IOCH
Immunization and Other Child Health Project

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

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

November 2000

Table of Contents

	Page No.
List of Tables and List of Charts	3
Acronyms	4
Terminology	5
Executive Summary	**6**
Introduction	9
Objectives	10
Methodology and its Limitations	10
Results	
General information	13
Routine immunization coverage levels of children	13
Routine TT immunization coverage levels of women	17
Coverage levels of NNT campaign	20
Discussions	22
Conclusions and Recommendations	**23**
Reference and Resource Materials	25
Annexures	
Annex A: EPI Cluster Survey design (extracts from an article written by Anthony G Turner, Robert J Magnani and Muhammed Shuaib)	26
Annex B: Illustration of when children surveyed first became eligible for different vaccines	27
Annex C: List of selected clusters	28
Acknowledgements	29

List of Tables

Table 1: Routine immunization coverage levels of the children

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

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

List of Charts

Chart 1: Immunization coverage among children less than 12 months old

Chart 2: Dropout rates for childhood immunization

Chart 3: Source of information and motivation for routine childhood immunization

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

Chart 5: Dropout rates for TT immunization

Chart 6: Source of information and motivation for routine TT immunization

Chart 7: Providers of routine childhood and TT immunization

Chart 8: Reasons for not receiving OPV during NNT campaign

Chart 9: Reasons for not receiving TT vaccine during NNT campaign

Chart 10: Source of information for NNT 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
IOCH	Immunization and Other Child Health
MSH	Management Sciences for Health
NGO	Non Governmental Organization
NNT Campaign	Multi-antigen campaign conducted in August 2000 to provide a dose of OPV to children of 0-59 months of age and a dose of TT to all eligible women of 15-49 years of age
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.*

Executive Summary

Background

EPI project conducted 2nd round of the NNT campaign in urban slums of 4 city corporations and 27 municipalities, high risk and hard to reach areas in 544 unions under 181 Upazilas between August 6 and August 16, 2000 to provide a dose of TT vaccine to all eligible women of 15-49 years of age and to provide a dose of OPV to children of 0-59 months of age. IOCH/MSH Project conducted a NNT coverage evaluation survey including routine immunization coverage in high risk and hard to reach areas where NNT campaign was conducted, from September 10-24, 2000. The objectives of the survey were as follows:

Objectives

The principal objectives of the survey were:

a) to assess the levels of routine immunization coverage of children (12-23 months) and to find out the reasons for non-immunization and partial immunization,

b) to assess the levels of TT immunization coverage in women of child bearing age (15-49 years) regardless of their marital status and to find out the reasons for non-immunization and partial immunization,

c) to assess the coverage levels of OPV and TT vaccine during the 2nd round of NNT campaign conducted in August'2000 and find out the reasons for non-immunization.

Coverage levels for the Routine Immunization of Children

Access: 93% of the children received at least one dose of antigen (DPT 1st dose in this case) from routine immunization sessions based on crude data (card plus history). However 6% of the children did not receive any immunization.

Crude coverage between 12-23 months: 93% children received BCG, 75% received three doses of OPV, 74% received three doses of DPT and 71% received measles vaccine.

Valid coverage between 12-23 months: 93% children received BCG, 58% received three doses of OPV, 57% received three doses of DPT and 68% received measles vaccine.

Valid coverage by 12 months: 93% children received BCG, 54% received three doses of OPV, 54% received three doses of DPT and 56% received measles vaccine.

Source of immunization: Childhood immunization is provided by EPI Outreach centers in 85% of the cases. EPI vaccination centers are within half-an-hour walking distance from client's residence in 90% of the cases.

Reasons for non-immunization and partial immunization of children: The main reasons for non-immunization and partial immunization were the lack of knowledge of the parents/caretakers about the importance of immunization and in particular the need to return for the subsequent doses.

Problems detected: although access to immunization was very high, there was a very high drop out rate (20% from DPT1 to DPT3 and 25% from DPT1 to measles vaccine) and fairly high percentage of invalid doses due to early immunization (8% for DPT1 and 3% for measles vaccine). Childhood immunization cards were available in 38% of the cases and were lost in another 42% of the cases.

Coverage levels for the Routine TT immunization of women

85% of the women of childbearing age (15-49 years) had received a first dose of TT. Only 32% of the women had received the five doses of TT vaccine. 15% of the women had not received any immunization.

Reasons for non-immunization and partial immunization of women: The major reasons cited for non-immunization were that the women were unaware of the need for TT immunization and fear of taking injections. Whereas the major reasons for partial immunization were that they were either unaware of the need for immunization or they were unaware about the need for subsequent doses of TT vaccine.

Coverage levels for the NNT Campaign

Among population living in high risk and hard to reach areas, OPV coverage was 87% among eligible children. 57% of the eligible women received a dose of TT vaccine during NNT campaign. The most important reason for non-immunization during the NNT campaign was that the children were not at home or the eligible women were not aware of the campaign.

Information and motivation activity

Information and motivation level for routine immunization for the population living in high risk and hard to reach areas are not satisfactory. This is a serious issue for routine TT immunization where 70% of the women did not know how many doses of TT vaccine a women should take to protect her lifelong from Tetanus. For childhood immunization information and motivation level is not satisfactory. Government and municipal health workers, relatives and neighbors were found to be the main source of information for routine immunization for this particular group of population surveyed. Surprisingly this is true for NNT campaign as well. Conventional approaches for mass communication like Radio, Television, Posters, and Newspaper have found to be little effective among this particular group of population.

Suggested solutions

This survey indicates a need for appropriate information being given to parents/caretakers in an effective way about the importance of each child being fully immunized (preferably before 12 months of age) and about how to achieve full immunization (the time and place of immunization sessions and the number of doses required). Women of childbearing age require more education about how to prevent neonatal tetanus with 5 doses of TT vaccination. Screening of all women (15-49 years of age) by vaccinators for eligibility for TT vaccination during any contact at the immunization session should be strongly emphasized. Vaccinators should utilize the opportunity to vaccinate any woman coming to the EPI sessions for any purpose to complete TT 5 dose schedule. There is also a need for training to be given to the service providers to help them keep up to date with EPI policies and guidelines and increase their capacity for counseling parents about EPI.

Information and motivation activities needs to be geared up. Operations research is necessary to try new interventions in terms of communication and motivation to reach these hard core group living in high risk and hard to reach areas and to suggest solutions - how mass media could be effectively utilized to supplement the role played by the health workers during campaign activities.

Introduction

National EPI program conducted 2nd round of the NNT campaign in urban slums of 4 city corporations and 27 municipalities, high risk and hard to reach areas in 544 unions under 181 Upazilas between August 6 and August 16, 2000 to provide a dose of TT vaccine to all eligible women of 15-49 years of age and to provide a dose of OPV to children of 0-59 months of age. First round of NNT campaign was conducted in September 1999. Objective of the 2nd round of NNT campaign was to increase TT vaccine coverage among women of 15-49 years of age and eventually reduce the incidence of Neo-natal Tetanus. OPV was given during 2nd round of NNT campaign in an aim to reduce the wild poliovirus transmission in the high-risk areas where 29 patients were identified with wild poliovirus in 1999. This campaign was also aimed to achieve higher OPV coverage in hard to reach areas where routine immunization coverage is usually low.

