



IOCH
Immunization and Other Child Health Project

**Vaccination Coverage Survey of the
Expanded Areas of the Proposed Barisal
City Corporation**

June 2001

Survey Report No. 38

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Acronyms

BCC	Behavior Change Communication
BCG	Bacillus of Calmette and Guerin
CES	Coverage Evaluation Survey
COSAS	Coverage Survey Analysis System
DPT	Diphtheria, Pertussis and Tetanus
EPI	Expanded Program on Immunization
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. Valid data includes only the doses of vaccines that were given after the minimum date of eligibility and/or after the minimum interval necessary to be effective and to protect the child. There is no maximum interval for a dose and therefore a dose administered after 52 weeks is still regarded as valid. By comparing crude coverage with valid coverage data of any particular antigen, one can determine how much coverage was lost due to the inability to give vaccine at the appropriate time.

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

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

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

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

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

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 expanded areas (excluding the existing Barisal municipal area) of the proposed Barisal City Corporation in June 2001.

Objectives

The overall objective of the survey was to assess the level of immunization coverage in the expanded areas (excluding the existing municipal areas) of the proposed Barisal City Corporation. 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 9th 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 expanded areas (excluding the existing municipal area) of the proposed Barisal City Corporation 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 9th 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 4.41¹ and EpiInfo.

¹ 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), 97% children received at least one dose of antigen (DPT 1st dose in this case) from routine immunization sessions. Only 3% children did not receive a dose of any antigen.

Crude coverage between 12-23 months: 97% children received BCG, 91% received three doses of OPV, 91% received three doses of DPT and 83% received measles vaccine. 83% children were fully immunized.

Valid coverage between 12-23 months: 97% children received BCG, 74% received three doses of OPV, 74% received three doses of DPT and 76% received measles vaccine. 66% children were fully immunized.

Valid coverage by 12 months: 96% children received BCG, 73% received three doses of OPV, 73% received three doses of DPT and 72% received measles vaccine. 58% children were fully immunized.

Source of immunization and distance of immunization center: Childhood immunization in this area was provided mostly by the GOB outreach centers (77%), followed by the hospitals and clinics (20%). NGO clinics provided immunization to 3% 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 of children: About 43% of the parents of the non-immunized children did not know that their children needed to be vaccinated for protection from six diseases. The other reasons for non-immunization were inconvenient location of the vaccination center (29%), fear of adverse reaction to immunization (14%) and family problem/sickness of mother (14). As regards reasons for partial immunization or dropout, one-fourth of the parents cited sickness of their children as a reason for dropout. 18% parents reported that they did not know that their children needed to be brought again to the vaccination centers for subsequent doses to get fully immunized. The other reasons for dropout as cited by the parents were that the parents did not know when to come to the EPI center for measles vaccine (11%) and that the parents were busy with work (11%).

Problems detected: Although access to immunization was quite high, there was 6% dropout from DPT1 to DPT3 and 14% from DPT1 to Measles vaccine. There were also a number of invalid doses due to early immunization (10% for DPT1, 3% for DPT2 and 4% for DPT3 and 9% for measles vaccine). However, prevalence of uncorrected missed opportunity was low (ranging from 0 for DPT2 to 2% for DPT3 only). Child immunization cards (EPI Cards) were ever given to 97% of the children; but they were available at the time of interview in 39% of the cases. EPI Card retention rate was 40%, which means that 60% of the EPI cards were lost. About one-third of the parents (34%) 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 83% of women of reproductive age (15-49 years) received a first dose of TT; 81% received two doses; and 31% received 5 doses of the TT vaccine. 17% 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 3%, TT2 to TT3 was 33% and TT1 to TT5 was 62%. It implies that 62% of those women who received TT1 dose did not get fully immunized for life-long protection against tetanus.

Sources of TT immunization: Majority of the women received TT vaccine from GOB outreach centers (58%), followed by hospitals and clinics (30%). NGO clinics provided TT immunization to 10% cases and private clinics provided to 2% cases only.

