	73%	72%	65%
Fully immunized	73%	-	-
Zero dose	7%	-	-

**Table 1** shows little or no difference between the valid data of immunization by 23 months age group and the valid data by 12 months except for measles coverage (72% versus 65%). Proportion of fully immunized children under one year of age (valid data) among those having immunization cards were 64%. **Chart 3** shows the actual coverage for children of less than 12 months.

**Chart 3: Immunization coverage among children less than 12 months old**  
(Card plus history data, valid doses only)

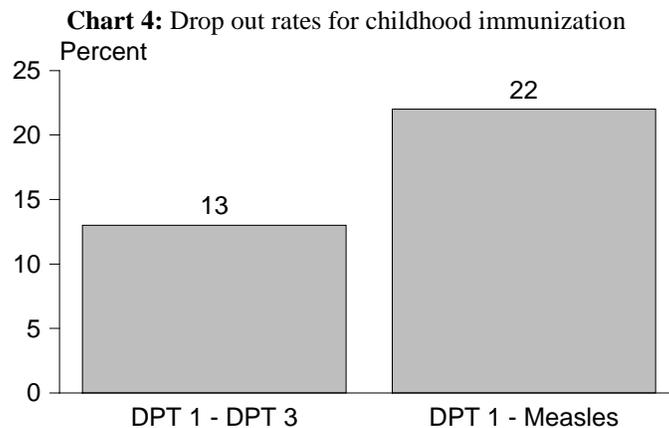


**Program access** [(percent of children surveyed who received DPT 1<sup>st</sup> dose (crude data - by card or history)].

Access to immunization was very good as 93% of children received a 1<sup>st</sup> 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 13% and DPT 1 to measles drop out rate was 22% (**Chart 4**).



## 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 related to program quality was fairly satisfactory. In Rangpur municipality the number of invalid doses<sup>4</sup> were very low for different antigens. 2% of children received an invalid dose of DPT1 and 2% received an invalid dose of measles vaccine. 2% children received a DPT second dose less than 4 weeks after the first dose of DPT and another 3% children received DPT third dose less than 4 weeks after the second dose of DPT.

### BCG vaccination

93% of the children surveyed received BCG vaccine based on card plus history data. 83% of the children were found with a BCG scar but 11% did not produce a visible scar.

### Missed opportunities of immunization

The prevalence of uncorrected missed opportunities for immunization was very low (range 0% to 1% for all antigens).

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

The reasons cited by parents for non-immunization and partial immunization are shown in **Table 2**. 7% of the children surveyed were non-immunized. 79% of those children were not vaccinated as their parents were not aware of immunizations. 20% of the children were partially immunized (crude data). Among the reasons cited by parents for partial immunization series were a) 36% of those children were not fully immunized as their parents were not aware that they had to take the children to the immunization session to complete the series in b) 20% cases child was sick and not brought to the immunization session and c) another 12% were not fully vaccinated as their parents did not feel the need for immunization.

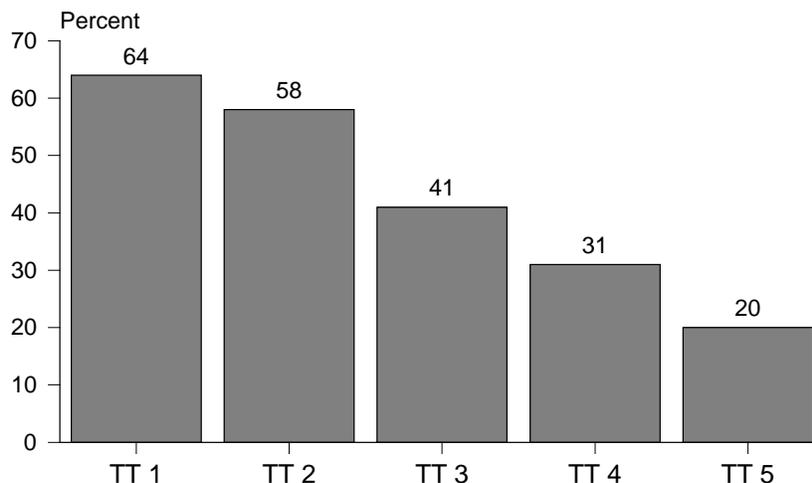
**Table 2:** Reasons for non-immunization and partial immunization of the children

