PN-ADG-317

IOCH

Immunization and Other Child Health Project

Vaccination Coverage Survey of the Khulna City Corporation

May 2003

Survey Report No. 117

This survey was conducted by IOCH, a project of Management Sciences for Health, funded by USAID under AID contract No. HRN-I-01-98-00033-00, Task Order No. 01

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

September 2003

Table of Contents

List of Tables

List of Figures

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 (like a village or para) in urban areas
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
SNID	Sub-national Immunization Day
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 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 are 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.

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

Program access is measured by the percentage of children surveyed who received DPT 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

Following the 11th National Immunization Campaign, a national coverage evaluation survey was conducted under the auspices of the Expanded Program on Immunization (EPI), Directorate General of Health Services (DGHS), Government of Bangladesh, with technical assistance from WHO and IOCH in May-June 2003. As a part of this initiative, IOCH conducted a 30-cluster coverage evaluation survey in the Khulna City Corporation (KCC) on 20 - 26 May 2003.

Objectives

The overall objective of the survey was to assess the level of immunization coverage in the Khulna 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 who had given birth during one year prior to the survey, and find out the reasons for non-immunization and partial immunization; and
c) assess the coverage levels of OPV and Vitamin A administered during the 11th NIDs.

Methodology

The survey employed the WHO recommended 30-cluster survey methodology that has been widely used in many developing countries to assess immunization coverage. In all, 30 clusters were randomly selected from Khulna City Corporation following PPS sampling procedures. A list of the selected clusters is provided in Annex- A and their locations are shown on the maps in page12. From each cluster, 7 children 12 – 23 months and 7 women who gave birth during last 12 months 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 11th NIDs.

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[1] and EpiInfo.

Coverage levels for the routine immunization of children

Access to child immunization: Based on crude data (card plus history), 95% children received at least one dose of antigen (DPT 1st dose in this case) from routine immunization sessions. 5% children did not receive a dose of any antigen.

Crude coverage of 12-23 months age group: 95% children received BCG, 89% children received three doses of OPV, 89% received three doses of DPT and 81% received measles vaccine. 81% children were fully immunized.

[1] COSAS (Coverage Survey Analysis System) is a dedicated software for analyzing coverage evaluation survey data.

Valid coverage of 12-23 months age group: 95% children received BCG, 78% children received three doses of OPV, 78% received three doses of DPT and 78% received measles vaccine. 71% children were fully immunized.

Valid coverage by 12 months: 95% children received BCG, 76% children received three doses of OPV, 77% received three doses of DPT and 71% received measles vaccine. 65% children were fully immunized.

Routine immunization coverage by Gender: There was no gender difference in accessing immunization services. Boys' access to immunization services, as measured by the crude coverage of DPT1, was the same as that of the girls (95% for both the boys and the girls). However, measles coverage for the boys was 12 percentage points higher than that for the girls, resulting in 11 percentage points higher crude FIC for boys than for the girls (86% crude FIC for boys vs. 75% crude FIC for girls). A similar trend was also observed in case of valid FIC and valid FIC by 12 months (77% valid FIC for boys vs. 65% valid FIC for girls, and 71% valid FIC by 12 months for boys vs. 59% valid FIC by 12 months for girls).

Child immunization coverage trend: Access to child immunization (as measured by DPT1) has been high, ranging from 91% to 96% over the past four years. Crude FIC (Fully Immunized Children) has increased from 78% in 2000 to 81% in 2003. However, there has been no improvement in the coverage of valid FIC by 12 months over the last 4 years.

Dropout rates: Although access to child immunization was quite high (95% for DPT1), the dropout rates for different antigens were 7% from DPT1 to DPT3 and 14% from DPT1 to measles.

Dropout trend: The dropout rate from DPT1 to DPT3 reduced from 9% in 2000 to 7% in 2001 and then again remained constant over the last two years. The dropout rate from DPT1 to Measles reduced from 15% in 2000 to 12% in 2002 and then again increased to 14% in 2003.

Invalid doses: 5% of the DPT1 doses were administered before 6 weeks of age of the children, and 4% of the measles doses were given before 38 weeks of age of the children. Besides, 4% of the DPT1 doses and 2% of the DPT2 doses were given before 4 weeks interval between the doses.

Trend in invalid doses: Invalid doses of DPT1 have increased over the past four years (from 3% in 2000 to 5% in 2003). However, percentage of invalid measles doses has remained unchanged over the period.

Missed opportunities: Total missed opportunities (uncorrected plus corrected) for different antigens ranged from 1% to 4%. The prevalence of uncorrected missed opportunities for different antigens ranged from 1% to 2%. The composite index for total missed opportunities was 42, reflecting the need for further improving the quality of screening during vaccination sessions.

EPI card retention: 95% of the children interviewed were ever given EPI cards; however, EPI cards were available with 57% of the respondents at the time of interview. EPI card retention rate was 60% only, as 40% of the EPI cards were lost.

Knowledge about required visit to immunization center for full immunization: 27% of the mothers interviewed did not have any idea about how many times a child was required to be taken to an immunization center to get fully immunized; while 26% had wrong idea about it. Only 47% of the mothers could mention correctly the number of times (i.e. 4 times) a child is required to visit immunization center to get fully immunized.

Sources of immunization services: Childhood immunization in this area was provided mostly by the NGO clinics (63%), followed by the CC/GOB outreach centers (26%). GOB hospitals and clinics provided EPI services to 8% and 2% of the cases respectively. Private clinics provided immunization services to another 1% of the cases only.

Adverse reaction following vaccination: 3% of the children (who had ever received any vaccine) were reported to have abscesses after receiving vaccine, and all of them had their abscesses at their thighs. About 1% of the ever immunized children experienced other adverse reaction following immunization, such as fever.

Charges for immunization: Majority of the parents (60%), whose children had ever vaccinated, reported to have paid money for vaccinating their children, and 83% of them paid Tk 10.00 or less per contact for vaccination. Another 15% paid an amount between Tk. 11.00 and Tk. 20.00 per contact for vaccination. Only 2% paid more than Tk. 20.00 per contact for vaccination.

Reasons for non-immunization and partial immunization or dropout of children: 10 children (out of 210) never received any vaccine and the reasons for their non-immunization included: fear of adverse reaction (40%), parents did not believe in the benefits of vaccination (20%), and parents did not know where to go for vaccination (10%) or sickness of child (10%). The primary reasons for partial immunization or dropout included: parents did not know when to return for subsequent doses/ measles vaccine to get fully immunized (20%), and sickness of the children (33%).

Coverage levels for the routine TT immunization of women who gave birth in last one year

TT immunization coverage: Access to TT immunization for the women who gave birth in last one year was quite good. 96% of the women received TT1. The corresponding figures for TT2, TT3 and TT4 were 94%, 68% and 44% respectively. Only 26% of the women received TT5, which provide lifelong protection against tetanus. 4% of the women never received any TT vaccine.

Trend in TT immunization coverage: An up-ward trend in TT immunization was observed over the past 4 years. Coverage of TT1 increased from 81% in 2000 to 96% in 2003 and coverage of TT5 increased from 12% in 2000 to 26% in 2003.

Age distribution of women never receiving TT immunization: There was no apparent association between age of the women and their immunization status.

Invalid TT doses: A significant proportion of TT doses were invalid as they were administered before the minimum required interval between the doses. 16% of the TT3 doses were given before 6 months interval between TT2 and TT3, and as such were invalid. 47% of the TT4 doses were invalid, since they were given before one year interval between TT3 and TT4; similarly, 50% of the TT5 doses were invalid for the same reason.

Protection against tetanus at birth: 89% of the newborn babies were found protected against tetanus, indicating that 11% newborn babies were still not protected against tetanus at birth.

Knowledge about full TT immunization: 83% of the women did not have correct knowledge about the number of TT doses required for a woman for full immunization. Only 17% women could correctly mention that a woman was required to receive 5 doses of TT vaccine for full immunization for lifelong protection against tetanus.

TT card retention: 86% of the women were ever given TT cards; however, TT cards were available with 35% of the women only at the time of interview. TT card retention rate was 41% only, as 59% of the TT cards were lost.

Sources of TT immunization: Half of the women received TT vaccine from the NGO clinics (50%), followed by the CC/GOB EPI outreach centers (29%). GOB hospitals and clinics provided TT immunization to 12% and 2% of the cases respectively. 7% women received TT vaccine from the private clinics.

Adverse reaction following immunization: None of the woman (out of 201 women who had ever received any TT vaccine) was reported to have abscess after receiving TT vaccine. However, 3 women (out of 201) experienced other adverse reaction such as fever, pain and itching after receiving TT vaccine.