Reasons for non-immunization and partial immunization of women: The main reason cited for non-immunization was that the women were unaware of the need for immunization (57%). About one-fourth of the women mentioned that there was no provision of TT vaccine when they had their pregnancies, while 6% women did not know the place and time of immunization session. The major reasons for partial immunization or dropout were that either the health worker did not specify when to return for the next dose of TT vaccine (36%) or the women were not aware of the need to return for subsequent doses of TT immunization (21%).

Coverage levels for the 9th NID campaign

During the 9th NIDs, 96% of the children <5 years received OPV in both the rounds. The coverage for OPV in the 1st round was 97%: while it was one percentage point higher in the 2nd round. Vitamin A capsules were given to 91% of the eligible children during the 8th NID campaign

The primary reasons for not accepting OPV during the 9th NIDs, as cited by the parents, included lack of knowledge about NIDs, children were away from home or parents were busy with other work on the day of NIDs.

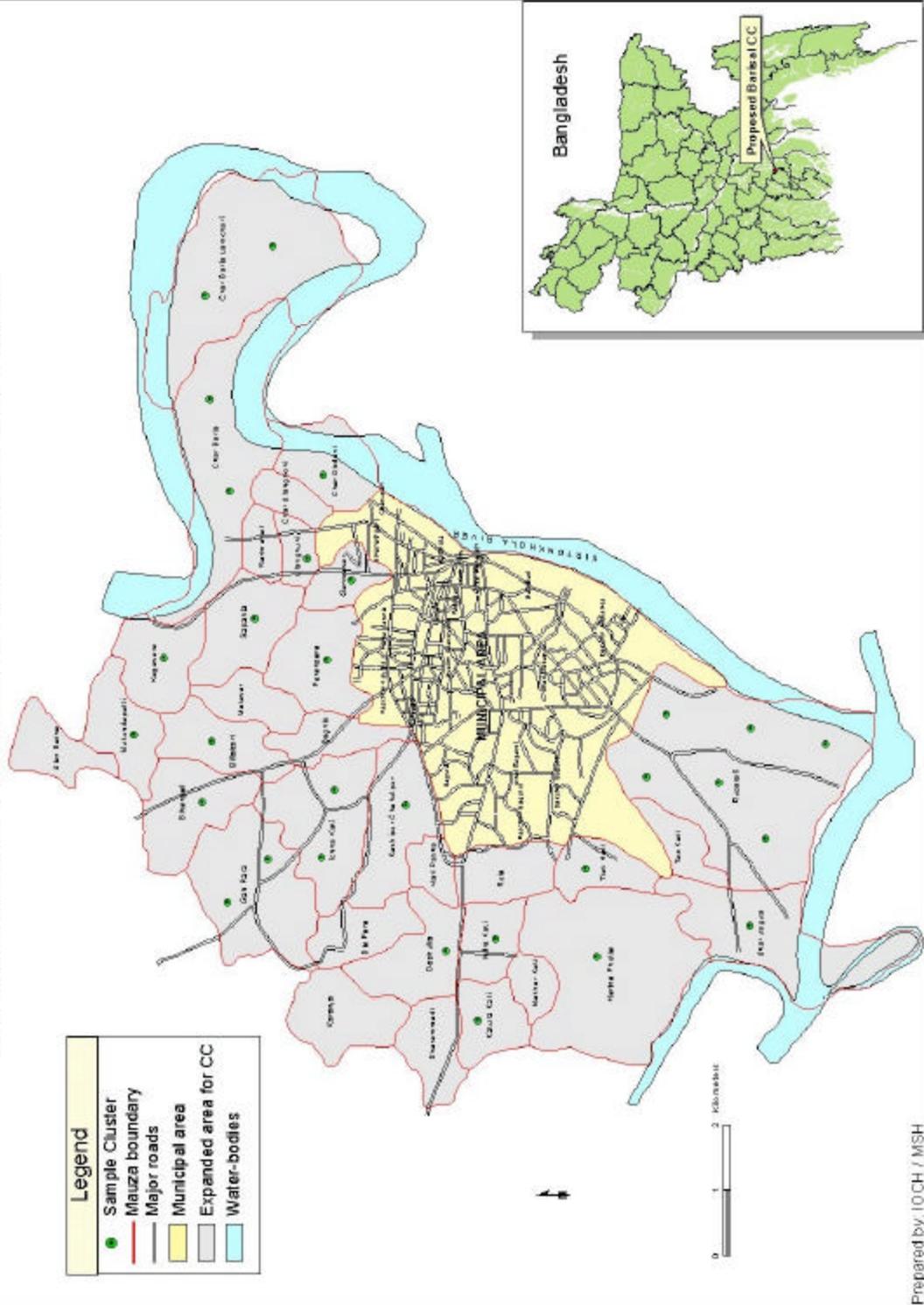
Majority of the parents learned about the NID campaign from IPC during home visit by the GOB/municipal field workers (78%), followed by miking (31%). Television/radio as a source of information was cited by (22%) of the parents; while 21% reported that they came to know about the NIDs from their relatives and 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 (10% for DPT1, 3% for DPT2, 4% for DPT3 and 9% for measles) and dropout rates (6% for DPT1 to DPT3 and 14% 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, JUNE 2001
 EXPANDED AREAS OF THE PROPOSED BARISAL CITY CORPORATION



