



**IOCH**  
**Immunization and Other Child Health Project**

**Vaccination Coverage Survey of the  
Bhola Municipality**

**October 2001**

**Survey Report No. 48**

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## Table of Contents

List of tables and charts	2
Acronyms	3
Terminology	4
<b>Summary Results</b>	<b>5</b>
Background	5
Objectives	5
Methodology	5
Routine immunization coverage levels of children	6
Routine TT immunization coverage levels of women	6
Coverage levels of the 9 <sup>th</sup> NID campaign	7
Suggested solutions	7
Map showing the locations of the selected clusters	8
Tables and Charts	9
<b>Annexures</b>	
Annex A: EPI Cluster Survey design (extracts from an article written by Anthony G Turner, Robert J Magnani and Muhammed Shuaib)	15
Annex B: List of selected clusters for the survey	16
Annex C: List of never vaccinated children by clusters	17
Acknowledgements	18
List of IOCH reports	19

## **List of Tables**

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

**Table 2:** Invalid doses of immunization provided to the children

**Table 3:** Missed opportunities by antigens

**Table 4:** EPI Card availability and retention

**Table 5:** Distance between the child's home and the vaccination site

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

**Table 7:** Reasons for non-immunization and partial immunization for TT of the women

**Table 8:** Coverage of the 9<sup>th</sup> NID Campaign

**Table 9:** Reasons for non-immunization of OPV during the 9<sup>th</sup> NID campaign

## **List of Charts**

**Chart 1:** Drop-out rate for childhood immunization

**Chart 2:** Sources of childhood immunization services

**Chart 3:** Respondent's knowledge about required visits to immunization centers

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

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

**Chart 6:** Providers of TT immunization

**Chart 7:** Sources of information about the 9<sup>th</sup> 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
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 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.

**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*.

## SUMMARY RESULTS

### Background

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 municipal authorities are primarily responsible for providing and/or coordinating primary health care including routine EPI services in municipal areas. However, in the absence of an effective management information system and reliable service statistics at municipal level, it is often difficult to assess the level of immunization coverage of the municipalities. In view of this situation, the IOCH decided to conduct a series of coverage evaluation surveys in the selected municipal areas to assess the level of immunization coverage in these municipal areas. As a part of this effort, the IOCH conducted a coverage evaluation survey in the Bhola Municipality in October 2001.

### Objectives

The overall objective of the survey was to assess the level of immunization coverage in the Bhola 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 coverage levels of OPV and Vitamin A administered during the 9<sup>th</sup> NID campaign.

### Methodology

The survey employed the WHO recommended 30-cluster survey methodology that has been widely used in many developing countries to assess immunization coverage (the survey methodology and its limitations are presented in Annex A). In all, 30 clusters were randomly selected from the Bhola Municipality following PPS sampling procedures. A list of the selected clusters is provided in Annex- B and their locations are shown on the maps in page 8. From each cluster, 7 children 12 – 23 months and 7 women of reproductive age (15 – 49 years) irrespective of their marital status were selected following 30 cluster survey methodology to ascertain their routine immunization coverage. Also, 7 children < 5 years (0 – 59 months) were selected to assess the immunization coverage of the 9<sup>th</sup> National Immunization Campaign.

The WHO standard questionnaires were used for documenting the routine immunization status of the children and women. Also, separate questionnaires were used to collect data on NIDs and reasons for non-immunization and dropouts. The data were collected by the experienced Field Investigators of the Survey Team of the IOCH. Data processing and analysis were done by the Monitoring & Evaluation Unit of the IOCH using COSAS 4.41<sup>1</sup> and EpiInfo.

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<sup>1</sup> COSAS (Coverage Survey Analysis System) is a dedicated software for analyzing coverage evaluation survey data.

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

*Access:* Based on crude data (card plus history), 98% children received at least one dose of antigen (DPT 1<sup>st</sup> dose in this case) from routine immunization sessions. Only 2% children did not receive a dose of any antigen.

*Crude coverage between 12-23 months:* 97% children received BCG, 93% children received three doses of OPV, 93% received three doses of DPT and 88% received measles vaccine. 87% children were fully immunized.