Coverage levels for the 11th NIDs

OPV and Vitamin A coverage: 98% of the children <5 years received OPV in both rounds of the 11th NIDs. OPV coverage was 99% in each of the rounds. Vitamin A capsules were given to 93% of the eligible children (12 – 59 months of age). Besides, 14 ineligible children (out of 210) were wrongly administered Vitamin A, as they were under 1 year on the 1st round NID day.

NID coverage trend: The coverage of OPV in both rounds during the NIDs has steadily increased over the past 4 years (from 90% in 2000 to 98% in 2003). Vitamin A coverage has also improved over the same period (from 88% in 2000 to 93% in 2003).

Sources of OPV during the11th NIDs: Most of the children received OPV from the NID sites (98% in the 1st round and 96% in the 2nd round). 3% percent children received OPV during child-to-child search (1% in the 1st round and 2% in the 2nd round).

Household visitation during child-to-child search: While visiting each and every household during child-to-child search to identify the left out children, the health workers/volunteers were supposed to write the date of their visitation on the door or wall of the house. However, no such visitation date was found written on door or wall of majority of the households. Only 46% households in the 1st round and 47% households in the 2nd round were found with date of

visitation (by the workers/volunteers during child-to-child search) written on the door or wall of the houses.

Sources of information of the 2nd round of the 11th NIDs: Majority of the parents learned about the 2nd round of the 11th NIDs from television (65%), followed by mobile miking (49%). About one-third (31%) of the parents came to know about the NIDs from NGO workers. City Corporation workers as source of information of the NIDs were mentioned by 30% of the parents.

Reasons for not receiving vaccines from the NID sites: The primary reason for not receiving OPV from the NID sites included: a) lack of information about the NIDs (38% in the 2nd round); b) child was sick on NID day (40% in the 1st round); c) Children were away from home (20% in the 1st round and 12% in the 2nd round); and d) children waited at home to be immunized by the health workers during child-to-child (20% in the 1st round and 13% in the 2nd round).

Conclusions and recommendations

Access to child immunization was quite high (95% for DPT1); but this high access dropped to 71% for valid fully immunized children because of dropouts and invalid doses. Although there has been some improvement in reducing the dropout rates from DPT1 to DPT3 over the past 4 years, no tangible reduction in dropout rate for DPT1 to measles has taken place during the period. Too many invalid doses are provided to the children before the minimum required age or before the minimum required interval between the doses. Similarly, access to TT immunization for the women (who gave birth during last one year) was very good. 96% of the women received the first dose of TT, which reduced to 26% for TT5 that provides lifelong protection against tetanus. 16% of TT3 doses, 47% of the TT4 and 50% of the TT5 doses were invalid. To further improve the valid coverage of fully immunized children and women, the current dropout rates and invalid doses need to be further reduced.

- *Vaccination providers should focus on quality of services, such as counseling and screening of children/ mothers/women (for immunization) by the health workers. The health worker at the first contact must counsel the mother/woman properly to motivate her to return and to get herself and/or her child fully immunized. Emphasis should also be given on screening of clients for immunization to avoid or reduce invalid doses and missed opportunities. The service providers must screen properly each and every child/ woman to decide his/her eligibility for a specific dose of specific antigen.*
- *The service providers should be given refresher training to improve their technical skills on organizing good vaccination sessions: counseling of mothers/women and screening of clients for immunization.*

The national EPI program emphasizes that all children should get fully immunized before their 1st birthdays (i.e., by 12 months). However, the coverage of fully immunized children (FIC) by 12 months was 65% (which was 6 percentage points less than the coverage of FIC by 23 months).

- *During IPC by the health worker and/or during counseling at first contact, mothers should be clearly informed that only 8 doses will protect their children and that it must happen before 12 months of age. The mass media, such as television, radio and newspapers can play a vital role in educating the parents in this regard.*

EPI card (child immunization card) and TT card play an important role in ensuring good quality of immunization services. It helps the mothers to adhere to immunization schedule, as well as assists the service providers to screen the children for specific doses of specific antigens. Unfortunately, the retention rates of both the EPI card and TT card were very low, 60% and 41 respectively.

- *Vaccination cards (EPI card/TT card) should be given special attention. Vaccination cards must be issued to each and every child/woman vaccinated, properly filled out and screened, and they should be replaced, if lost, whenever needed. During counseling at the first contact and/or IPC by the health worker, mothers/women should be explained the benefits and importance of EPI cards/ TT cards for immunization of themselves and their children. They should be asked to preserve the EPI card and TT card safely, and to bring the cards with them whenever they come to the clinic/ EPI center for immunization of themselves and their children. In the case of loss of EPI card/TT card, it should be provided over and over, and the history of the earlier vaccinations accurately recorded again and again, if necessary.*

Although 96% of the women who gave birth in the past one year received at least two doses of TT, many newborn babies (11% of the total newborn babies) were found unprotected against tetanus at birth.

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

The understanding of mothers' about the number of doses required for fully immunization of themselves and of their children is very critical. It was found that the mothers had a poor understanding of full immunization. Over half of the mothers (53%) could not mention how many times a child was required to be taken to EPI center to get fully immunized. Similarly, 83% of the women (who gave birth in past one year) did not know how many TT doses were required for a woman for lifelong protection against tetanus.

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

Fear of adverse reaction was cited as primary reason for non-immunization of children by majority of parents (40%). It appears that the parents may have wrong impressions about adverse reaction of vaccination. However, the current 3% abscess rate might have contributed to such impressions of the parents.

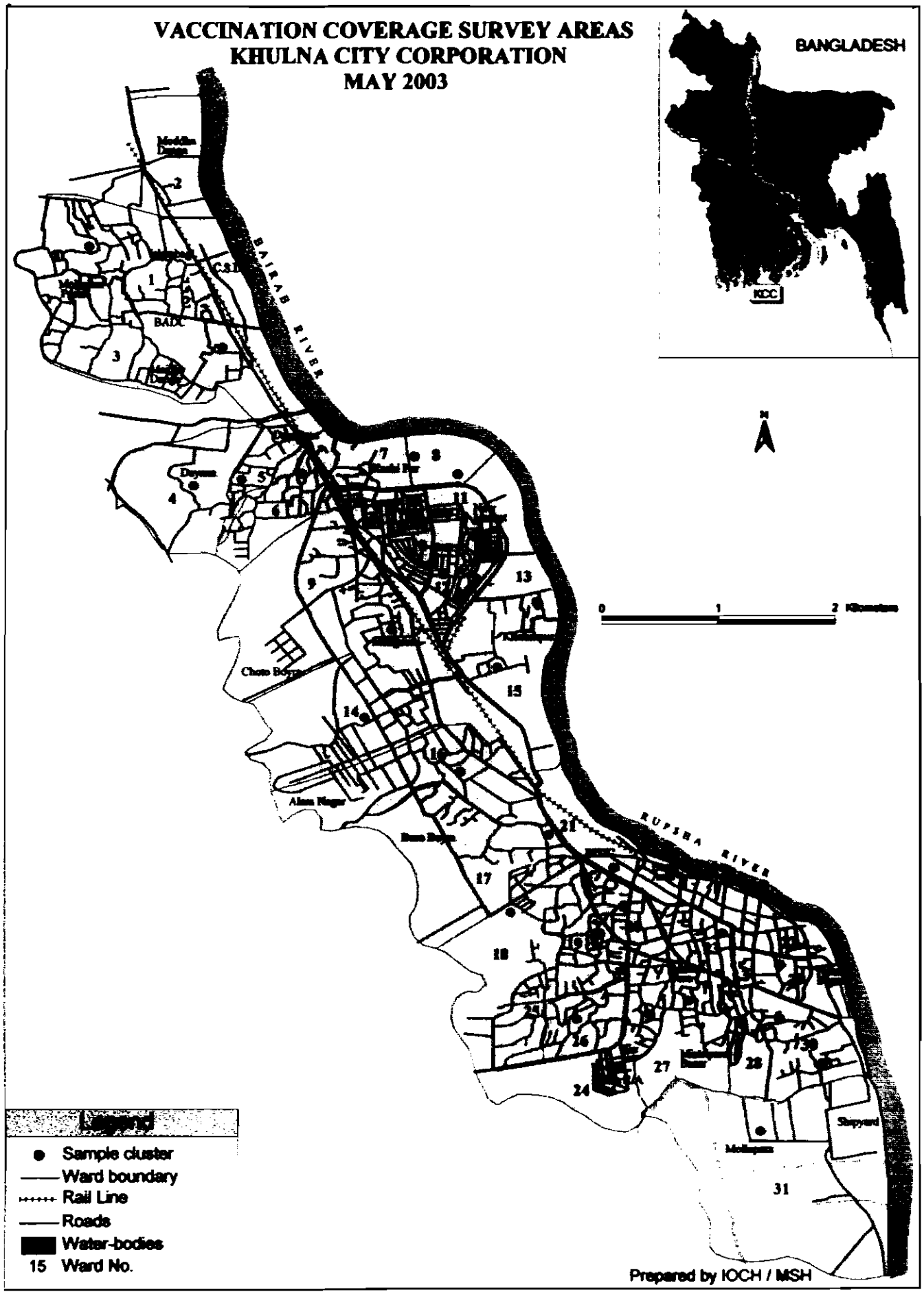
- *Appropriate BCC activities by the health workers during IPC and counseling at the first contact may remove the fear of adverse reaction of vaccination from the minds of the parents. Very selective and focused mass media campaign, in addition to IPC by health workers, may also be conducted to achieve this end.*
- *Special attention should be given to better sterilization/injection safety procedures to reduce current 6% abscess rate*