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	96
Polio-1	97	87	87
Polio-2	93	80	79
Polio-3	91	74	73
DPT-1	97	87	87
DPT-2	93	80	79
DPT-3	91	74	73
Measles	83	76	72
Fully immunized	83	66	58
Zero Dose	3	-	-

Chart-1: Drop-out rate for childhood immunization

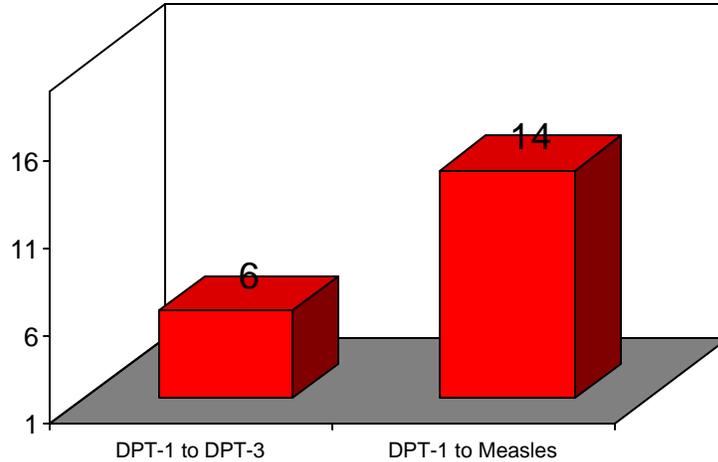


Table 2: Invalid doses of immunization provided to the children

Invalid doses	Percentage
DPT-1	10
DPT-2	3
DPT-3	4
Measles	9

Table 3: Missed opportunities by antigens

Name of the vaccine	Uncorrected		Corrected	
	Number	Percent	Number	Percent
BCG	2	1	7	3
DPT-1	2	1	3	1
DTP-2	0	-	3	1
DPT-3	4	2	3	1
OPV-1	2	1	3	1
OPV-2	0	-	3	1
OPV-3	4	2	3	1
Measles	1	1	1	1

Table 4: EPI card availability and retention

Card Status	Number	Percentage
EPI card available	81	39
EPI card ever given	203	97
EPI card retention	81	40

Chart 2: Sources of childhood immunization services

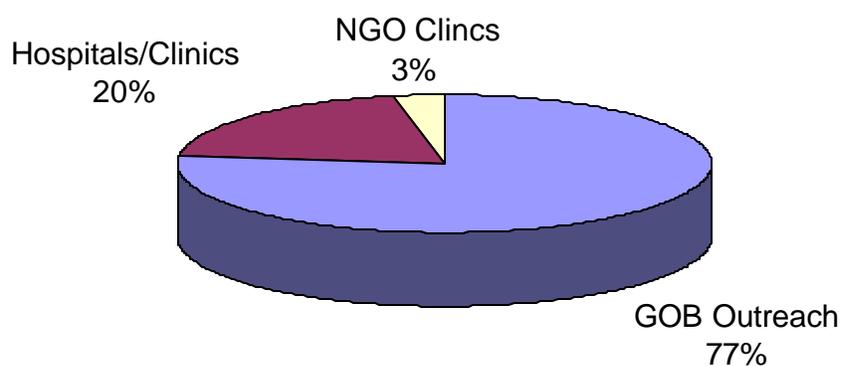


Table 5: Distance between the child's home and the vaccination site

Time (Minutes)	Number	Percentage
1-5 Min.	76	36
6-10 Min.	117	56
11-30 Min.	17	8
Don't know	0	