Reasons	Non immunized	Partially immunized
Don't feel need for immunization	79%	12%
Unaware of need of return for 2 <sup>nd</sup> or 3 <sup>rd</sup> dose	-	36%
Place and/or time of immunization unknown	-	4%
Fear of side reactions	7%	4%
Wrong ideas about contraindications	-	2%
Vaccinator absent	-	4%
Vaccine not available	-	2%
Mother too busy with households work	7%	8%
Family problem/Mother sick	-	4%
Child ill, not brought	7%	20%
Child ill, brought but not given immunization	-	2%
Others	-	2%

### **B. Routine TT immunization coverage levels of the women**

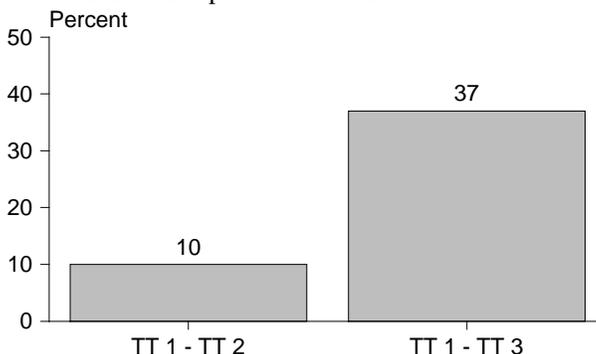
64% of the women had access to a first dose of TT vaccine (based on crude data). 58% of the women received two or more doses of TT vaccine. Only 20% had received all the 5 required doses (**Chart 5**). 36% of the women surveyed had not received any doses of TT vaccine.

**Chart 5:** Routine immunization coverage levels for TT of the women (15-49 years)



The dropout rate from first dose of TT vaccine to second dose of TT vaccine was 10% and the dropout rate from first dose of TT vaccine to third dose of TT vaccine was 37% (**Chart 6**). Survey findings indicate that no women missed an opportunity for a first dose of TT immunization during their antenatal check-ups.

**Chart 6:** Drop out rates for TT immunization



### **Reasons for non-immunization and partial immunization of the women**

36% women were not immunized and 44% were partially immunized. **Table 3** indicates that the major reasons cited for non-immunization of women were: a) unaware of the need for immunization (62%) and b) 18% of women cited that “in our times TT was not in practice.” This otherwise means that they were not convinced about the benefits of TT immunization. Whereas the major reasons cited for partial immunization were: a) unaware of need to return for subsequent doses of immunization (47%) and b) health worker did not specify the date to return for the next dose (14%).

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

Reasons	Non immunized	Partially immunized
Next dose is not yet due	-	10%
Don't feel need for immunization	68%	11%
Health worker did not specify the date to return for next dose	-	14%
Unaware of need of return for 2 <sup>nd</sup> or 3 <sup>rd</sup> dose	-	47%
Place and/or time of immunization unknown	2%	-
Fear of side reactions	2%	2%
In our times TT immunization was not in practice	18%	7%
Other reasons related to lack of motivation	-	2%
Postponed until another time	-	2%
Fear of injection	6%	4%
Place of immunization too far	-	1%
Vaccine not available	-	1%
Too busy with households work	-	1%
Cultural/religious reasons	2%	-
Other reasons related to obstacles	4%	-

### **C. Child to child search activity after first round of seventh NID campaign**

427 children were interviewed. 50% of the interviewed children were girls. 5% of the children were out of their normal residence for consecutive two months or more within last six months period. 98% of the children live in buildings or tin shade house. 84% of children below 5 years of age received OPV during the first round of NID campaign and all of them received vaccine from NID centers.

#### **Reasons for non-immunization of OPV**

16% of the children were not vaccinated with OPV during first round of seventh NID campaign. The main reasons invoked for not being immunized during NIDs were lack of information of NID (26%), mother was busy with other works (26%) and vaccine was not available (17%). These together with other reasons are shown in **Table 4**.