The routine EPI program in the Upazilas is carried out by Government Health and Family Planning staff at fixed and outreach sites. NGOs and private practitioners also provide immunization services in many places. The doses of immunization provided are supposed to be reported to the Upazila Health and Family Planning Officer at the end of each immunization session. After compilation, the data is submitted on a monthly basis to the concerned Civil Surgeon's office that aggregates it with other district results and sends it on to the EPI HQ in Dhaka. For many reasons (e.g. immunization provided to children older than the target age group, tendency for over reporting, underestimated target etc.) routine EPI coverage data is generally unreliable[5,7,8] and does not provide specific information for such areas as those surveyed.

IOCH therefore decided to carry out a survey based on the WHO recommended EPI 30 cluster survey method[1] to obtain data on the status of the routine immunization coverage as well as OPV and TT coverage achieved during 2nd round of NNT campaign among children and women living in the high risk and hard to reach areas where NNT campaign was conducted. Population living in high risk and hard to reach areas were taken as a unit and 30 clusters were selected through random sampling method (please see map).

Objectives

The overall objectives of the survey was to assess the level of NNT campaign and routine immunization coverage among population living in high risk and hard to reach areas. The specific objectives were:

a) to assess the levels of routine immunization coverage of children (12-23 months) and to find out the reasons for non-immunization and partial immunization,

b) to assess the levels of TT immunization coverage in women of child bearing age (15-49 years) regardless of their marital status and to find out the reasons for non-immunization and partial immunization,

c) to assess the coverage levels of OPV and TT vaccine during the 2nd round of NNT campaign conducted in August'2000 and find out the reasons for non-immunization.

d) to understand better the socioeconomic and demographic profile and health care seeking behavior of the families with zero dose children (findings of this part of the survey will be described in separate report, and as such not included in this report).

Methodology and its Limitations

The survey followed the WHO recommended 30-cluster survey method[1], which has been widely used in many developing countries to assess immunization coverage. It is relatively simple and can be done at low cost. (The detailed survey methodology and its limitations are presented in **Annex A**). Briefly, the immunization information is collected on a randomly selected group of 210 children/women from 30 clusters (7 children/women per cluster) in a given community. It gives an estimate of immunization coverage to within +/- 10 percentage points of the true population proportion with 95% statistical confidence, assuming a design effect of 2.

In this survey 7 children between 12-23 months (children born between September 10, 1998 and September 9, 1999) were selected from each cluster to ascertain their routine vaccination status. **Annex B** describes how the dates of eligibility of different antigens in routine immunization were determined for children. The second round of NNT campaign was conducted between August 6-16, 2000 in urban slums and other hard to reach and high risk areas. Children born between August 6, 1995 and August 5, 2000 were selected for collecting information on NNT child vaccination status. 7 children of this age group were chosen from each cluster to evaluate OPV immunization status achieved during NNT campaign. Seven women between 15-49 years of age, irrespective of their marital status were selected to ascertain their tetanus toxoid vaccination status for routine immunization and another 7 women of same age group were interviewed for TT immunization status achieved during NNT campaign.

The 30 clusters (villages) were chosen randomly by IOCH from a list of the populations of hard to reach and high risk areas. The list of selected clusters is given in **Annex C** and their location is shown on the following map. The WHO standard questionnaire was used in this survey for documenting the routine immunization status of children and women. Separate questionnaires were used for collecting the data of NNT campaign.

Data was collected by IOCH monitoring team. Data collection period was from September 10-24, 2000. Data entry and analysis was done by IOCH using COSAS 4.41[3], "EPI Info" and SPSS programs. The final report was prepared by the Monitoring and Evaluation Unit, IOCH/MSH Project.

Limitations of the 30-cluster survey method

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

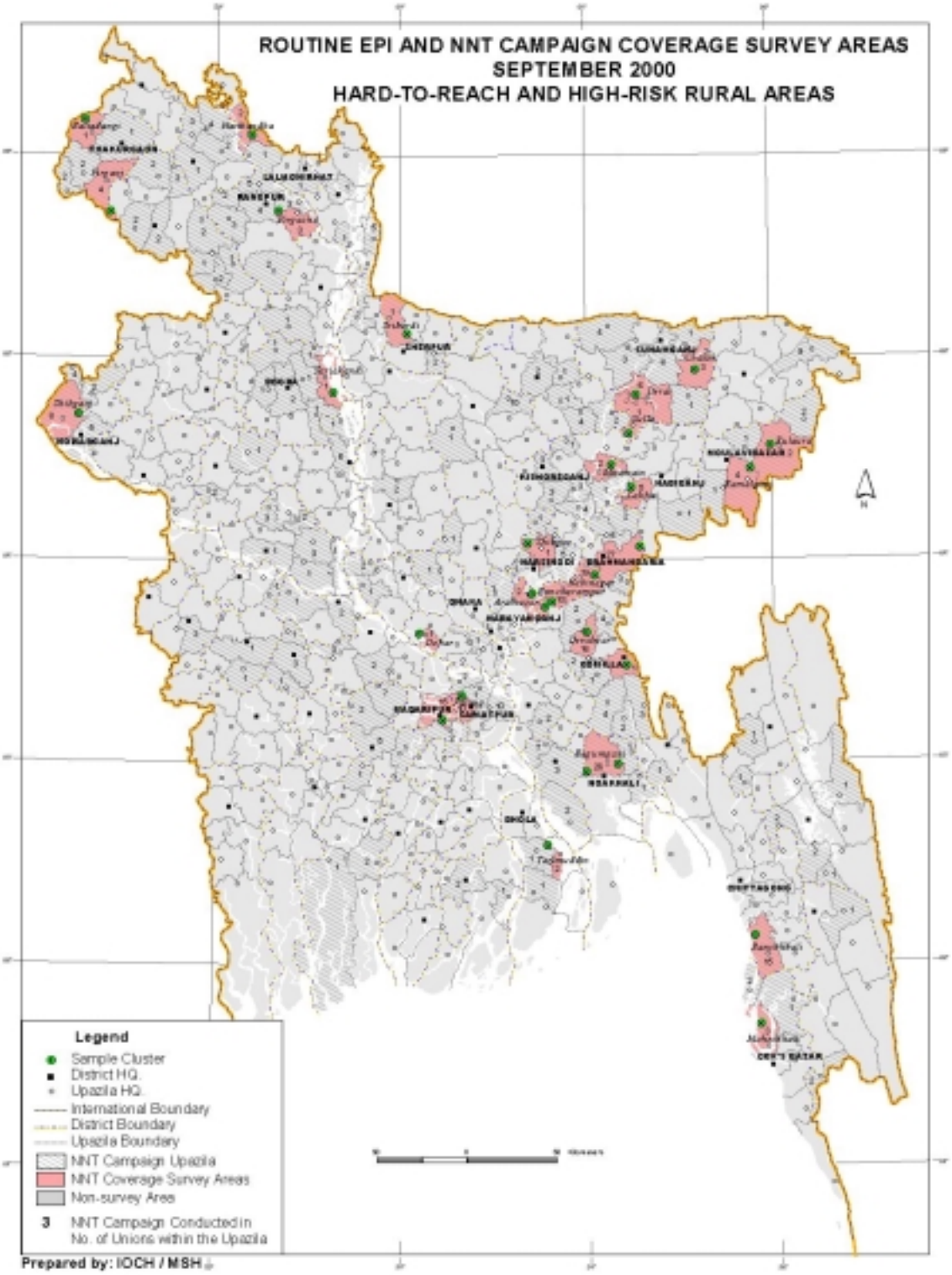
Linked to the sampling method:

- As an inherent bias in the sampling technique in 30 clusters, bigger villages are more likely to be selected as a cluster. The survey leaves out scattered small villages with poor access to services. It also does not reflect the lack of uniformity in service availability or the behavior of particular populations.
- There is a wide confidence interval (+/- 10%). It means that if the result shows that 56% of the children received a valid dose of measles vaccine before 12 months of age, then the 'true' figure of measles immunization of children could be anywhere between (56-10) = 46% and (56+10) = 66%. This type of survey is useful when the coverage is low but is less relevant to assess higher coverage or to compare surveys - unless there is a big difference between two surveys.
- To be relevant the analysis of valid data must apply to a relatively high percentage of available cards.