*Valid coverage between 12-23 months:* 97% children received BCG, 78% children received three doses of OPV, 78% received three doses of DPT and 88% received measles vaccine. 74% children were fully immunized.

*Valid coverage by 12 months:* 97% children received BCG, 76% children received three doses of OPV, 76% received three doses of DPT and 83% received measles vaccine. 70% children were fully immunized.

*Source of immunization and distance of immunization center:* Childhood immunization in this area was provided mostly by the GOB EPI outreach centers (39%), followed by the GOB hospitals and clinics (38%). NGO clinics provided immunization to 23% cases only. All the EPI outreach centers were located within half an hour walking distance from the homes of the children.

*Reasons for non-immunization and partial immunization or dropout of children:* The primary reasons for non-immunization of children, as cited by the parents, included lack of awareness of need and importance of immunization (25%), fear of adverse reaction (25%), sickness of children (25%) and social/religious barrier (25%). As regards reasons for partial immunization or dropout, over one-fourth of the parents (30%) reported sickness of their children. The other reasons for partial immunization or dropout cited by the parents included lack of knowledge of need for second or subsequent doses to get their children fully immunized (13%) and unavailability of vaccine at the vaccination session (13%).

*Problems detected:* Although access to immunization was high, there was 5% dropout from DPT1 to DPT3 and 11% from DPT1 to Measles vaccine. There were also a number of invalid doses due to early immunization (11% for DPT1, 3% for DPT2, and 1% for DPT3). However, prevalence of uncorrected missed opportunity for different antigens was low (1%). Child immunization cards (EPI Cards) were ever given to 98% of the children; but they were available at the time of interview in 53% of the cases. EPI Card retention rate was 54%, which means that 46% of the EPI cards were lost. About 43% of the parents could mention correctly the number of times (i.e. 4 times) their children needed to visit the immunization centers to get fully immunized.

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

The survey of coverage levels for immunization against tetanus toxoid showed that about 92% of women of reproductive age (15-49 years) received a first dose of TT; 89% received two doses; and 39% received 5 doses of the TT vaccine. About 8% women never received any TT vaccine.

*Dropout rate for TT immunization:* The dropout rate for TT immunization among the women of reproductive age was quite high. The dropout rate for TT1 to TT2 was 4%, TT2 to TT3 was 18%, TT3 to TT4 was 23% and TT1 to TT5 was 58%. It implies that 58% of those women who received TT1 dose did not get fully immunized for life protection against tetanus.

*Sources of TT immunization:* Majority of the women (49%) received TT vaccine from GOB EPI outreach centers, followed by GOB hospitals and clinics (35%). NGO clinics provided TT immunization to 16% cases and private clinics to 1% cases only.

*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 (41%). About one-third of the women cited fear of pain of TT injection as reason for not receiving any dose of TT vaccine; while one-fourth of the women mentioned that there was no provision of TT vaccine when they had their pregnancies. The major reasons for partial immunization or dropout were that the women did not know that they needed subsequent doses to get fully immunized (39%) or they were told by the health workers that 2 or 3 doses were enough for them for their pregnancies, and they were not advised (by health worker) for full immunization (26%).

### **Coverage levels for the 9<sup>th</sup> NID campaign**

During the 9<sup>th</sup> NIDs, 97% of the children <5 years received OPV in both the rounds. The coverage for OPV in the 1st Round was 99%; while it was 98% in the 2<sup>nd</sup> Round. Vitamin A capsules were given to 92% of the eligible children during the 9<sup>th</sup> NID campaign

As regards primary reasons for not receiving OPV during the 9<sup>th</sup> NIDs, majority of the parents reported that they waited for the health workers/vaccinators to visit their homes to vaccinate their children during the campaign, but the worker did not come. Over one-third of the parents were not aware of the 2<sup>nd</sup> Round of the NID Campaign.