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

Reasons	Non- immunized (%) (N=7)	Partially immunized (%) (N=28)
Did not know about need to vaccinate the child	43	-
Did not know that the child needs to receive the 2 nd /3 rd doses	-	18
Did not know about importance of Measles vaccine	-	4
Did not know when to return for measles	-	11
Did not know about place and time of immunization	-	4
Fear of adverse reaction	14	-
Vaccination site was too far way	29	4
Planning to vaccinate future	-	4
Mother too busy	-	11
Vaccinator was not available at the site	-	4
Child sick, was not taken to site	-	25
Family problem/mother sick	14	4
Child sick, was taken to site but not given vaccine	-	4
Others	-	11

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

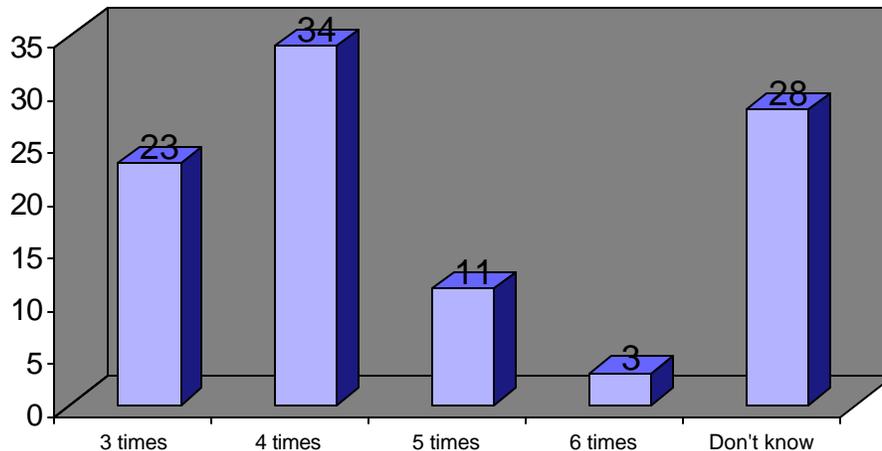


Chart 4: Routine immunization coverage levels for TT of women (15-49 years)