Linked to the implementation:

- The selection of the index house is key. Too often the proper method is not followed because the surveyors do not make the effort to number all the houses from their location to the end of the villages along the direction indicated by the bottle or by the pencil.
- If a household includes an eligible child who is not at home for a few hours, the surveyor often does not return later on but skips the house and substitutes another child. This is, of course, an incorrect procedure that introduces a bias.

It is also important to remember that this survey coverage data gives little information about the current program as it documents the activities of a year earlier.


ROUTINE EPI AND NNT CAMPAIGN COVERAGE SURVEY AREAS
SEPTEMBER 2000
HARD-TO-REACH AND HIGH-RISK RURAL AREAS
Legend
Sample Cluster
District HQ.
Upazila HQ.
International Boundary
District Boundary
Upazila Boundary
NNT Campaign Upazila
NNT Coverage Survey Areas
Non-survey Area
3 NNT Campaign Conducted in No. of Unions within the Upazila
Prepared by: IOCH / MSH

Results

General information

210 children were surveyed. 50% of them were boys. 4% of the infants were away of their home for more than 2 months in their first six months of life. 76% of them live in a building or tin shade house. Survey finding shows that 90% of the immunization centers are within half an hour walking distance of the children's home and 8% of the immunization centers were situated more than half an hour walking distance. 2% of the respondents could not answer correctly about the distance of immunization session. 15 children had abscess within two weeks after vaccination. In 7 of the cases it was in the thigh and in 8 of the cases it was in the left arm at the site of BCG vaccination. Parents walk to the immunization centers with their children in 89% of the cases, use rickshaw in 5% of the cases and 16% of the parents used boat/engine boat as means of transport (in few of the cases more than one type of transport was used).

210 women were surveyed. 3% of the women interviewed were unmarried at the time of survey. 13% of the women were away from their home for more than 2 months at one time within last two years. 80% of the women live in a building or tin shade house. Immunization centers were within half an hour distance in 92% of the cases. Immunization centers were within half an hour to one hour distance in 8% of the cases. 51% of the women surveyed were illiterate, 19% went to primary school, 5% went to adult literacy class and the remaining others have post primary education. 94% of the women surveyed were housewife, 3% of the interviewed women were engaged in agricultural activities, 1% of the women were engaged in small trading and the rest of the other women were engaged in various other trades and professions.

A. <u>Routine immunization coverage levels of children</u>

Coverage levels (card plus history data of COSAS analysis)

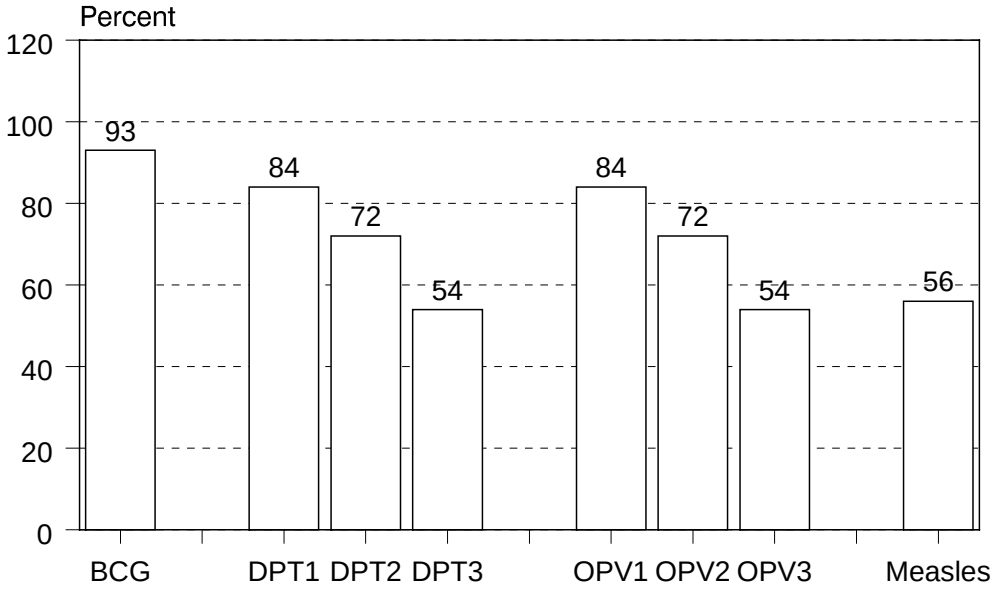
Table 1 shows the coverage levels of children between 12-23 months of age and their vaccination status at 12 months of age. The crude data figures for the 12-23 months age group indicates that 75% of the children received three doses of OPV, 74% received three doses of DPT and 71% were vaccinated against measles. The valid coverage levels are however considerably lower for all antigens except BCG and measles. 58% of the children received three doses of OPV, 57% received three doses of DPT and 68% were vaccinated against measles. 6% of the children surveyed had not been immunized at all and were therefore not reached by the routine EPI program. Proportion of fully immunized children under one year of age (valid data) among immunization card holders were 48%.

Table 1: Routine immunization coverage levels of the children

	Coverage % Immunization of 12-23 months age group		Coverage % Immunized by 12 months
	Crude data (Access)	Valid data	Valid data
BCG	93%	93%	93%
Polio 1	94%	87%	84%
Polio 2	84%	74%	72%
Polio 3	75%	58%	54%
DPT 1	93%	86%	84%
DPT 2	84%	74%	72%
DPT 3	74%	57%	54%
Measles	71%	68%	56%
Fully immunized	68%	55%	46%
Zero dose	6%	-	-

Table 1 shows little or no difference between valid data of immunization by 23 months of age group and the valid data by 12 months except for measles coverage (68% versus 56%). **Chart 1** shows the actual coverage for children of less than 12 months.

Chart 1: Immunization coverage among children less than 12 months old

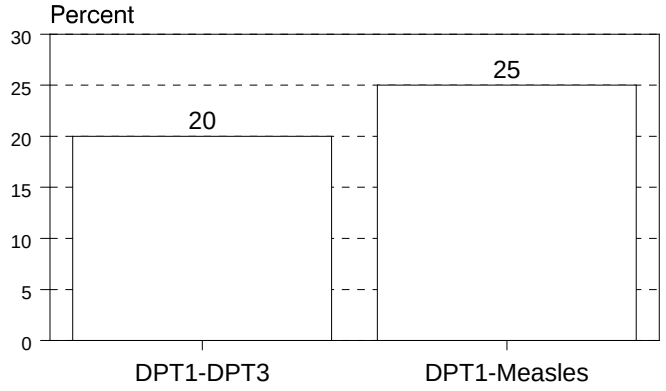


Program access (percent of children surveyed who received DPT 1st dose, crude data by card or history)

Access to immunization was very good. 93% of the children received a 1st dose of DPT.