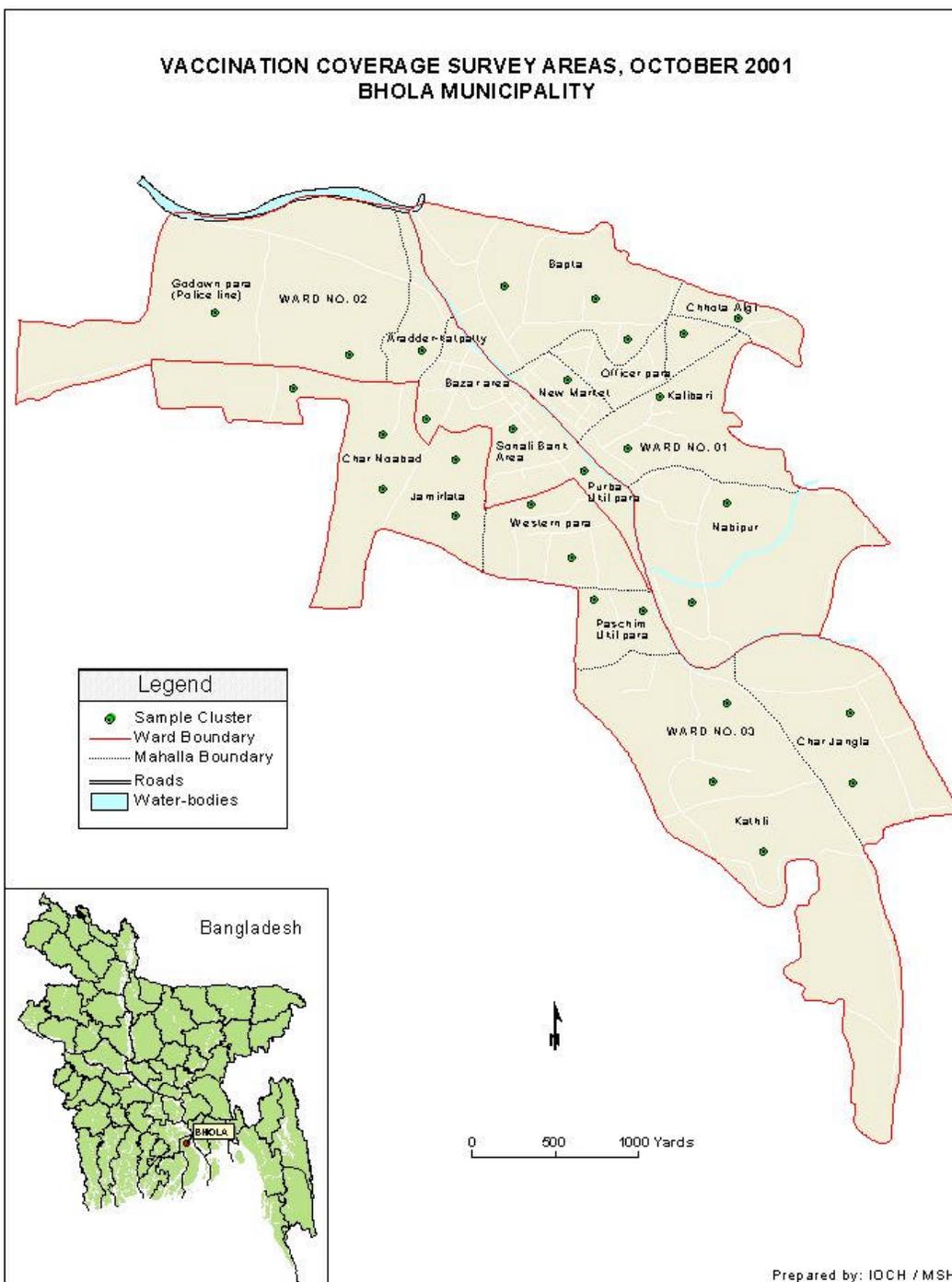
Majority of the parents learned about the NID campaign from miking (65%), followed by IPC during home visit by the GOB/municipal field workers (61%). Television/radio as a source of information was cited by 22% of the parents; while 23% came to know about the NIDs from other family members/ neighbors.

### **Suggested solutions**

The survey indicates the need for appropriate BCC activities and counseling to make the parents/caretakers understand the importance of full immunization of their children. The information must stress that each child, irrespective of sex, must be fully immunized before 12 months of age, and how to achieve full immunization (the time and place of the immunization sessions and the number of doses required). All women of childbearing age must be informed about how to prevent tetanus with 5 doses of TT vaccination to protect herself and her newborn child.