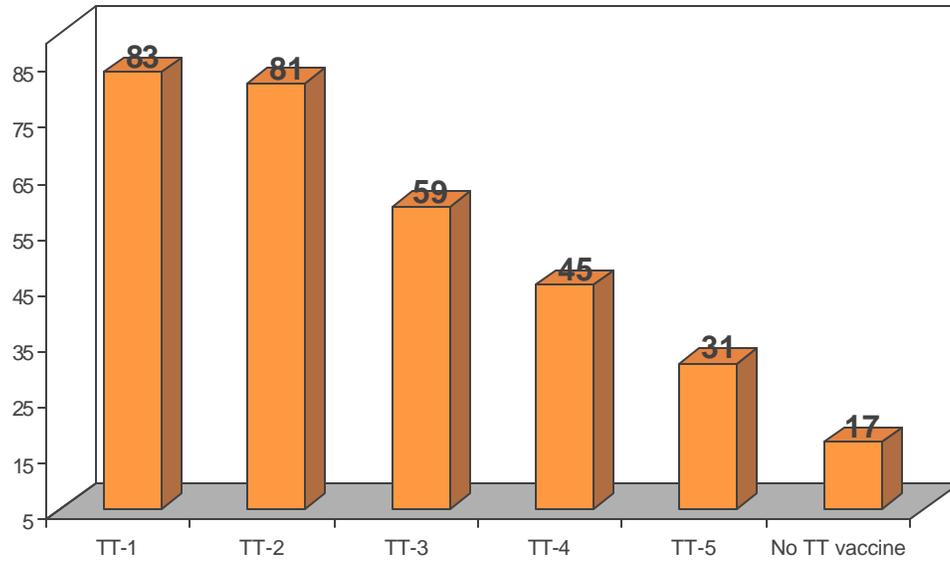


Chart 5: TT Immunization drop-out rate among women 15-49 years

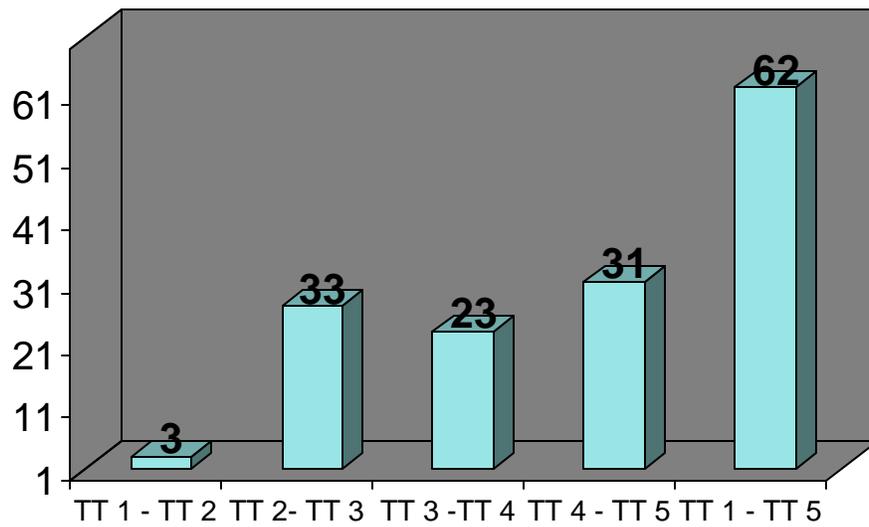


Chart 6: Providers of TT immunization

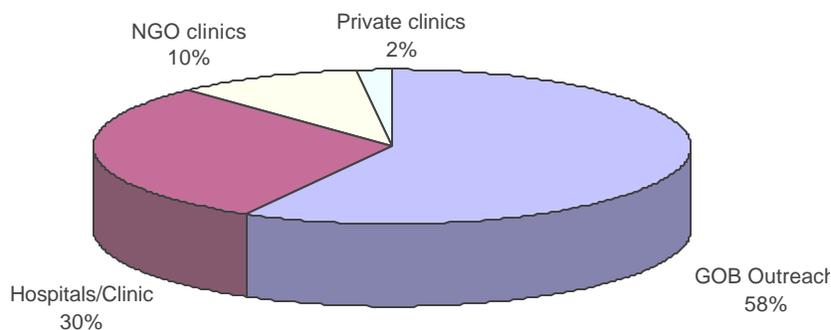


Table 7: Reasons for non-immunization and partial immunization for TT of the women

Reasons	Non- immunized (%) (N=35)	Partially immunized (%) (N=109)
Next dose is not yet due	-	5
Don't feel need for immunization	57	-
Health worker did not specify the next dose	-	36
According to health worker 2/3 doses of TT is enough during pregnancy	-	33
Place and/or time of immunization unknown	6	-
Unaware of need to return for subsequent doses	-	21
In our times TT immunization was not in practice	26	-
Fear of injection	6	-
Fear of adverse reaction	3	2
Postponed until another time	-	1
Too busy with households work	-	1
Women ill, not brought	-	1
Others	3	1

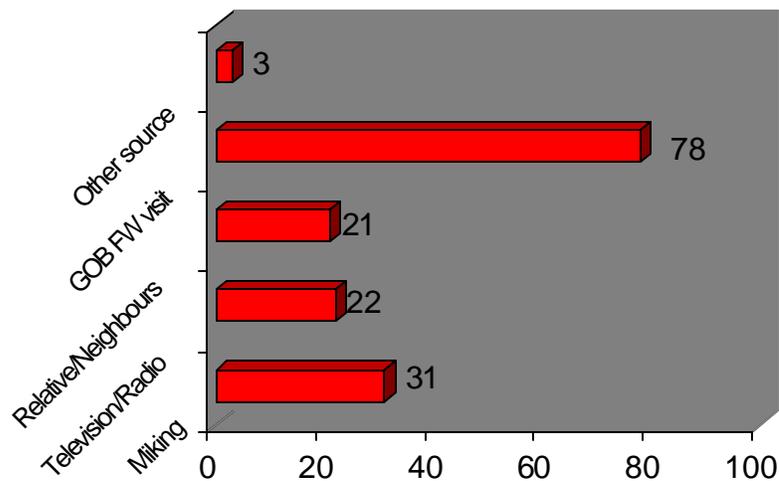
Table 8: Coverage of the 9th NID Campaign