Program continuity (dropout rate)
Crude data for antigens received by 12-23 months of age is used for calculating the dropout rate. In this survey, the DPT1 to DPT3 dropout rate was 20% and DPT1 to measles dropout rate was 25% (**Chart 2**).

Chart 2: Dropout rates for childhood immunization



Program quality
Adherence to immunization schedule-invalid doses
Adherence to immunization schedule is generally considered to be the major indicator of program quality. The data indicates that the providers performances reduced the coverage of DPT1 from an initial access of 93% measured by crude data to a coverage of 86% (valid data) for children between 12-23 months of age. A similar trend is seen for other antigens except BCG and measles. The number of invalid doses[4] were fairly high for different antigens. 8% of the children received an invalid dose of DPT1 and 3% received an invalid dose of measles vaccine. 1% of the children received a DPT second dose less than 4 weeks after the first dose of DPT and another 3% of the children received a DPT third dose less than 4 weeks after the second dose of DPT.

BCG vaccination
93% of the children surveyed received BCG vaccine based on card plus history data. 92% of the children were found with a BCG scar, but in 1% of the cases BCG vaccination did not produce a visible scar.

Missed opportunities for immunization
Uncorrected missed opportunities for immunization were very low (less than one percent for different antigens).

Availability of documentation of immunization
Child immunization cards were available in 38% of the cases and were lost in another 42% cases.

Reasons for non-immunization and partial immunization of the children

The reasons cited by parents for non-immunization and partial immunization are shown in **table 2**. 6% of the children were not immunized. 33% of the parents of the non-immunized children were unaware of the need for immunization. Another 25% had fear of side reactions. The rest of the respondents answered various other reasons. 26% of the children were partially immunized. Inaccurate or inadequate knowledge of the need for next due dose, date of vaccination of DPT/OPV and measles vaccine was cited by parents in 25% of the cases.

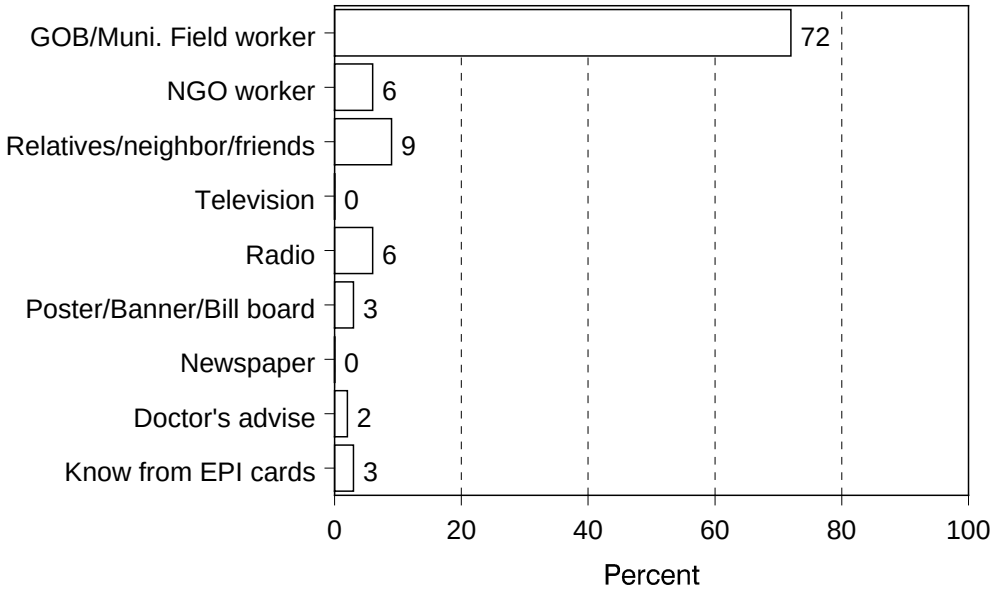
Table 2: Reasons for non-immunization and partial immunization of the children

Reasons	Not immunized	Partially immunized
Did not know about the need to vaccinate the child	33%	9%
Parents did not know the importance of taking subsequent due doses	-	9%
Parents do not know when to go for second or third dose of DPT/OPV	-	2%
Parents did not know the importance of taking measles vaccine	-	7%
Parents did not know when to return for measles vaccine	-	7%
Place or time of immunization not known	8%	2%
Fear of side reactions	25%	6%
Parents thinking to give vaccine in future	8%	4%
Mother was too busy	8%	6%
Vaccination site was far away	-	6%
Vaccinator absent	8%	9%
Vaccine was not available	-	2%
Vaccinator did not behaved well	-	4%
Family problem/sickness of mother	8%	-
There was abscess after last vaccination	-	4%
Child was sick, not taken to immunization session	-	7%
Child was sick, taken to immunization session – but immunization was not given	-	2%
Vaccinator will come home to give vaccine	-	6%
Other reasons	-	11%

Information and motivation for routine childhood immunization

23% of the respondents could mention correctly the number of times a child should be taken to the immunization session ("4 times" - was taken as correct answer), 33% gave wrong answer and 44% of the respondents could not answer. 42% of the respondents could mention the correct age of completing childhood vaccination ("9-12 months" - was taken as correct answer). 48% could not answer and 10% gave wrong answer. **Chart 3** shows that those who answered right or wrong, knew it in majority of the cases from the Government or municipal health workers (72%). Relatives, neighbor and friends were the source of information in 9% of the cases.

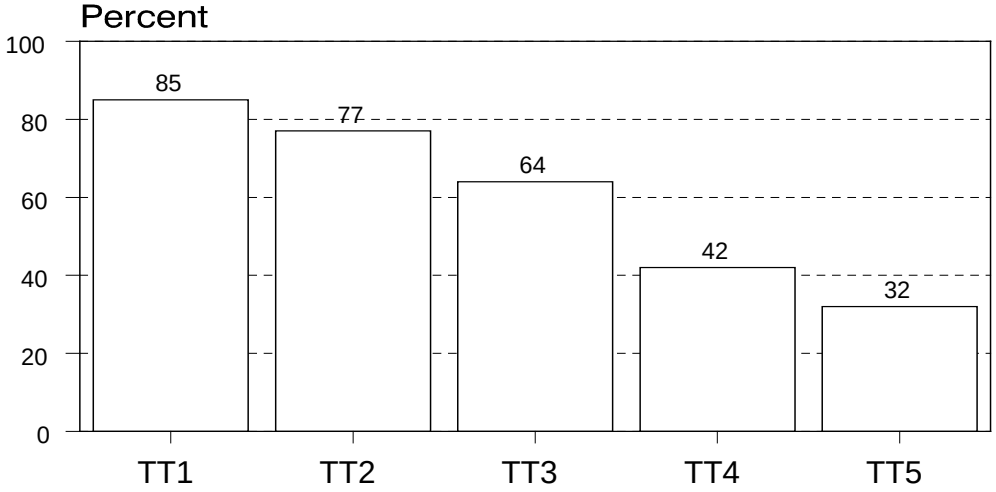
Chart 3: Source of information and motivation for routine childhood immunization



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

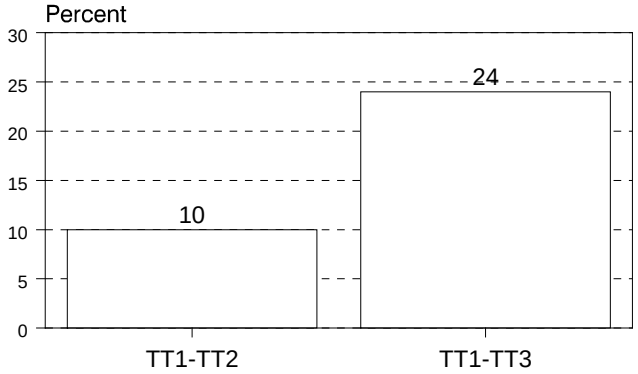
85% of the women had access to a first dose of TT vaccine (based on crude data). 77% of the women received two or more doses of TT vaccine. 32% of the women had received all the required five doses (**Chart 4**). 15% of the women surveyed had not received any dose of TT vaccine.