2% of the children 0 –59 months did not receive OPV in the both rounds of the 11th NIDs. 54% households in the 1st round and 53% in the 2nd round were found not marked with visitation date of the workers during child-to-child search on the door or wall of the house.

- *Area specific innovative strategies suitable to local situation have to be undertaken during the next NIDs to reach to the left out children. These may include, but not limited to, the following:*
    - *using mosque miking, as well as Imam of the mosque during Jumma Pray;*
    - *special team at railway station, bus stand, ferry-ghat etc. for traveling children*
    - *evening NID sites for working mothers;*
    - *special mobile teams at night to vaccinate homeless and floating children; and*
    - *strengthening supervision of field workers during child-to-child search to ensure that each and every household is visited and properly marked by the workers*

7% of the eligible children (12 – 59 months) did not receive Vitamin A during the 1st round of the 11th NIDs. Besides, 14 ineligible children out of 210 (i.e., 7%) were wrongly administered Vitamin A, as they were under 1 year on the 1st round NID day.

- *Special attention should be given to:*
    - *ensure that each and every eligible child 12–59 months receives Vitamin A;*
    - *Prevent administration of Vit. A to children under one year. There should be a better screening for age; and*
    - *no Vitamin A capsules should be given to the parents to administer them to their children either at NID site or in their homes.*


VACCINATION COVERAGE SURVEY AREAS
KHULNA CITY CORPORATION
MAY 2003
BANGLADESH
KCC
BAIRAB RIVER
RUPSHA RIVER
BADC
Shipyard
Legend
Sample cluster
Ward boundary
Rail Line
Roads
Water-bodies
15 Ward No.
Prepared by ICCH / MSH

TABLES AND FIGURES

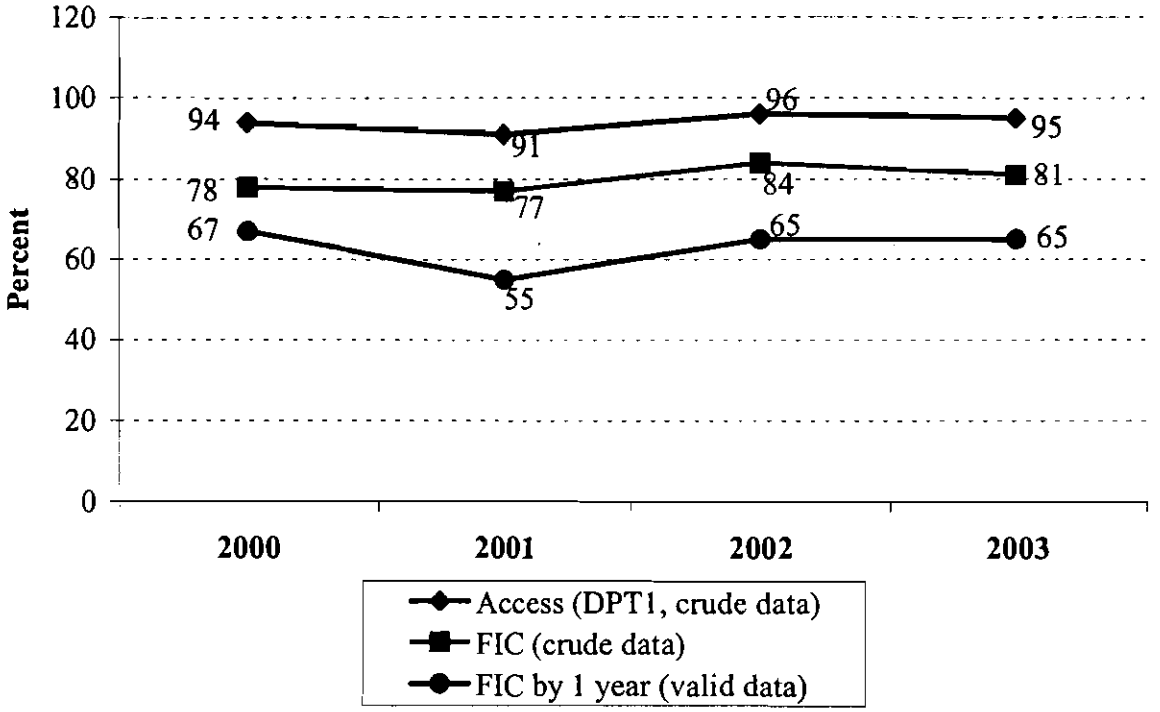
Table 1: Routine immunization coverage levels of the children

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	95	95	95
OPV1	95	90	90
OPV2	92	84	81
OPV3	89	78	76
DPT1	95	90	90
DPT2	92	84	81
DPT3	89	78	77
Measles	81	78	71
Fully immunized	81	71	65
Zero Dose	5	-	-

Table 2: Routine immunization coverage levels by gender

Name of the vaccine	Coverage % Immunization of 12-23 months age group				Coverage % Immunized by 12 months	
	Crude data (Access)		Valid data		Valid data	
	Male (%)	Female (%)	Male (%)	Female (%)	Male (%)	Female (%)
BCG	95	95	95	95	95	95
OPV1	95	95	88	92	88	92
OPV2	93	92	83	84	83	79
OPV3	90	88	78	78	78	75
DPT1	95	95	88	92	88	92
DPT2	93	92	83	84	83	79
DPT3	89	88	79	78	79	75
Measles	87	75	84	72	77	65
Fully immunized	86	75	77	65	71	59
Zero dose	5	5	-	-	-	-

Figure 1: Child immunization coverage trend



Source: National Coverage Evaluation Survey- 2000, 2001, 2002 and 2003

Figure 2: Drop-out rate for child immunization

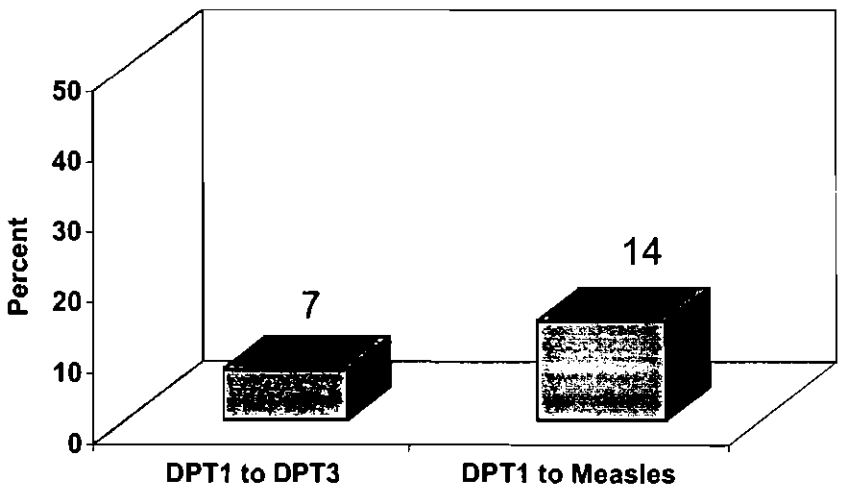
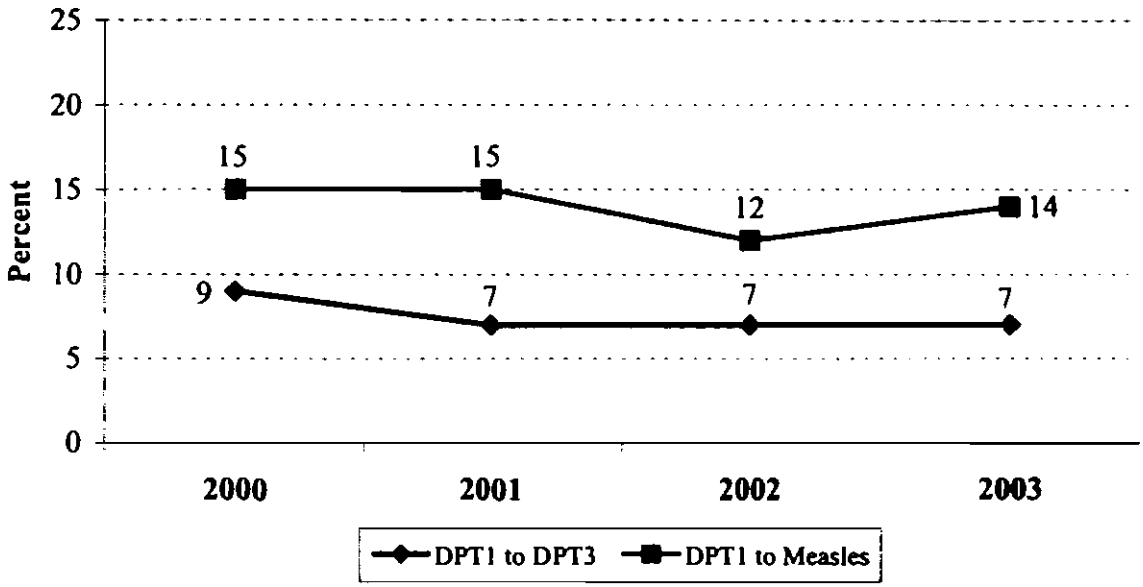