Round	OPV %	Vit "A" %
1 st round	97	-
2 nd round	98	91
Both rounds	96	-
Any round	99	-

Table 9: Reasons for non-immunization of OPV during 9th NID campaign

Reasons	1 st Round %	2 nd Round %
Did not know about NID	67	50
Too busy	17	-
Child away from home	17	25
Rain	-	25

Chart 7: Source of information about the 9th NID campaign



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

Union Name	Name of the Mouza	Name of the Village	Total HH	Total Pop.	Cluster No.
Char Baria	Char Abdani	Char Abdani	406	2397	1
	Char Baria	Char Baria	648	3518	2,3
	Char baria lam chari	Char baria lam chari	1100	6059	4,5
	Ganwasar	Ganwasar	416	2250	6
	Kagasura	Kagasura	479	2250	7
	Mukunda patti	Mukunda patti	297	1403	8
	Puran para	Puran para	359	1899	9
	Sapania	Sapania	305	1788	10
Jagua	Ulan ghuni	Ulan ghuni	154	834	11
	Harina Phutia	Harina Phutia	745	3982	12
	Rupatali	Rupatali	2638	15089	13,14,15,16,17,18
	Tiak hati	Tiak hati	94	587	19
	Uttar jagua	Uttar jagua	510	3131	20
	Bihangal	Bihangal	190	1028	21
	Billa bari	Billa bari	433	2437	22
	Dia para	Dia para	264	1482	
	Gan para	Gan para	604	3520	23,24
	Ichha kati	Ichha kati	866	4838	25,26
Roypasha karapur	Kashipur Chahutpur	Kashipur Chahutpur	663	3515	27
	Dephulia	Dephulia	226	1381	28
	Indra kati	Indra kati	112	710	29
	Katura kati	Katura kati	189	1002	30

List of never vaccinated children identified by clusters

Union Name	Name of the Mouza	Name of the Village	Total HH	Total Pop.	Cluster No.	Never Vaccinated Children
Char Baria	Char Abdani	Char Abdani	406	2397	1	
	Char Baria	Char Baria	648	3518	2,3*	1*
	Char baria lam chari	Char baria lam chari	1100	6059	4,5	
	Ganwasar	Ganwasar	416	2250	6	
	Kagasura	Kagasura	479	2250	7	1
	Mukunda patti	Mukunda patti	297	1403	8	
	Puran para	Puran para	359	1899	9	
	Sapania	Sapania	305	1788	10	
Jagua	Ulan ghuni	Ulan ghuni	154	834	11	
	Harina Phutia	Harina Phutia	745	3982	12	
	Rupatali	Rupatali	2638	15089	13,14,15*, 16,17,18	1*
	Tiak hati	Tiak hati	94	587	19	
	Uttar jagua	Uttar jagua	510	3131	20	
	Bihangal	Bihangal	190	1028	21	1
	Billa bari	Billa bari	433	2437	22	
	Dia para	Dia para	264	1482		
	Gan para	Gan para	604	3520	23,24*	1*
	Ichha kati	Ichha kati	866	4838	25,26*	1*
Roypasha karapur	Kashipur Chahutpur	Kashipur Chahutpur	663	3515	27	
	Dephulia	Dephulia	226	1381	28	1
	Indra kati	Indra kati	112	710	29	
	Katura kati	Katura kati	189	1002	30	
				Total	7	

Acknowledgements

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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
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21. Vaccination Coverage and Other Health Care Practices Survey in the Pabna Char Areas—August 2000. Survey Report No. 21. January 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
30. Vaccination Coverage Survey of the Patuakhali, Jhalokathi and Pirojpur Municipalities- Aug. 2000. Survey Report No. 30. July 2001
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33. Vaccination Coverage Survey of the Tongi Municipality- March 2001. Survey Report No. 33. July 2001

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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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