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



The dropout rate from first dose of TT vaccine to second dose of TT vaccine was 10% and the dropout rate from the first dose of TT vaccine to third dose of TT vaccine was 24% (**Chart 5**). Survey findings indicates that none of the women missed an opportunity for a first dose of TT vaccine during their antenatal check-ups. 30% of the women had TT immunization cards and they were lost in another 29% cases.

Chart 5: Dropout rates for TT immunization



Reasons for non-immunization and partial immunization of the women

15% of the women were not immunized and 53% were partially immunized. **Table 3** indicates that the major reasons cited for non-immunization of women were: a) unaware of need for immunization (66%) and b) fear of taking injections (16%). Whereas the reasons for partial immunizations were: a) women did not feel the need for immunization (36%) and b) unaware of need for subsequent doses of TT immunization (23%).

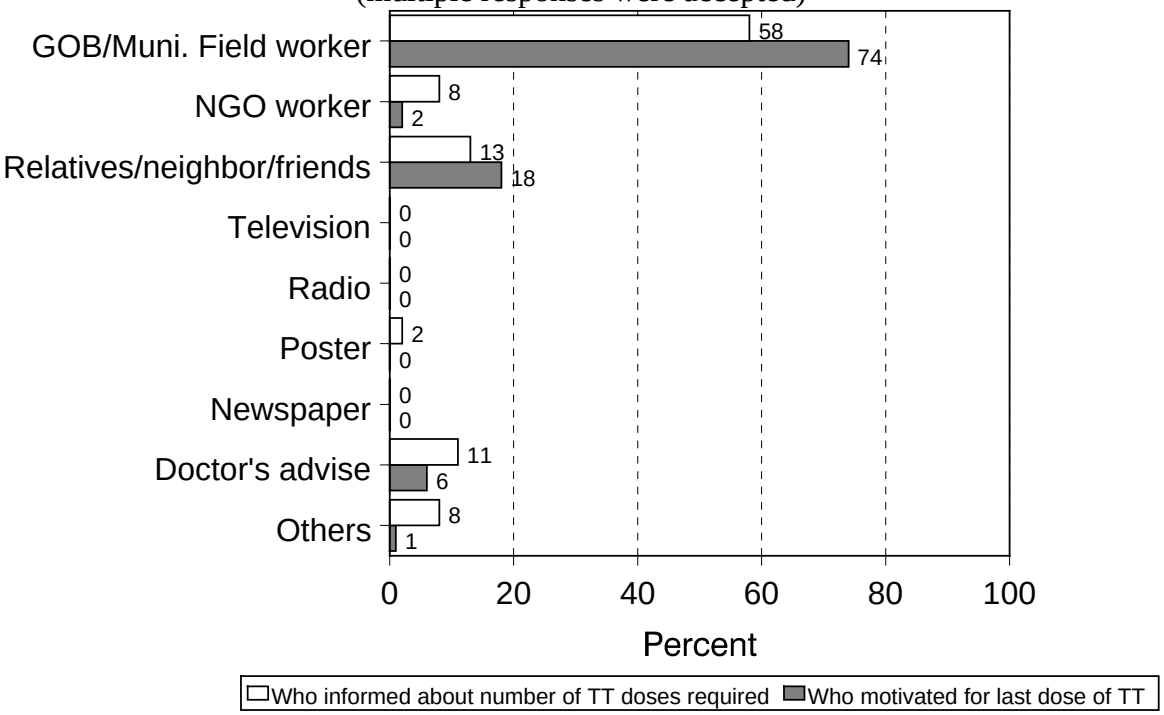
Table 3: Reasons for non-immunization and partial immunization for TT of the women

Reasons	Not immunized	Partially immunized
Did not feel the need for immunization	66%	36%
Health worker did not specify the date to return for next dose	-	7%
Unaware of the need for subsequent doses	-	23%
Fear of side effects	16%	1%
Fear of taking injections	9%	3%
Place and/or time of immunization not known	3%	1%
Vaccinator absent	3%	1%
Too busy with household works	3%	3%
Women ill, went to session but TT was not given	-	2%
Next dose is not yet due	-	22%
Others	-	3%

Information and motivation for routine TT immunization

19% of the women could mention correctly the number of doses of TT vaccine a woman should take to give her a life long protection. 11% gave a wrong answer and 70% of the women could not answer. **Chart 6** shows that those who answered right or wrong, knew it in majority of the cases from the Government or municipal health workers (58%). Relatives, neighbor and friends were the source of information in 13% of the cases. Another question was asked, "who motivated you to take the last dose of TT you took?" **Chart 6** shows that majority of them (74%) said that Government or municipal health workers motivated them. Relatives, neighbors and friends motivated them in 18% of the cases.

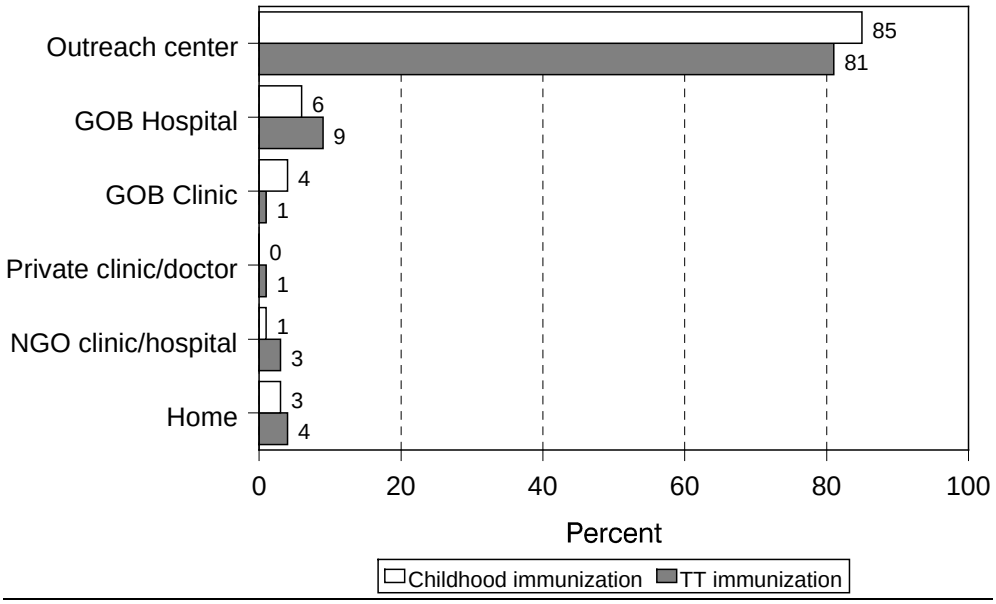
Chart 6: Source of information and motivation for routine TT immunization (multiple responses were accepted)



Providers of routine childhood and TT immunization

Chart 7 shows that childhood immunization was provided from EPI outreach centers in 85% of the cases, 10% from GOB Hospitals and clinics. Providers of routine TT immunization is almost the same as of childhood immunization.