Figure 3: Child immunization dropout trend

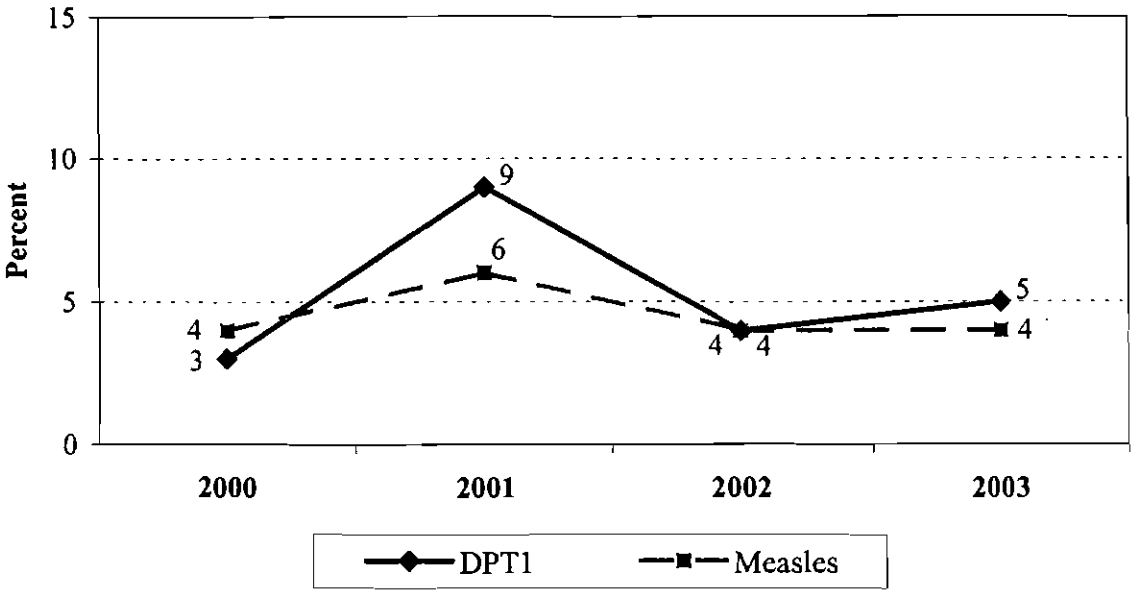


Source: National Coverage Evaluation Survey- 2000, 2001, 2002 and 2003

Table 3: Invalid doses of immunization provided to the children

Antigens	Percents
DPT1	5
DPT2	4
DPT3	2
Measles	4

Figure 4: Trend in invalid doses of child immunization



Source: National Coverage Evaluation Survey- 2000, 2001, 2002 and 2003

Table 4: Missed opportunities by antigens

Name of the vaccine	Uncorrected		Corrected		Total	
	Number	Percent	Number	Percent	Number	Percent
BCG	4	2	5	2	9	4
DPT1	3	1	3	1	6	3
DTP2	1	0	1	0	2	1
DPT3	4	2	2	1	6	3
OPV1	3	1	2	1	5	2
OPV2	1	0	1	0	2	1
OPV3	3	1	2	1	5	2
Measles	3	1	4	2	7	3
*Index					42	

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

Table 5: EPI cards availability and retention

Card Status	Number	Percentage
EPI card available	120	57
EPI card ever given	199	95
EPI card retention	120	60

Figure 5: Knowledge about required visits to immunization centers for full immunization

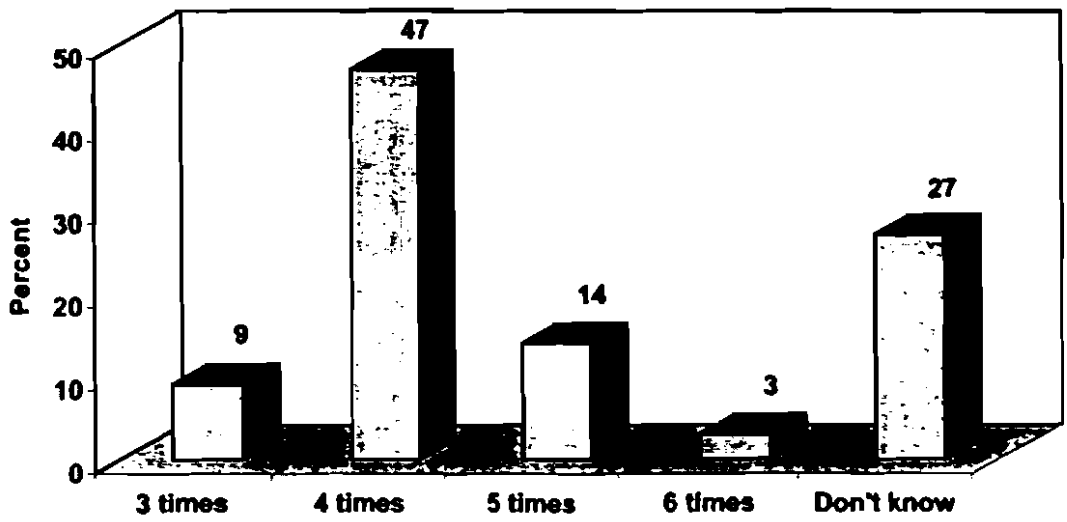


Figure 6: Sources of child immunization services

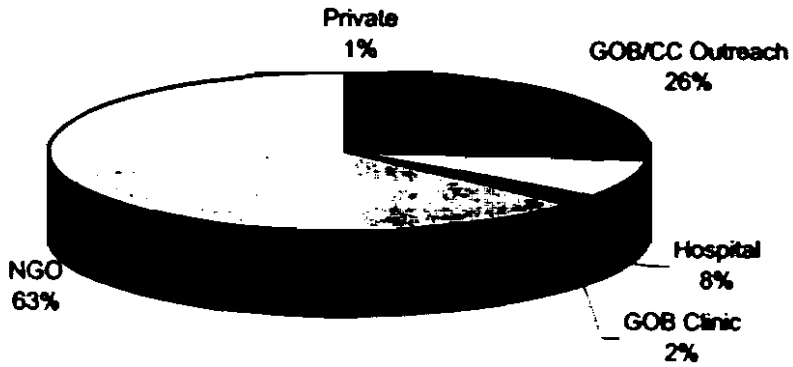


Table 6: Children who had an abscess after receiving vaccine

Status of children abscess	Number	Percentage
Abscess	5	3
No abscess	195	97
Total	200	100

Table 7: Site of abscess (after receiving vaccine)

Site of abscess	Number	Percentage
Arm	-	-
Thigh	5	100
Buttock	-	-
Other	-	-
Total	5	100

Table 8: Children who had any other adverse reaction after receiving vaccine

Status of other adverse reaction	Number	Percentage
Other adverse reaction	1	1
No other adverse reaction	199	99
Total	200	100