The poor quality of services, as reflected by the percentage of invalid doses (11% for DPT1, 3% for DPT2 and 1% for DPT3) and moderate dropout rates (5% for DPT1 to DPT3 and 11% for DPT1 to measles) could be further improved by proper screening of eligibility of clients for each antigen at the time of vaccination, and by adequate counseling of mothers. There is also a need to further train the service providers to help them keep up with EPI policies and guidelines and increase their capacity for counseling parents and women of reproductive age about EPI.

VACCINATION COVERAGE SURVEY AREAS, OCTOBER 2001  
BHOLA MUNICIPALITY



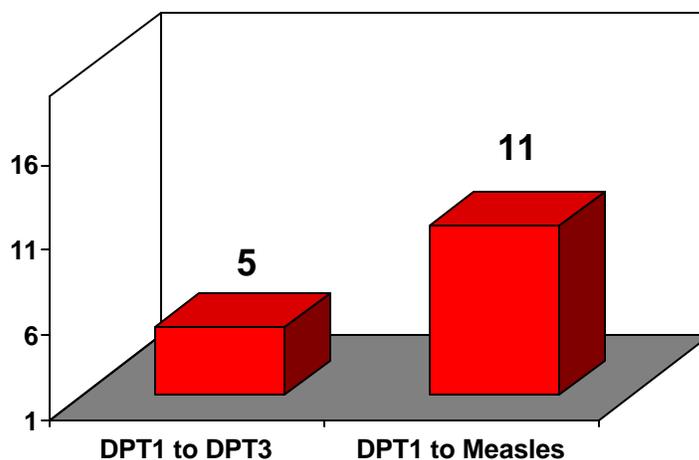
Prepared by: IOCH / MSH

## TABLES AND CHARTS

**Table 1: Routine immunization coverage levels of the 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	97	97	97
OPV1	98	87	86
OPV2	96	81	80
OPV3	93	78	76
DPT1	98	87	86
DPT2	96	81	80
DPT3	93	78	76
Measles	88	88	83
Fully immunized	87	74	70
Zero Dose	2	-	-

**Chart-1: Drop-out rate for childhood immunization**



**Table 2: Invalid doses of immunization provided to the children**

Antigens	Percentage
DPT1	11
DPT2	3
DPT3	1
Measles	0

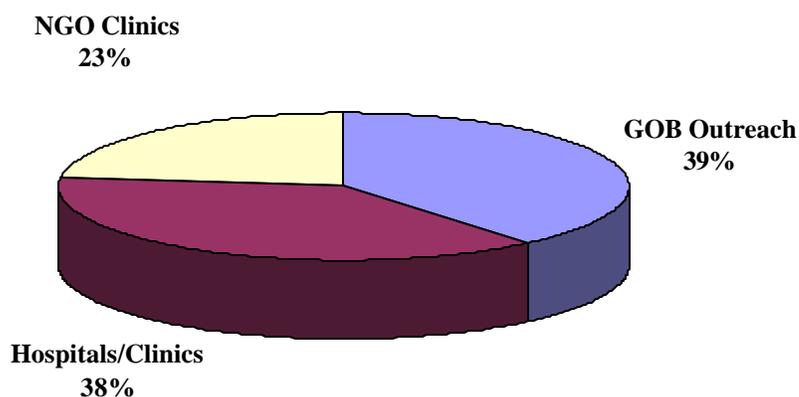
**Table 3: Missed opportunities by antigens**

Name of the vaccine	Uncorrected		Corrected	
	Number	Percent	Number	Percent
BCG	3	1	9	4
DPT1	3	1	5	2
DTP2	1	.5	5	2
DPT3	1	.5	4	2
OPV1	3	1	5	2
OPV2	1	.5	5	2
OPV3	1	.5	4	2
7Measles	2	1	1	.5

**Table 4: EPI card availability and retention**

Card Status	Number	Percentage
EPI card available	111	53
EPI card ever given	205	98
EPI card retention	111	54