Chart 7: Providers of routine childhood and TT immunization



C. <u>Coverage levels of NNT campaign</u>

OPV immunization during NNT campaign

87% of the children received OPV during NNT campaign conducted between August 6 and 16, 2000. 96% of them were vaccinated in the immunization centers. 4% of the children were vaccinated during house visit. NNT immunization centers were within 10 minutes walking distance in 75% of the cases and 25% centers were over 10 minutes walking distance. In 94% of the cases parents took their children to the immunization centers by walking and in only 8% of the cases they used boat/engine boat (few of the respondents said that they had to walk and also had to use boat/engine boat to reach the EPI center).

TT immunization during NNT campaign

57% of the eligible women were vaccinated with a dose of TT vaccine during NNT campaign. NNT immunization centers were within 10 minutes walking distance in 77% of the cases and 22% centers were over 10 minutes walking distance. 1% of the respondents could not answer about the distance of NNT centers. In 96% of the cases women went to the NNT centers by walking and in 6% of the cases they used boat/engine boat (few of the respondents said that they had to walk and also had to use boat/engine boat to reach the EPI center).

Reasons for not receiving OPV and TT vaccine during NNT campaign

13% of the children and 43% of the eligible women were not vaccinated with a dose of OPV and TT vaccine respectively during NNT campaign. **Chart 8 and 9** shows along with other reasons that among those non-vaccinated children 42% were not vaccinated as the children were away from their home during the campaign. Among non-vaccinated women 36% were not vaccinated as they were not aware of it.

Chart 8: Reasons for not receiving OPV during NNT campaign

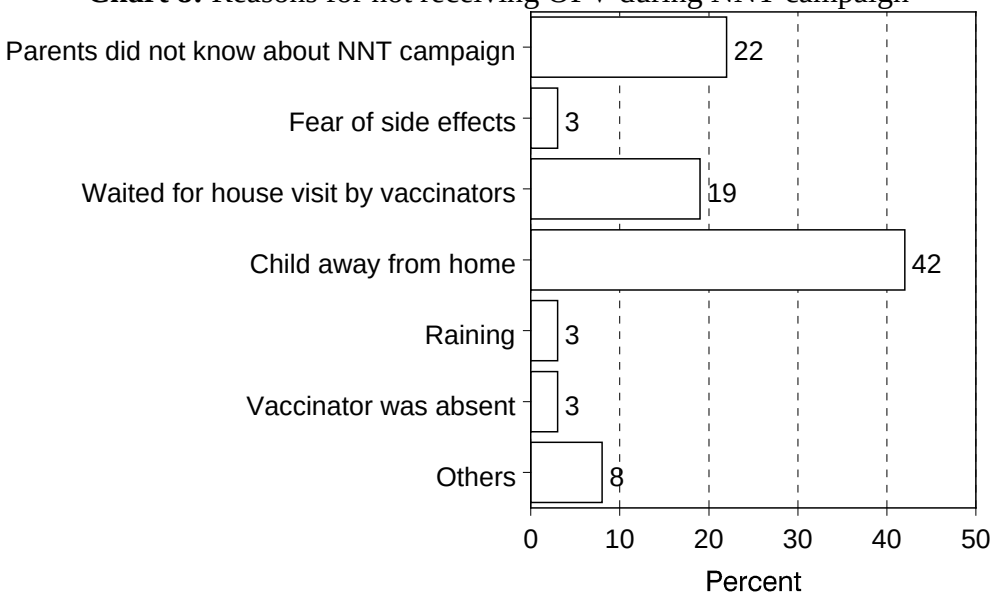
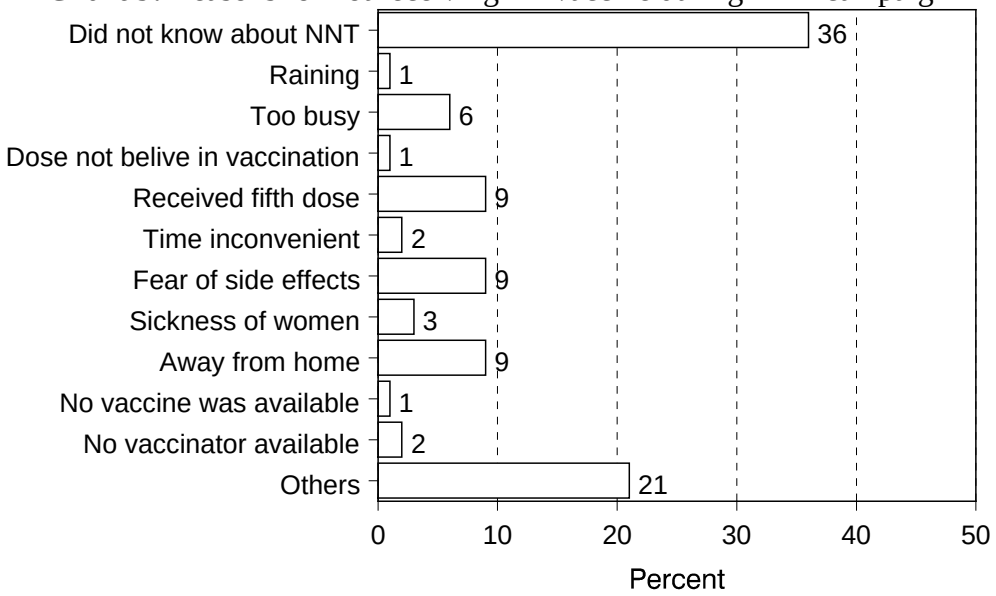


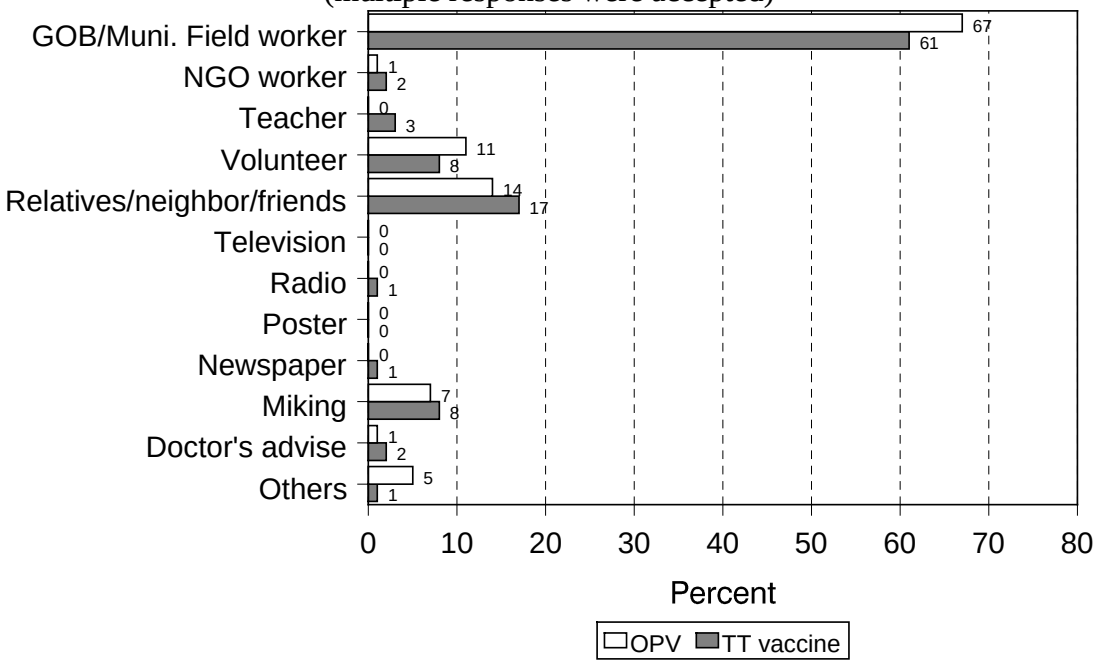
Chart 9: Reasons for not receiving TT vaccine during NNT campaign



Source of information for NNT campaign

Chart 10 shows that the most important source of information for NNT campaign was Government or Municipal field workers house visit. Relatives, neighbors and friends are important source of information too.