Table 9: Nature of other adverse reaction

Nature of other adverse reaction	Number	Percentage
Fever	1	100
Total	1	100

Table 10: Nature of other adverse reaction by antigen

Nature of other adverse reaction	Antigen							
	BCG		DPT		Measles		Total	
	#	%	#	%	#	%	#	%
Fever	1	100	-	-	-	-	1	100
Total	1	100	-	-	-	-	1	100

Table 11: Parents of the children who paid money for receiving vaccine by amount of money paid per contract

Amount of money (in Taka)	Number	Percentage
1-10 Taka	100	50
11-20 Taka	18	9
21-30 Taka	1	0.5
>30 Taka	1	0.5
No money was paid	80	40
Total	200	100

Table 12: Reasons for non-immunization and partial immunization of the children

Reasons for non-immunization or partial immunization	Non-immunized (%) (N=10)	Partially immunized (%) (N=30)
Did not know when return for 2nd/3rd dose	-	13
Did not know when return for measles vaccine	-	7
Did not know where to go for vaccination	10	3
Fear of adverse reaction	40	
Does not believe in vaccination	20	
Planning to vaccinate in future	-	10
Too busy to not taken the child	10	
Vaccination site was too far away	-	7
Vaccinator not friendly	10	
Child was sick and not taken	10	30
Child was sick and taken but not given	-	3
Had to pay money for vaccine	-	7
Did not importance for next dose	-	7
Lost card	-	3
House change	-	3
Others	-	7

Figure 7: TT immunization coverage levels of the women who gave birth in last one year

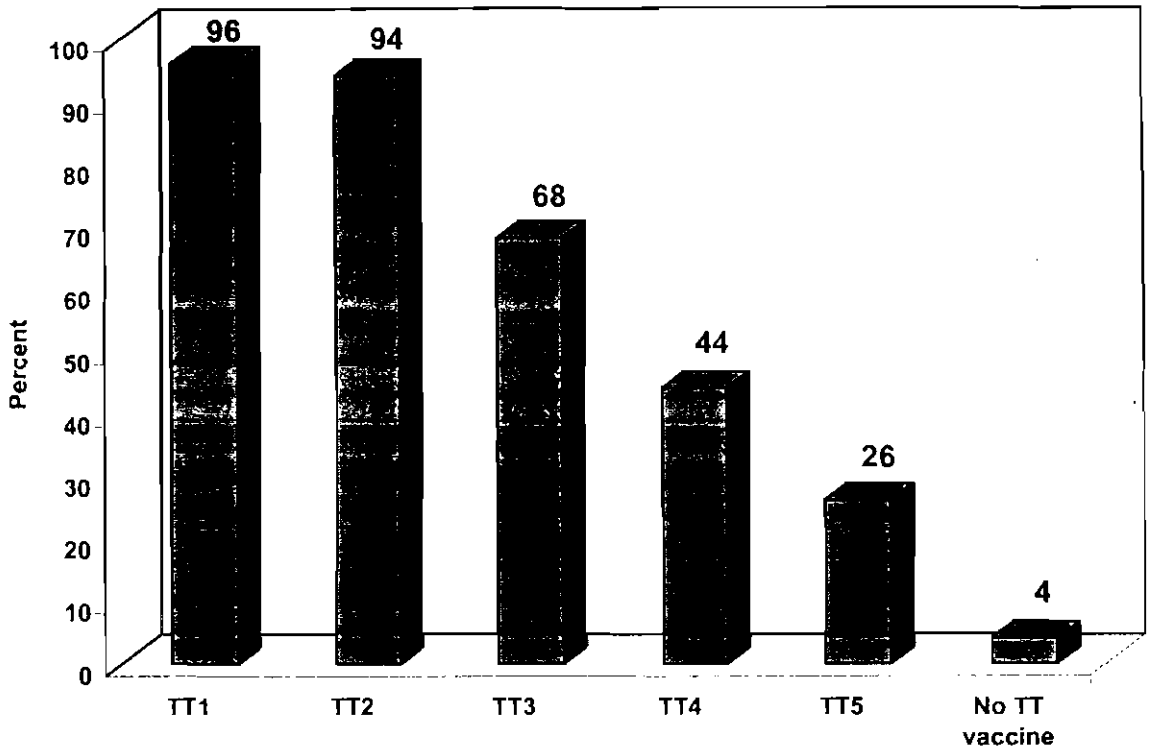
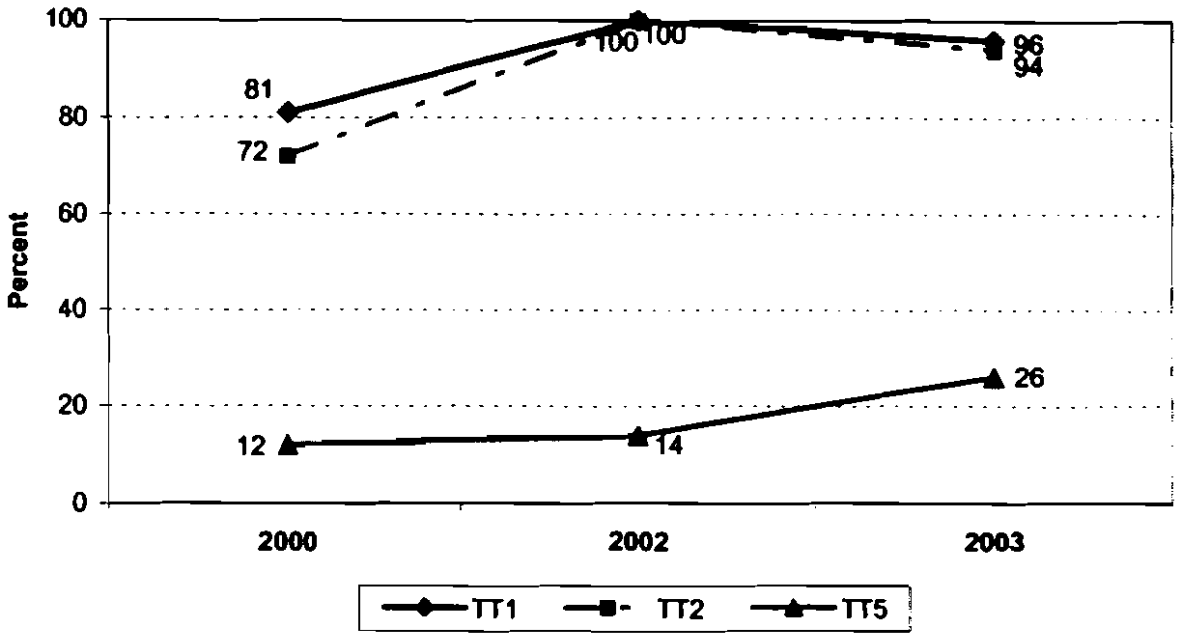


Table 13: Age distribution of women who never received TT vaccine (among those who gave birth in last year)

Age group	# of women	Never received TT	
		#	%
<20 years	24	2	8
20-25 years	99	4	4
26-30 years	58	1	2
31-35 years	26	2	8
>35 years	3	-	-
Total	210	9	4

Figure 8: TT immunization trend among the women giving birth in last one year



Source: National Coverage Evaluation Survey- 2000, 2002 and 2003

Table 14: Interval between TT1 and TT2, TT2 and TT3, TT3 and TT4, TT4 and TT5 doses

Interval between dose	<1 months		1 months+		<6 months		6 months+		<1 year		1 year +		Total	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%
TT1-TT2	2	1	194	99	-	-	-	-	-	-	-	-	196	100
TT2-TT3	-	-	-	-	23	16	117	84	-	-	-	-	140	100
TT3-TT4	-	-	-	-	-	-	-	-	43	47	48	53	91	100
TT4-TT5	-	-	-	-	-	-	-	-	26	50	26	50	52	100

Table 15: Children born protected against tetanus

Status of children born protected	Number	Percentage
Protected	187	89
Not Protected	23	11

Table 16: Knowledge about number of TT doses required for life time protection against tetanus

Answers	Number	Percentage
3 doses	3	1
5 doses	36	17
6 doses	1	0
Don't know/ no idea	170	81

Table 17: TT cards availability and retention

Card Status	Number	Percentage
TT card available	74	35
TT card ever given	181	86
TT card retention	74	41