**Table 4:** Reasons for non-immunization of OPV during seventh NID campaign

Reasons	Percentage
Unaware of NID	26%
NID site was not known	4%
NID site was too far	4%
Long waiting time	1%
Vaccine was not available	17%
Vaccinator absent	6%
Child's/Mother's sickness	9%
Preoccupation with other work	26%
Child was not available	4%
Others	1%

### Child to child search status

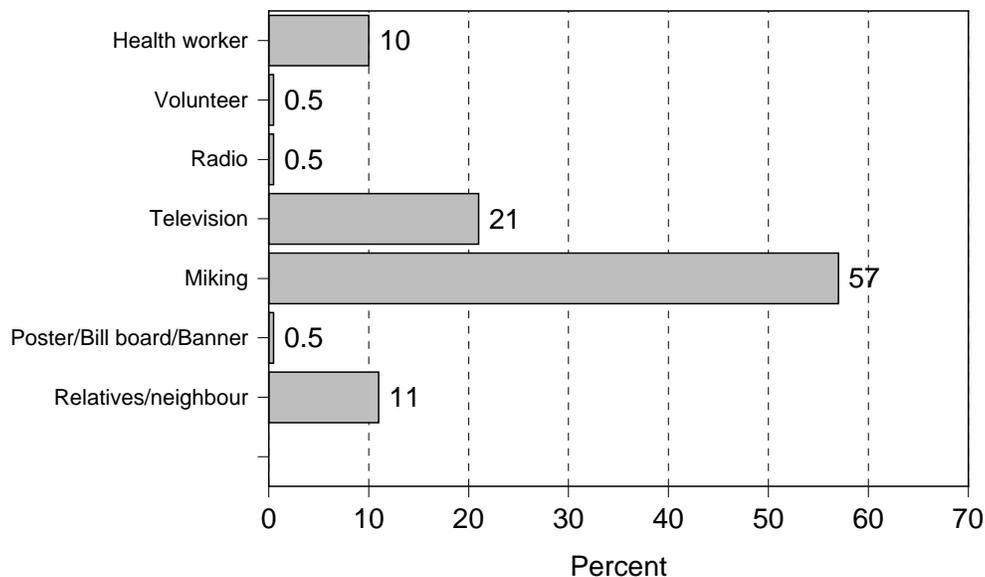
Parents reported that 63% of the houses were visited by health worker to check whether the child was vaccinated with OPV or not within 24-27<sup>th</sup> April,2000. All those houses visited were marked by health worker as a mark for house visit done.

16% of the eligible children were not vaccinated on the day of the first round of seventh NID campaign. Out of those children, 65% children were vaccinated during child to child search. But, 28% of the non immunized children missed the opportunity of being vaccinated during house to house search simply due to the fact that their houses were not visited by health worker. Remaining 7% of the children were not vaccinated even during house to house search as the child were not at home during health workers visit.

### Source of information about the first round of seventh NID campaign

98% of the parents said that they have heard about NID on or before 23<sup>rd</sup> of April, 2000. 57% received information through miking, 21% from Television and 10% from health workers. These together with other sources of information are mentioned in **Chart 7**.

**Chart 7:** Source of information of first round of seventh NID campaign.



## Discussion

The survey showed that 93% of the children of 12-23 months of age had access to routine immunization. But the promising start was eroded by a high dropout rate (e.g. 13% from DPT1 to DPT3 and 22% from DPT1 to measles vaccine) and by a small percentage of invalid doses (2% for DPT1 and another 2% for measles vaccine). 7% of the children had not been immunized at all. Child immunization cards were available in only 65% of the cases and were lost in another 27% of cases. 58% women got at least two doses of OPV. But only 20% women received all five doses of TT. Only 18% of the women had TT immunization cards and another 37% women had lost their cards. The absence of cards has got serious implications as it may mean that when a child comes to the immunization session for the second or subsequent doses, the vaccinators will have to immunize without accurately knowing the date of birth of the child and the date of previous immunization. This is another factor likely to increase the number of invalid doses given. This is also true for TT immunization where there is often a long interval between doses.