**Chart 2: Sources of childhood immunization services**



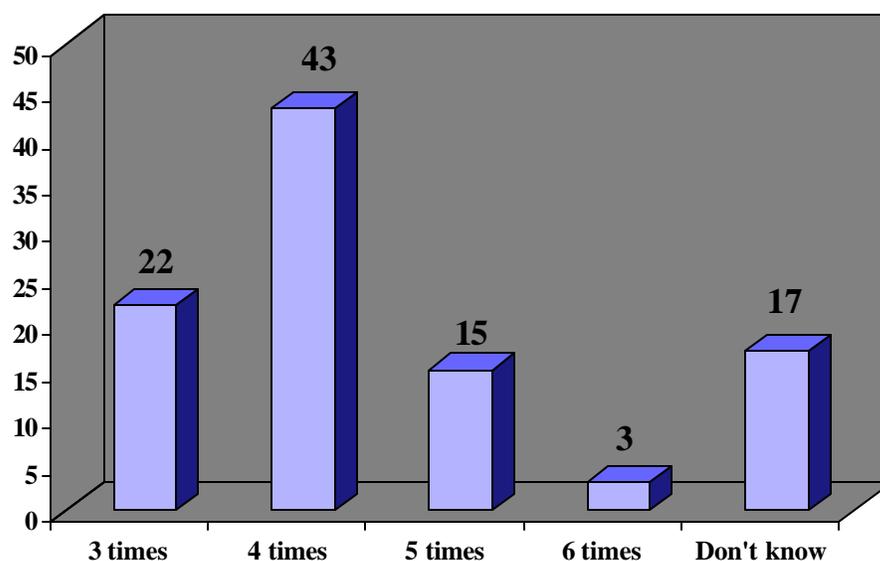
**Table 5: Distance between the child's home and the vaccination site**

Time (Minutes)	Number	Percentage
1-5 Min.	111	53
6-10 Min.	90	43
11-30 Min.	9	4
Total	210	100

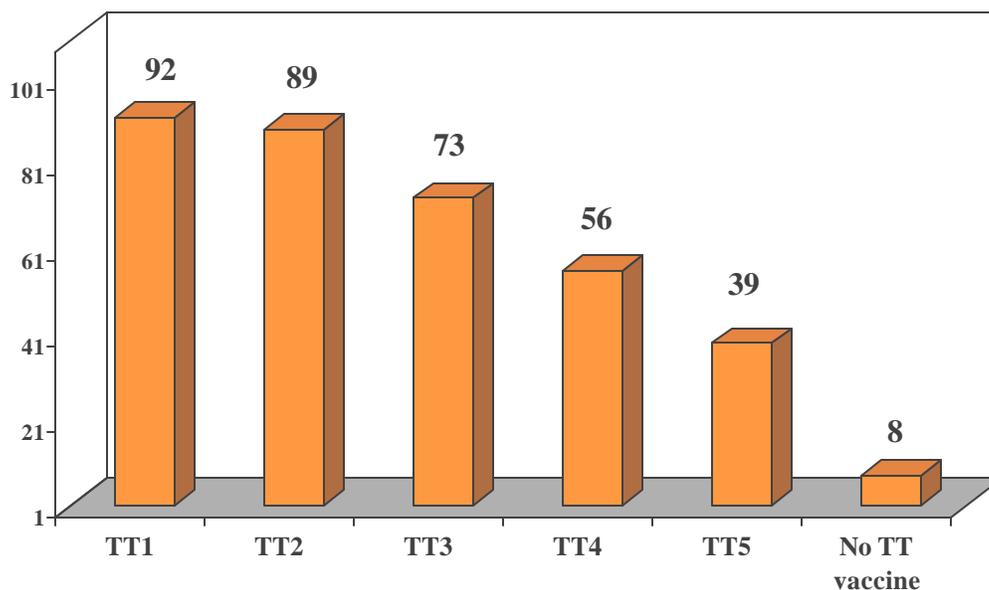
**Table 6: Reasons for non-immunization and partial immunization of the children**