Chart 10: Source of information for NNT campaign
(multiple responses were accepted)



Discussion

The survey showed that 93% of the children of 12-23 months of age had access to routine immunization. But the promising start was eroded by very high drop out rate (e.g. 20% from DPT1 to DPT3 and 25% from DPT1 to measles vaccine) and by a fairly high percentage of invalid doses (8% for DPT1 and 3% for measles vaccine). 6% of the children had not been immunized at all. Child immunization cards were available in only 38% of the cases and were lost in another 42% of the cases. 85% of the women had their first dose of TT vaccine, but only 32% of the eligible women had all the required five doses of TT vaccine. 15% of the women did not receive any TT vaccine. 30% of the women had TT immunization cards and another 29% women had lost their cards. The absence of cards has got serious implications as it may mean that when a child comes to the immunization session for the second or subsequent doses, the vaccinators will have to immunize without accurately knowing the date of birth of the child and the date of previous immunization. This is another factor likely to increase the number of invalid doses given. This is also true for TT immunization where there is often a long interval between doses.

87% of the eligible children were vaccinated with a dose of OPV during NNT campaign. 57% of the eligible women received a dose of TT vaccine during the same campaign. Unaware of the campaign was stated by the female respondents in majority of the cases for non immunization with TT vaccine during NNT campaign.

Conclusions and Recommendations

Coverage levels for routine immunization of children

Access to routine immunization and low full immunization

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

The dropout rates

The high drop out rates could be reduced to acceptable levels[5,6,9] by:

- providing better counseling to parents/caretakers about the importance of each child receiving all the required antigens before 12 months. They also require advise about when and where they should take their child for the next dose. Most children will need to attend 4 immunization sessions. 25% of the children dropped out simply because their parents/caretakers did not know the importance of taking subsequent doses or the dates for taking those doses of vaccine.
- undertaking appropriate Behavior Change Communication (BCC) activities through the mass media and service providers to increase awareness of the need for children to receive all the doses of each of the antigens.
- providing refresher training and orientation to the service providers for counseling parents. It is apparent from the results of the survey that they lack the relevant technical skills and/or motivation for counseling. 4% of the parents reported that the vaccinators did not behaved well with them.

Invalid doses

A number of children received invalid doses of vaccine because they received them before the minimum age recommended for each of the antigens or before the minimum interval that should occur between the doses. This indicates the poor quality of screening, inadequate technical knowledge and/or lack of motivation of the service providers. This situation may be improved by:

- providing appropriate refresher training to the service providers to emphasize proper screening and filling of vaccination cards, to remind them about the correct ages and intervals for immunizations and checking for BCG scar at the time of measles immunization
- strengthening the support given to the service providers through supervision;
- emphasizing the need to retain and use vaccination cards by parents.

Coverage levels for TT vaccination

Access to TT vaccine (TT1) was fairly good but the rate of drop out after the second dose was very high. The coverage of 85% for TT1 reduced to 32% for TT5 and 15% had not been immunized at all. A woman of reproductive age needs to receive 5 doses of TT at appropriate intervals to acquire immunity for rest of her reproductive life. TT coverage is likely to be improved by:

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

Coverage levels for NNT campaign

87% of the children received a dose of OPV but only 57% of the eligible women received a dose of TT. Most important reason for low coverage was lack of awareness of the campaign. Improvements might be made by:

- providing appropriate BCC activities to inform parents/caretakers of the campaign and make them aware of the importance of vaccination for their children and women of child bearing age.

Reference and Resource materials

1. WHO EPI Mid Level Managers module: Evaluate Vaccination Coverage (WHO/EPI/MLM/91.11)

2. Anthony G Turner, Robert J Magnani and Muhammad Shuaib, "A not quick as quick but much cleaner alternative to the Expanded Programme on Immunization (EPI) cluster survey design", International Journal of Epidemiology, 1996, volume 25, Issue No. 1, pages 198-203.

3. COSAS 4.3 version manual, WHO, November 1991.

4. Training manual on EPI for the field workers of Ministry of Health and Family Planning, 4th edition, 1997.

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

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

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

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

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

Annex - A

The following are extracts from **Anthony G Turner, Robert J Magnani and Muhammad Shuaib's** article entitled ***"A not quick as quick but much cleaner alternative to the Expanded Programme on Immunization (EPI) cluster survey design"*** *published in the International Journal of Epidemiology in 1996, volume 25, Issue No. 1, pages 198-203.*

The standard EPI Cluster Survey Design

"The sample design for the EPI Cluster Survey is a two stage design involving the selection of 30 primary sampling units or 'clusters' (usually village or other area units), from which 210 children with a target age range (usually 12-23 months) are chosen, seven children per cluster. The sample size of 210 children (per domain or stratum) is mandated by the desire to estimate the level of immunization coverage to within +/- 10 percentage points of the true population proportion with 95% statistical confidence, assuming a design effect (i.e. *deff*) of 2.0. Based upon prior experience with immunization coverage surveys (primarily in the US), 30 clusters are generally thought to be necessary to yield sufficiently reliable estimate."

"In the standard design, clusters are chosen from a list of primary sampling units (i.e. villages, urban communities, census enumeration areas etc.) through systematic random sampling with probability proportional to estimated size (*ppes*). The latest estimates of cluster population sizes, which are assumed to be proportional to the number of children in the target age group in each cluster, are typically used as measures of size. The 30 clusters so chosen are then visited by survey field staff who carry out the second stage of sample selection and conduct the household interviews. "

"The original EPI design called for sample children to be chosen randomly from a list of all eligible children in each sample cluster. However, because the creation of lists of households and children tends to be time consuming, costly, and unfeasible in some settings, this procedure is only infrequently used in actual practice. Instead, one of several simplified second stage sampling procedures is commonly used. In one variant, children are selected by first choosing a random direction from a central location in a village or community (e.g. by spinning a bottle). The number of households in that direction to the edge of the community is then counted, and one household is randomly chosen to be the first sample household. Subsequent households are chosen by visiting the nearest neighboring households until information has been gathered on seven children. In a yet simpler variant, a direction from a central starting point is randomly chosen as described above and households are contacted as the interviewer moves in the chosen direction until the required information has been gathered for seven children."

"The second stage sampling methods described above are 'quota sampling procedures' and some of the problems resulting from the use of this approach have been noted over the years."