Figure 9: Providers of TT immunization

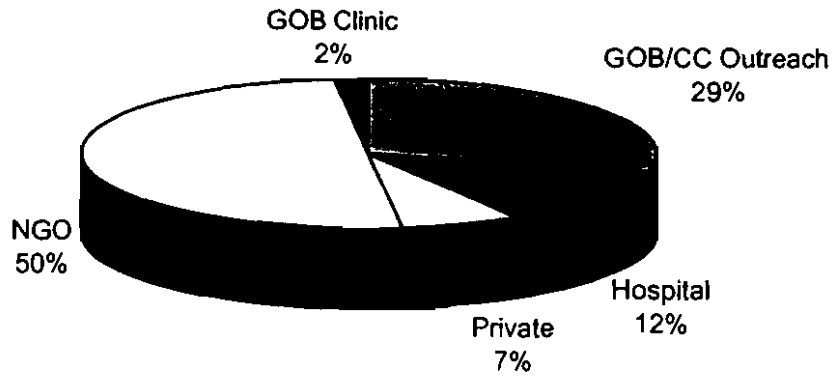


Table 18: Women who had an abscess after receiving TT

Status of women abscess	Number	Percentage
Abscess	-	-
Not abscess	201	100
Total	201	100

Table 19: Women who had any other adverse reaction after receiving TT

Status of other adverse reaction	Number	Percentage
Other adverse reaction	3	2
No other adverse reaction	198	98
Total	201	100

Table 20: Nature of other adverse reaction

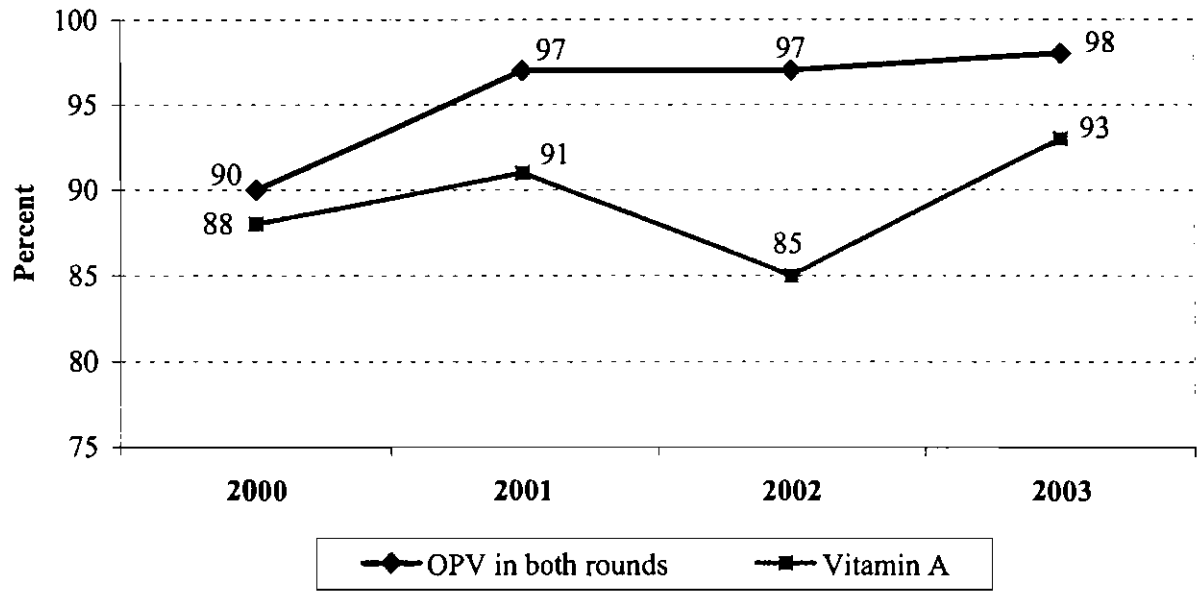
Nature of other adverse reaction	Number	Percentage
Pain and Itching	1	33
Fever	2	67
Total	3	100

Table 21: OPV and Vitamin A Coverage during the 11th NIDs

N=210

Round	OPV (%)	Vitamin A (%)
1st round	99	93
2nd round	99	-
Both round	98	-
Any round	100	-

Figure 10: NID coverage trend



Source: National Coverage Evaluation Survey- 2000, 2001, 2002 and 2003

Table 22: Sources of OPV during the 11th NIDs

Sources of OPV	1st Round		2nd Round	
	#	%	#	%
NID site	205	98	201	96
Child to child search	2	1	5	2
Mobile on NID	-	-	1	1
Mobile after NID	-	-	-	-
Not received	3	1	3	1
Total	210	100	210	100

Table 23: Date of child-to-child search of the 11 NIDs were written on the door of the house

Variable	1st Round		2nd Round	
	#	%	#	%
Written	96	46	99	47
Not written	114	54	111	53
Total	210	100	210	100

Figure 11: Sources of information of the 2nd round of the 11th NID campaign

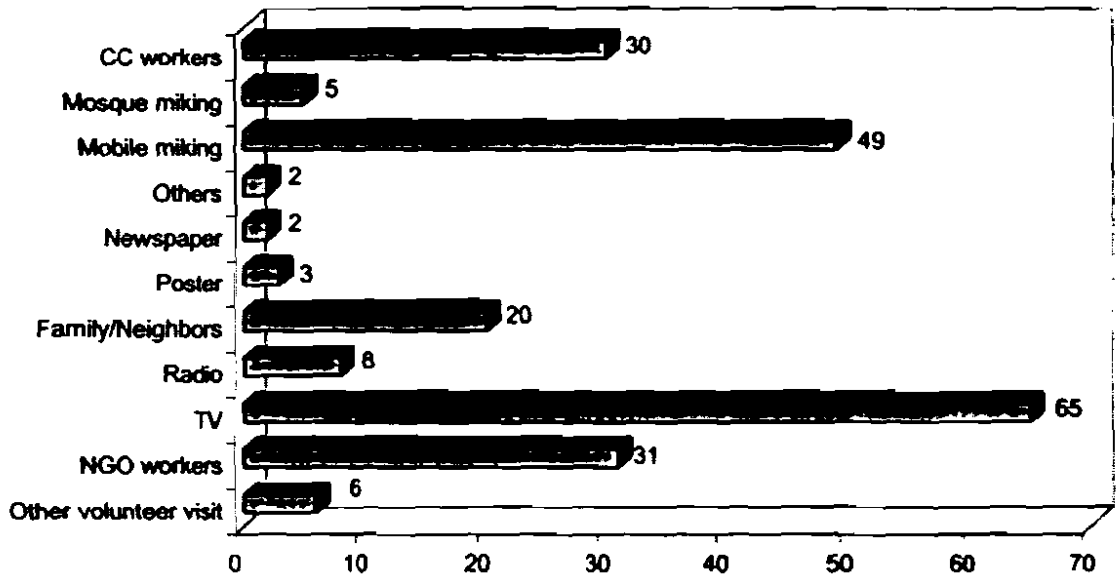


Table 24: Reasons for not receiving of OPV from NID sites of the 11th NIDs

Reasons	1st Round (%) (N=5)	2nd Round (%) (N=8)
Did not know about NID	-	38
Too busy	-	13
Traveling	-	-
Child already vaccinated-routine	20	12
Forgot the date	-	12
Not at home	20	12
Child sick, not given	40	-
Waited for house visit	20	13
Mother sick, not taken	-	-

Annex- A

List of Selected Clusters for the Survey

Ward No.	Mahalla name	Total HH	Total Pop.	Cluster No.
1	Paschim Maheshwarpasha	494	2673	1
3	Ghosh Para	117	628	2
4	Deanna (North & South)	2125	11558	3
5	Pabla Paschim (SK Ayub Ali Road)	1386	6543	4
6	Uttar Pabla (Khan Para)	607	2617	5
8	Peoples Jute Mill Area	817	3193	6
	Uttar Kashipur	2713	11540	7
9	Dakshin Muzgunni	572	2826	8
11	Peoples New Colony	867	4271	9
12	Khalishpur HE Area (Part-1)	4447	22309	10
	Khalishpur HE (Purba Block)	3513	17573	11
13	Newsprint Mills	787	4433	12
14	Choto Boyra (Part)	1777	9563	13
15	Dakshin Khalishpur	1263	7599	14
16	Nurnagar	1656	8358	15
17	Shibbari	487	2448	16
18	Uttar Gobarchoka Main Road	1145	6123	17
19	Madhya Gobarchoka	1447	7587	18
20	Shekh Para	1838	10419	19
21	Railway Colony (Jessroe Road)	1089	6573	20
23	Ahsan Ahmed Road	302	1748	21
24	Paschim Bagmara	1780	9169	22
	Roy Para	837	4267	23
26	Bakshi Para	381	2025	24
27	Bagmara	995	4842	25
28	Kar Para	689	3272	26
29	M.T. Road	750	4223	27
30	Daroga Para	206	1048	28
	Toot Para	693	3673	29
31	Mollah Para	853	4480	30