Reasons	Non-immunized (%) (N=4)	Partially immunized (%) (N=23)
Did not know about need of immunization	25	-
Did not know about need of second dose	-	13
Did not know when to return for 2 <sup>nd</sup> /3 <sup>rd</sup> dose	-	9
Fear of adverse reaction	25	9
Rumors against vaccination	-	4
Vaccine was not available at the site	-	13
Family problem/mother sick	-	4
Child sick, was not taken to site	25	30
Social/religious barrier	25	-
Child sick, was taken to site but not given vaccine	-	4
Child not at home or away from home	-	9
Others	-	4

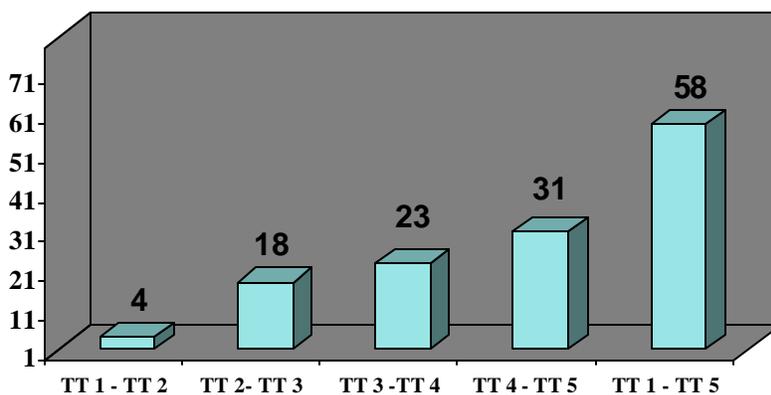
**Chart 3: Respondents' knowledge about required visits to immunization centers**



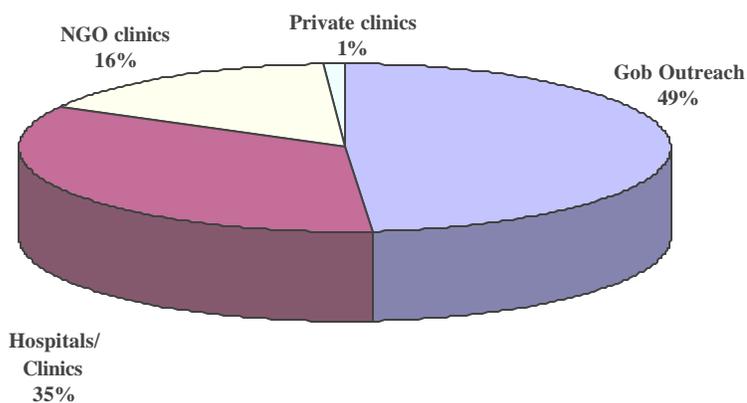
**Chart 4: Routine immunization coverage levels for TT of women (15-49 years)**



**Chart 5: TT Immunization drop-out rate among women 15-49 years**



**Chart 6: Providers of TT immunization**



**Table 7: Reasons for non-immunization and partial immunization for TT of the women**

Reasons	Non-immunization (%) (N=17)	Partially immunization (%) (N=111)
Next dose is not yet due	-	15
Don't feel need for immunization	41	-
Health worker did not specify the next dose	-	7
As per HW advice 2/3 TT is enough during the pregnancy	-	26
Unaware of need of next dose	-	39
In our times TT immunization was not in practice	24	-
Fear of injection	35	5
Postponed until another time		4
Women ill, not brought	-	5