"First, quota sampling does not ensure that every eligible member of the target population has a known, non-zero chance of being selected. Hence, the standard EPI design, as it is usually applied, is not a true probability sample design. ……."

"A second problem concern sampling weights. …….. However, since measures of size in sampling frames are often inaccurate due to census errors and changes in population since the census was taken, application of the standard EPI Cluster Survey method does not automatically result in a self weighting sample. The survey data must be weighed in order to yield unbiased estimates. …… However, since selection probabilities are not known in most EPI Cluster Survey applications, sampling weights can not be calculated."

"Thirdly, a computer simulation study demonstrates that the EPI Cluster Survey based upon quota sampling at the second stage of sample selection is considerably more prone to sampling bias than conventional cluster sampling, particularly where immunized children are 'pocketed' within clusters. "

"Finally, there is the issue of how second stage sample selection should proceed in surveys with multiple measurement objectives."

Annex B

The following illustration describes when children surveyed first became eligible for different vaccines:

Birth dates of surveyed children ('x' marked)

|xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx|_____|

September 10, 1998 September 9, 1999 September 10, 2000 (Survey started)

Date when first eligible for BCG

|xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx|_____|

September 10, 1998 September 9, 1999 September 10, 2000 (Survey started)

Date when surveyed children were first eligible for DPT1 and OPV1

|___|xxxxxxxxxxxxxxxxxxxxxxxxx|xxx|_____|

October 22, 1998 October 21, 1999 September 10, 2000 (Survey started)

Date when surveyed children were first eligible for Measles vaccine

|_____|xxxxxxxxxxxxxxxxxxxxxxxxxxx|_____|

June 3, 1999 June 2, 2000 September 10, 2000 (Survey started)

Annex C

NNT coverage Survey in the Hard to reach and high risk areas in rural areas
List of clusters identified for survey
Total population in all hard to reach and high risk areas = 11,566,118

District	Upazila	Union	Village	Population	Cluster No.
Lalmonirhat	Hatibandha	Tangbhanga	Barai para	4050	1
Brahmanbaria	Bancharampur	Salimabad	Paikar Char	1448	2
		Purba Uzan char	Radha nagar	4308	22
	Brahmanbaria Sadar	Harashpur	Baghdia	1406	26
	Nabinagar	Natghar	Natghar	4865	29
Bhola	Tazimuddin	Bara Maloncha	Mahadevpur	2539	3
Chittagong	Bashkahli	Baharchhara	Baharchhara	2632	4
Maulvi Bazar	Kamalganj	Patanushar	Khabiraji	464	5
	Kulaura	Kadirpur	Mansur	2498	23
Bogra	Sariakandi	Bohail	Shankarpur	1509	6
Sherpur	Sreebardi	Garjarip	Garjaripa	1911	7
Narayanganj	Araihazar	Sadasardi	Ramchandardi	4699	8
Habiganj	Lakhai	Bulla	Paschim Beguni	1852	9
Thakurgaon	Baliadangi	Paria	Uttar Paria	10658	10
	Pirganj	Bairchuna	Kumaria	593	11
Rangpur	Pirgacha	Kalyani	Fakira	2951	12
Narshingdi	Shibpur	Daulalpur	Daulalpur	3540	13
Comilla	Comilla Sadar	Chouara	Bamisha Kismat	927	14
	Debiduar	Debiduar	Bhingla bari	4284	25
Noakhali	Begumganj	Chayani	Bara Mahaddipur	1501	15
		Rasulpur	Rafique pur	7316	16
Cox's Bazar	Maheshkali	Hoanak	Khorsar para	1444	17
Khishorganj	Mithamain	Keorjot	Telikhai	1874	18
Sunamganj	Chatak	Dakshin Khurma	Chandar bari	100	19
	Sulla	Sulla	Sreehail	2092	20
	Derai	Charnar Char	Kanpur	144	28
Dhaka	Dohar	Nayabari	Purbo Dhoair	1369	21
Madaripur	Madaripur Sadar	Jhaudi	Brahamandi	4325	24
Nawabganj	Shibganj	Dhaingar	Chaitanpur (Part)	2577	27
Shariatpur	Sariatpur Sadar	Domsar	Char Koarpur	1603	30

Acknowledgements

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

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

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

Report preparation:
Dr. Bikash Ranjan Roy

Report review:
Dr. Pierre Claquin, Chief of Party, IOCH/MSH
Dr. E.G.P. Haran, Senior Child Health Advisor, IOCH/MSH
Md. Mafizur Rahman, Monitoring and Evaluation Specialist, IOCH/MSH

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

Cover photo:
Moumina Dorgabekova/Image Jinn

Survey team members:

1	Mr. Nurul Amin Khan	Polio Eradication Facilitator
2	Mr. Mamunur Rashid	Polio Eradication Facilitator
3	Mr. Sahadat Hossain	Polio Eradication Facilitator
4	Mr. Ali Ahmed	Polio Eradication Facilitator
5	Mr. Tohidul Islam	Polio Eradication Facilitator
6	Mr. Mizanur Rahman	Polio Eradication Facilitator
7	Mr. Ziaur Rahman	Polio Eradication Facilitator
8	Mohd. Sahadat Hossain	Polio Eradication Facilitator
9	Mr. S.M Faruq Bin Noor	Polio Eradication Facilitator
10	Mr. Shahjahan Hossain	Polio Eradication Facilitator
11	Mr. Wazed Ali	Polio Eradication Facilitator
12	Mr. Raymond Gomez	Polio Eradication Facilitator
13	Mr. Mamun-ur Rashid	Polio Eradication Facilitator
14	Mr. Jahangir Alom	Polio Eradication Facilitator
15	Mr.Bodrul Alam Mostazir	Polio Eradication Facilitator
16	Mr. Biswanath Biswas	Polio Eradication Facilitator
17	Mr. Mahabub Alam Takulder	Polio Eradication Facilitator
18	Mr. Mahafuzur Rahman	Polio Eradication Facilitator
19	Mr. Khodadad Talukder	Polio Eradication Facilitator
20	Mr. Akhter Hossain	Polio Eradication Facilitator
21	Mr. Gias Uddin Parvez	Polio Eradication Facilitator
22	Mr. Dhiraj Chambugong	Polio Eradication Facilitator
23	Md. Shamsuzzaman Sarker	Polio Eradication Facilitator

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

Unicef & IOCH Survey Reports

1. Vaccination Coverage Survey of the Teknaf and Ukhia Upazilas- February 2000. Survey Report No. 01, August2000
2. Vaccination Coverage Survey of the Brahmanbaria Sadar Upazila- February 2000. Survey Report No. 02, August 2000
3. Vaccination Coverage Survey of the Debidwar Upazila- February 2000. Survey Report No. 03, August 2000
4. Vaccination Coverage Survey of the Madaripur Upazila- February 2000. Survey Report No. 04, August 2000
5. Vaccination Coverage Survey of the Maulvi Bazar District- February 2000. Survey Report No. 05, August 2000
6. Vaccination Coverage Survey of the Raumari Upazila - February 2000. Survey Report No. 06, August 2000
7. Vaccination Coverage Survey of the Gangachara Upazila - February 2000. Survey Report No. 07, August 2000
8. Vaccination Coverage Survey of Chittagong Hill Tracts - February 2000. Survey Report No. 08, 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. 01, July 2000

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

Mamunul Haque, Communications Advisor, IOCH. E-mail: **mh@citechco.net**