It is a very good achievement that 84% of the children between 0-5 years of age surveyed received a dose of OPV during the first round. House to house search for administering OPV for children who did not have vaccine on the day of NID was found to be effective. But all the houses were not visited during that search activity.

## **Conclusions and Recommendations**

### **Coverage levels for routine immunization of children**

#### **Access to routine immunization and low full immunization**

This survey found that the access to routine immunization for children in Rangpur Municipality was very good with 93% of the children receiving a first dose of DPT, but this percentage was not maintained for subsequent immunizations. This important shortcoming can be mainly attributed to the lack of knowledge on the importance of full immunization leading to high drop out rates and also but to a least extent to the number of invalid doses and uncorrected missed opportunities.

#### **The dropout rates**

The high drop out rates could be reduced to acceptable levels<sup>5,6,9</sup> by:

- providing better counseling to parents/caretakers about the importance of each child receiving all the required antigens before 12 months. They also require advise about when and where they should take their child for the next dose. Most children will need to attend 4 immunization sessions. 47% of the children dropped out simply because their parents/caretakers did not know that they were required to return to the EPI center for subsequent doses.
- undertaking appropriate Behavior Change Communication (BCC) activities through the mass media and service providers to increase awareness of the need for children to receive all the doses of each of the antigens.
- providing refresher training and orientation to the service providers for counseling parents. It is apparent from the results of the survey that they lack the relevant technical skills and/or motivation for counseling. Some parents reported that they had never received any immunization information from a health worker and others complained that they had not been spoken to at all.

### **Coverage levels for TT vaccination**

Access to TT vaccine (TT1) was fairly good but the rate of drop out after the second dose was very high. The coverage of 64% for TT1 reduced to 20% for TT5 and 36% had not been immunized at all. A woman of reproductive age needs to receive 5 doses of TT at appropriate intervals to acquire immunity for rest of her reproductive life. TT coverage is likely to be improved by:

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

### **Status of first round of seventh NID campaign and child to child search**

The coverage levels of the seventh NID campaign were at a satisfactory level (84% of the children received OPV during first round of NIDs). Universal coverage could not be achieved even through child to child search for vaccinating the children who did not receive OPV during the day of NID. This occurred as only 63% of the households were visited instead of all houses in Rangpur municipality. Non visitation of the households apparently was an administrative issue and needs to be solved at local level.

## 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.
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11. 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 C

### EPI Coverage Survey in Rangpur Municipality

List of clusters identified for survey

Mouza/area	Population	Cluster Number
Bhagi (Part A)	3146	1
Dhap	11416	2,3
Hanumantola (Part)	1212	4
Kellaband	5661	5
Kukrul (Part A)	950	6
Nilkanta (Part A)	765	7
Radhaballabh	1569	8
Satgara	7609	9
Alamnagar colony	15915	10,11,12
Mulatoli	5622	13
Senpara	5365	14
Hanumantoal (Part)	3604	15
Jumma para	10484	16
Mistry para	2499	17
Gupta para	4655	18
Kamal Kachna	11309	19,20
Alamnagar (Part)	21386	21,22,23
Babupara Asratpur	6824	24
Chaketary	1967	25
Nurpur	3332	26
Robartson ganj	7181	27
Dimla	2285	28
Goshaibari	1982	29
Mahiganj	3346	30

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## List of IOCH Survey/Research/Technical Reports

### Survey Reports

1. Vaccination Coverage Survey of the Slums of Rajshahi City Corporation- January 2000. Survey Report No. 1. May 2000
2. Vaccination Coverage Survey of the Selected Unions along the North-western Border of Bangladesh- February 2000. Survey Report No. 2. June 2000
3. Vaccination Coverage Survey of the Selected Unions along the South-west Border of Bangladesh- February 2000. Survey Report No. 3. July 2000
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8. Vaccination Coverage Survey of Chittagong Hill Tracts - February 2000. Survey Report No. 08, August 2000

### Technical Report

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

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*Additional copies of any of these reports, if needed, will be provided free of cost on request to:*

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