Annex- B

List of Never Vaccinated Children Identified by Clusters

Ward No.	Mahalla name	Total HH	Total Pop.	Cluster No.	Never vaccinated children
3	Ghosh Para	117	628	2	1*, 2*, 4*, 5*
8	Peoples Jute Mill Area	817	3193	6	1*, 3*, 5*
12	Khalishpur HE Area (Part-1)	4447	22309	10	4*
27	Bagmara	995	4842	25	1*
31	Mollah Para	853	4480	30	2*

Acknowledgements

Survey coordination:
Mr. Md. Mafizur Rahman, Monitoring and Evaluation Specialist, IOCH/MSH

Survey management:
Mr. Jagadindra Majumder, Field Survey Manager, IOCH/MSH

Data analysis:
Mr. Md. Mafizur Rahman, Monitoring and Evaluation Specialist, IOCH/MSH
Mr. Khodadad Talukder, PEF Monitoring, IOCH/MSH

Report writing:
Mr. Md. Mafizur Rahman, Monitoring & Evaluation Specialist, IOCH/MSH

Report review:
Dr. Pierre Claquin, Chief of Party, IOCH/MSH

Digital map preparation:
Mr. Din Mohammed, Monitoring and Evaluation Assistant, IOCH/MSH

Cover photo:
Dr. Pierre Claquin, Chief of Party, IOCH/MSH

Survey Team members, IOCH/MSH:
Ms. Mahmuda Parvin, Field Investigator, IOCH/MSH
Mr. Md. Saiful Islam, Field Investigator, IOCH/MSH
Mr. Md. Mamun-ur-Rashid, Polio Eradication Facilitator, IOCH/MSH
Mr. Md. Touhidul Islam, Polio Eradication Facilitator, IOCH/MSH
Mr. Md. Sabbir Hossain, Polio Eradication Facilitator, IOCH/MSH

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
20. Results of Coverage Evaluation Survey of Routine EPI and August 2000 OPV + TT (NNT) Campaign, Hard-to-reach and High-risk rural areas - September 2000. Survey Report No. 20, November 2000
21. Vaccination Coverage and Other Health Care Practices Survey in the Pabna Char Areas - August 2000. Survey Report No. 21, January 2001
22. Vaccination Coverage Survey of the Mymensingh Municipality - April 2000. Survey Report No. 22, February 2001
23. Vaccination Coverage Survey of the Jessore Municipality - October 20 - 30, 2000. Survey Report No. 23, February 2001
24. Vaccination Coverage Survey of the Comilla Municipality - October 1 - 9, 2000. Survey Report No. 24, February 2001
25. Vaccination Coverage Survey of the Pabna Municipality - July 2000. Survey Report No. 25, February 2001
26. Vaccination Coverage Survey of the Sirajganj Municipality - July 2000. Survey Report No. 26, February 2001
27. Vaccination Coverage Survey of the Bogra Municipality - February 2001. Survey Report No. 27, April 2001
28. Vaccination Coverage Survey of the Peri-urban Areas of DCC - November 2000 (Peri-urban Area Survey-1). Survey Report No. 28, July 2001
29. Vaccination Coverage Survey of the Peri-urban Areas of DCC - November 2000 (Peri-urban Area Survey-2). Survey Report No. 29, July 2001
30. Vaccination Coverage Survey of the Patuakhali, Jhalokathi and Pirojpur Municipalities - August 2000. Survey Report No. 30, July 2001
31. Vaccination Coverage Survey of the Bandarban, Rangamati and Khagrachari Municipalities - January 2001. Survey Report No. 31, July 2001
32. Vaccination Coverage Survey of the Naogaon Municipality - February 2001. Survey Report No. 32, July 2001
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
36. Vaccination Coverage Survey of the Rangpur District - June 2001. Survey Report No. 36, July 2001
37. Vaccination Coverage Survey of the Nawabganj Municipality - June 2001. Survey Report No. 37, July 2001
38. Vaccination Coverage Survey of the Expanded Areas of the Proposed Barisal City Corporation - June 2001. Survey Report No. 38, July 2001
39. Vaccination Coverage Survey of the Barisal Municipality - June 2001. Survey Report No. 39, July 2001
40. Vaccination Coverage Survey of the Kadam Rasul Municipality - July 2001. Survey Report No. 40, August 2001
41. Vaccination Coverage Survey of the Jamalpur Municipality - July 2001. Survey Report No. 41, August 2001
42. Vaccination Coverage Survey of the Brahmanbaria Municipality - June 2001. Survey Report No. 42, September 2001
43. Vaccination Coverage Survey of the Gazipur Municipality - July 2001. Survey Report No. 43, September 2001
44. Vaccination Coverage Survey of the Narsingdi Municipality - August 2001. Survey Report No. 44, September 2001

45. Vaccination Coverage Survey of the Hard-to-Reach Unions of Dewanganj, Raumari and Rajibpur Upalizas - July 2001. Survey Report No. 45, September 2001
46. Vaccination Coverage Survey of the Satkhira Municipality - September 2001. Survey Report No. 46, September 2001
47. Vaccination Coverage Survey of the Barguna Municipality - October 2001. Survey Report No. 47, November 2001
48. Vaccination Coverage Survey of the Bhola Municipality - October 2001. Survey Report No. 48, November 2001
49. Vaccination Coverage Survey of the Kushtia Municipality - October 2001. Survey Report No. 49, November 2001
50. Vaccination Coverage Survey of the Chandpur Municipality - October 2001. Survey Report No. 50, December 2001
51. Vaccination Coverage Survey of the Bhairab Municipality - November 2001. Survey Report No. 51, December 2001
52. Vaccination Coverage Survey of the Jhenaidah Municipality - November 2001. Survey Report No. 52, December 2001
53. Vaccination Coverage Survey of the Chuadanga Municipality - November 2001. Survey Report No. 53, December 2001
54. Vaccination Coverage Survey of the Sherpur Municipality - November 2001. Survey Report No. 54, December 2001
55. Vaccination Coverage Survey of the Mongla Municipality - December 2001. Survey Report No. 55, January 2002
56. Vaccination Coverage Survey of the Ishwardi Municipality – January 2002. Survey Report No. 56, March 2002
57. Vaccination Coverage Survey of the Munshiganj Municipality – January 2002. Survey Report No. 57, March 2002
58. Vaccination Coverage Survey in the Tea Gardens Owned by the Foreign Companies – February 2002. Survey Report No. 58, March 2002
59. Vaccination Coverage Survey in the Tea Gardens Owned by the National/Local Companies – February 2002. Survey Report No. 59, March 2002
60. Vaccination Coverage Survey and Other Health Care Practices Survey in the Villages Bordering the Sundarbans – December 2001. Survey Report No. 60, April 2002
61. Vaccination Coverage Survey and Health Seeking Behavior of the Slum Residents of the Mirpur Area of Zone 8 of Dhaka City Corporation– Marech 2002. Survey Report No. 61, June 2002
62. Vaccination Coverage Survey in the Slums of Dhaka City Corporation – March 2002. Survey Report No. 62, August 2002
63. Vaccination Coverage Survey in the Slums of Chittagong City Corporation – April 2002. Survey Report No. 63, August 2002
64. Vaccination Coverage Survey in the Slums of Khulna and Rajshahi City Corporations – April 2002. Survey Report No. 64, August 2002
65. Vaccination Coverage Survey in the IOCH Supported 91 Municipalities – April 2002. Survey Report No. 65, August 2002
66. Vaccination Coverage Survey in the Peri-urban Areas of Dhaka City Corporation (Sultanganj and Hariramppur Unions) – April 2002. Survey Report No. 66, August 2002
67. Vaccination Coverage Survey in the Peri-urban Areas of Dhaka City Corporation (Demra, Matuail, Shyampur, Beraid, Dakshinkhan and Satarkhul Unions) – April 2002. Survey Report No. 67, September 2002
68. Vaccination Coverage Survey of the Kurigram Municipality – May 2002. Survey Report No. 68, September 2002
69. Vaccination Coverage Survey of the Dinajpur Municipality – May 2002. Survey Report No. 69, September 2002
70. Vaccination Coverage Survey of the Narayanganj Municipality – June 2002. Survey Report No. 70, September 2002
71. Vaccination Coverage Survey of the Cox's Bazar Municipality – June 2002. Survey Report No. 71, September 2002
72. Vaccination Coverage Survey of the Rangpur Municipality – May 2002. Survey Report No. 72, September 2002
73. Vaccination Coverage Survey of the Homeless Children in Dhaka City Corporation – March 2002. Survey Report No. 73, September 2002
74. Vaccination Coverage Survey of the Mymensingh Municipality – July 2002. Survey Report No. 74, September 2002
75. Vaccination Coverage Survey of the Kishoreganj Municipality – July 2002. Survey Report No. 75, September 2002
76. Vaccination Coverage Survey of the Netrokona Municipality – July 2002. Survey Report No. 76, October 2002
77. Vaccination Coverage Survey of the Sirajganj Municipality – July 2002. Survey Report No. 77, October 2002
78. Vaccination Coverage Survey of the Pabna Municipality – July 2002. Survey Report No. 78, October 2002
79. Vaccination Coverage Survey of the Madhupur Municipality – July 2002. Survey Report No. 79, October 2002
80. Vaccination Coverage Survey of Selected Border Unions of Rajshahi Division – October 2002. Survey Report No. 80, October 2002
81. Vaccination Coverage Survey of Selected Border Unions of Khulna Division – October 2002. Survey Report No. 81, October 2002
82. Coverage Evaluation of the SNID Campaign 2002 in the Slums of Dhaka City Corporation – September 2002. Survey Report No. 82, November 2002
83. Coverage Evaluation of the SNID Campaign 2002 in the Peri-urban Areas of Dhaka City Corporation (Sultanganj and Hariramppur Unions) – September 2002. Survey Report No. 83, November 2002
84. Coverage Evaluation of the SNID Campaign 2002 in the Peri-urban Areas of Dhaka City Corporation (Demra, Matuail, Shyampur, Beraid, Dakshin Khan, Satarkul and Uttar Khan Unions) – September 2002. Survey Report No. 84, November 2002
85. Coverage Evaluation of the SNID Campaign 2002 in the Slums of Chittagong City Corporation – October 2002. Survey Report No. 85, November 2002
86. Coverage Evaluation of the SNID Campaign 2002 in the Slums of Khulna City Corporation – October 2002. Survey Report No. 86, January 2003
87. Coverage Evaluation of the SNID Campaign 2002 in the Slums of the Selected Municipalities – October 2002. Survey Report No. 87, January 2003
88. Vaccination Coverage Survey of the Sylhet City Corporation (Ward 1 – 5) – November 2002. Survey Report No. 88, January 2003
89. Vaccination Coverage Survey of the Sylhet City Corporation (Ward 6 – 13) – November 2002. Survey Report No. 89, January 2003
90. Vaccination Coverage Survey of the Saidpur Municipality – November 2002. Survey Report No. 90, January 2003
91. Vaccination Coverage Survey of the Natore Municipality – November 2002. Survey Report No. 91, January 2003
92. Vaccination Coverage Survey of the Habiganj Municipality – November 2002. Survey Report No. 92, January 2003
93. Vaccination Coverage Survey of the Noakhali Municipality – November 2002. Survey Report No. 93, January 2003
94. Vaccination Coverage Survey of the Chowmuhani Municipality – November 2002. Survey Report No. 94, February 2003
95. Vaccination Coverage Survey of the Jessore Municipality – December 2002. Survey Report No. 95, February 2003