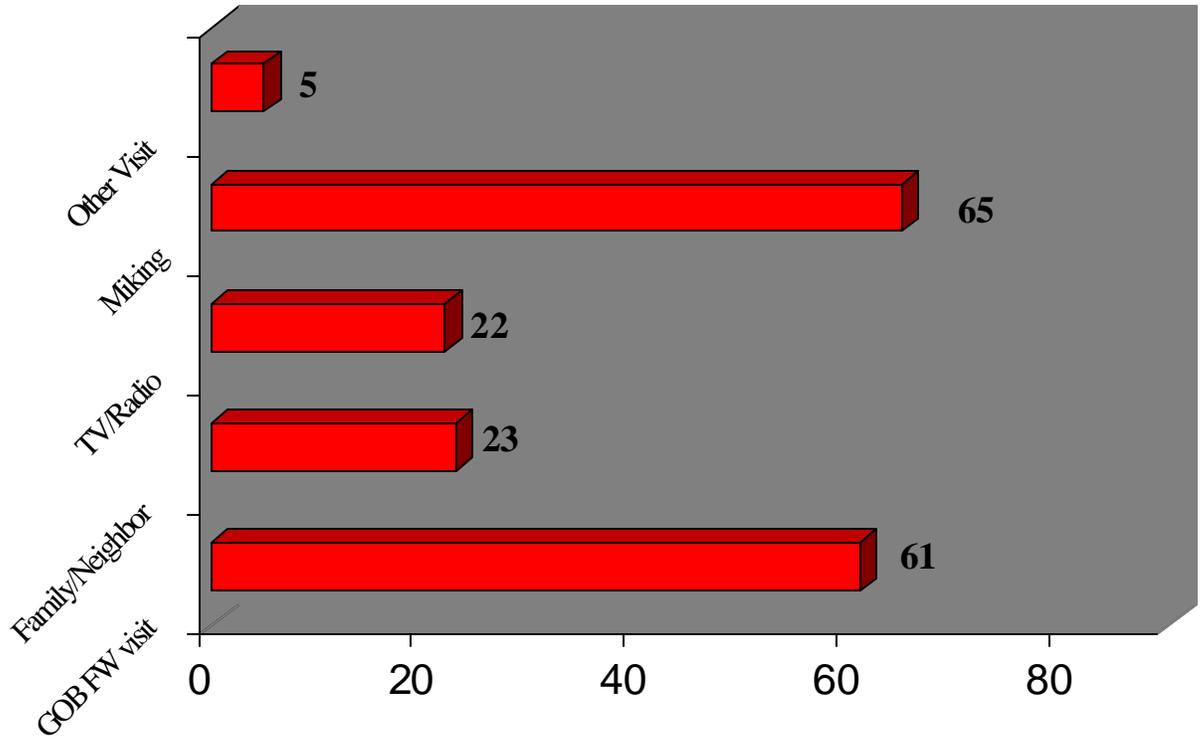
**Table 8: Coverage of the 9<sup>th</sup> NID Campaign**

Round	OPV %	Vit "A" %
1 <sup>st</sup> round	99	-
2 <sup>nd</sup> round	98	92
Both rounds	97	-
Any round	99	-

**Table 9: Reasons for non-immunization of OPV during 9<sup>th</sup> NID campaign**

Reasons	1 <sup>st</sup> Round %	2 <sup>nd</sup> Round %
Did not know about NID	14	36
Too busy	-	14
Already vaccinated 1 <sup>st</sup> round	-	7
Away from home	-	7
Waited for house visit	57	29
Others	29	7

**Chart 7: Source of information about the 9<sup>th</sup> NID campaign**



## 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."

**List of Selected Clusters for the Survey**

Sl No.	Ward no.	Mahalla name	Total HH	Total Population	Cluster No
1	1	Chhota algi	288	1821	1 – 2
2		Bapta (part)	565	3385	3 – 5
3		Kalibari	311	1851	6 – 7
4		Nabipur	452	2735	8 – 9
5		New market	116	791	10
6	2	Aradder katpatty	65	375	11
7		Char jangla (part)	179	595	12
8		Char noabad (part)	418	2555	13 – 14
9		Purba ukilpara	164	824	15
10		Godown para	299	1918	16
11		Sonali bank area	120	598	17
12	3	Char janglia (part)	517	2696	18 – 19
13		Charnoabad (part)	552	3123	20 – 22
14		Kathali (part)	431	2523	23 – 24
15		Paschim ukilpara	294	1846	25 – 26
16		Western para	430	2399	27 – 28
17		Jamirlata	438	2808	29 – 30