96. Vaccination Coverage Survey of the Magura Municipality – December 2002. Survey Report No. 96, February 2003
97. Vaccination Coverage Survey of the Comilla Municipality – January 2003. Survey Report No. 97, February 2003
98. Vaccination Coverage Survey of the Feni Municipality – January 2003. Survey Report No. 98, February 2003
99. Vaccination Coverage Survey of the Faridpur Municipality – January 2003. Survey Report No. 99, February 2003
100. Vaccination Coverage Survey of the Manikganj Municipality – January 2003. Survey Report No. 100, February 2003
101. Vaccination Coverage Survey of the Lakshmipur Municipality – January 2003. Survey Report No. 101, March 2003
102. Vaccination Coverage Survey of the Madaripur Municipality – January 2003. Survey Report No. 102, March 2003
103. Vaccination Coverage Survey of the Bhurungamari Upazila – February 2003. Survey Report No. 103, April 2003
104. Coverage Evaluation of the SNID Campaign- 2002 in the Slums of Rajshahi City Corporation– October 2002. Survey Report No. 104, May 2003
105. Vaccination Coverage Survey of the Chhitmahals (enclaves) of Bhurungamari Upazila – February 2003. Survey Report No. 105, May 2003
106. Vaccination Coverage Survey of the Lalmonirhat Municipality – February 2003. Survey Report No. 106, May 2003
107. Vaccination Coverage Survey of the Sunamganj Municipality – February 2003. Survey Report No. 107, May 2003
108. Vaccination Coverage Survey of the Gaibandha Municipality – March 2003. Survey Report No. 108, June 2003
109. Vaccination Coverage Survey of the Moulvibazar Municipality – March 2003. Survey Report No. 109, June 2003
110. Vaccination Coverage Survey of the Joypurhat Municipality – March 2003. Survey Report No. 110, June 2003
111. Vaccination Coverage Survey of the Narsingdi Municipality – April 2003. Survey Report No. 111, June 2003
112. Vaccination Coverage Survey of the Nawabganj Municipality – April 2003. Survey Report No. 112, June 2003
113. Vaccination Coverage Survey of the Dhaka City Corporation – May 2003. Survey Report No. 113, August 2003
114. Vaccination Coverage Survey in the Slums of Dhaka City Corporation – May 2003. Survey Report No. 114, August 2003
115. Vaccination Coverage Survey of the Rajshahi City Corporation – May 2003. Survey Report No. 115, September 2003
116. Vaccination Coverage Survey of the Chittagong City Corporation – May 2003. Survey Report No. 116, September 2003
117. Vaccination Coverage Survey of the Khulna City Corporation – May 2003. Survey Report No. 117, September 2003

MNT - 2001 Survey Reports

1. Vaccination Coverage Survey of Routine EPI and 2001 MNT Campaign in the Slums of Dhaka City Corporation. MNT Survey Report No. 1, March 2002
2. Vaccination Coverage Survey of Routine EPI and 2001 MNT Campaign in the Slums of Chittagong, Khulna and Rajsbahi City Corporations. MNT Survey Report No. 2, March 2002
3. Vaccination Coverage Survey of Routine EPI and 2001 MNT Campaign in the Selected 27 Municipalities. MNT Survey Report No. 3, March 2002
4. Vaccination Coverage Survey of Routine EPI and 2001 MNT Campaign in the Rural Areas of Chittagong, Khulna and Barisal Divisions. MNT Survey Report No. 4, March 2002
5. Vaccination Coverage Survey of Routine EPI and 2001 MNT Campaign in the Rural Areas of Dhaka, Rajshahi and Sylhet Divisions. MNT Survey Report No. 5, March 2002
6. Vaccination Coverage Survey of Routine EPI and 2001 MNT Campaign in the Brahmanbaria District. MNT Survey Report No. 6, March 2002
7. Vaccination Coverage Survey of Routine EPI and 2001 MNT Campaign in the Kishoreganj District. MNT Survey Report No. 7, March 2002

Unicef & IOCH Survey Reports

1. Vaccination Coverage Survey of the Teknaf and Ukhia Upazilas - February 2000. Survey Report No. 1, August 2000
2. Vaccination Coverage Survey of the Brahmanbaria Sadar Upazila - February 2000. Survey Report No. 2, August 2000
3. Vaccination Coverage Survey of the Debidwar Upazila - February 2000. Survey Report No. 3, August 2000
4. Vaccination Coverage Survey of the Madaripur Upazila - February 2000. Survey Report No. 4, August 2000
5. Vaccination Coverage Survey of the Maulvi Bazar District - February 2000. Survey Report No. 5, August 2000
6. Vaccination Coverage Survey of the Raumari Upazila - February 2000. Survey Report No. 6, August 2000
7. Vaccination Coverage Survey of the Gangachara Upazila - February 2000. Survey Report No. 7, August 2000
8. Vaccination Coverage Survey of Chittagong Hill Tracts - February 2000. Survey Report No. 8, October 2000

Technical Report

1. Joint National/International Review of EPI Program in Urban Areas of Bangladesh - 23 January - 3 February 2000. Technical Report No. 1, July 2000
2. Joint Review of the Expanded Program on Immunization (EPI) in the Areas of Rural service Delivery Partnership (RSDP), April 2001. Technical Report No. 2, May 2002

Additional copies of any of these reports, if needed, will be provided free of cost on request to: Dr. S.I.A. Jinnah, IOCH. E-mail: jinnah12@citechco.net