### List of Never Vaccinated Children Identified by Clusters

Sl No.	Ward no.	Mahalla name	Total HH	Total Population	Cluster No	Never vaccinated children
1	1	Chhota algi	288	1821	1 - 2	-
2		Bapta (part)	565	3385	3 - 5	-
3		Kalibari	311	1851	6 - 7	1
4		Nabipur	452	2735	8 - 9	-
5		New market	116	791	10	-
6	2	Aradder katpatty	65	375	11	-
7		Char jangla (part)	179	595	12	-
8		Char noabad (part)	418	2555	13 - 14	-
9		Purba ukilpara	164	824	15	-
10		Godown para	299	1918	16	1
11		Sonali bank area	120	598	17	-
12	3	Char janglia (part)	517	2696	18 - 19	-
13		Charnoabad (part)	552	3123	20 - 22	-
14		Kathali (part)	431	2523	23 - 24	-
15		Paschim ukilpara	294	1846	25 - 26	-
16		Western para	430	2399	27 - 28	-
17		Jamirlata	438	2808	29 - 30	2

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**Survey coordination:**

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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
4. Vaccination Coverage Survey of the Slums of Khulna City Corporation- January 2000. Survey Report No. 4. July 2000
5. Vaccination Coverage Survey of the Slums of Chittagong City Corporation- January 2000. Ward Number 1 to 18. Survey Report No. 5. July 2000
6. Vaccination Coverage Survey of the Slums of Chittagong City Corporation- January 2000. Ward Number 19 to 41. Survey Report No. 6. July 2000
7. Vaccination Coverage Survey of the Dinajpur Municipality- January 2000. Survey Report No. 7. July 2000
8. Vaccination Coverage Survey of the Noakhali Municipality- January 2000. Survey Report No. 8. July 2000
9. Vaccination Coverage Survey of the Slums of Dhaka City Corporation- January 2000. Dhaka Slums of Zones 1, 2 & 4. Survey Report No. 9. July 2000
10. Vaccination Coverage Survey of the Slums of Dhaka City Corporation- January 2000. Dhaka Slums of Zones 5, 6 & 7. Survey Report No. 10. July 2000
11. Vaccination Coverage Survey of the Slums of Dhaka City Corporation- January 2000. Dhaka Slums of Zones 3, 8, 9 & 10. Survey Report No. 11. July 2000
12. Vaccination Coverage Survey of the Tribal and Non-tribal Populations in the North-east Border Areas of Bangladesh. Survey Report No. 12. August 2000
13. Vaccination Coverage Survey of the Sylhet Municipality – January 2000. Survey Report No. 13. August 2000.
14. Vaccination Coverage Survey of the Kishoreganj Municipality – April 2000. Survey Report No. 14. September 2000.
15. Vaccination Coverage Survey of the Rangpur Municipality – May 2000. Survey Report No. 15. September 2000.
16. Vaccination Coverage Survey of the Greater Faridpur Municipalities – June 2000. Survey Report No. 16. September 2000.
17. Results of Coverage Evaluation Survey of Routine EPI and August 2000 OPV + TT (NNT) Campaign, Chittagong, Khulna and Rajshahi City Corporation Slums – September 2000. Survey Report No. 17. November 2000.
18. Results of Coverage Evaluation Survey of Routine EPI and August 2000 OPV + TT (NNT) Campaign, Dhaka City Corporation Slums – September 2000. Survey Report No. 18. November 2000
19. Results of Coverage Evaluation Survey of Routine EPI and August 2000 OPV + TT (NNT) Campaign, Slums of selected 27 Municipalities– September 2000. Survey Report No. 19. November 2000
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23. Vaccination Coverage Survey of the Jessore Municipality – October 20-30, 2000. Survey Report No. 23. February 2001.
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27. Vaccination Coverage Survey of the Bogra Municipality - February 2001. Survey Report No. 27. April 2001
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29. Vaccination Coverage Survey of the Peri-urban Areas of DCC- Nov. 2000 (Peri-urban Area Survey-2). Survey Report No. 29. July 2001
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33. Vaccination Coverage Survey of the Tongi Municipality- March 2001. Survey Report No. 33. July 2001
34. Vaccination Coverage Survey of the Tangail Municipality- March 2001. Survey Report No. 34. July 2001
35. Vaccination Coverage Survey of the Savar Municipality- May 2001. Survey Report No. 35. July 2001
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1. Vaccination Coverage Survey of the Teknaf and Ukhia Upazilas- February 2000. Survey Report No. 01, August 2000
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7. Vaccination Coverage Survey of the Gangachara Upazila - February 2000. Survey Report No. 07, August 2000
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### **Technical Report**

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

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