



IOCH
Immunization and Other Child Health Project

**Vaccination Coverage Survey of the Slums of
Dhaka City Corporation- January 2000**

Dhaka Slums of Zones 3, 8, 9 & 10

Survey Report No. 11

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Acronyms

BCC	Behaviour Change Communication
BCG	Bacillus of Calmette and Guerin
CES	Coverage Evaluation Survey
COSAS	Coverage Survey Analysis System
DCC	Dhaka City Corporation
DMA	Data Management Aid
DPT	Diphtheria, Pertussis and Tetanus
EPI	Expanded Program on Immunization
IOCH	Immunization and Other Child Health
MNT	Measles and Neonatal Tetanus
MSH	Management Sciences for Health
NGO	Non Governmental Organization
NID	National Immunization Day
OPV	Oral Polio Vaccine
TT	Tetanus Toxoid
UNICEF	United Nations Childrens Fund
Upazilla	Sub district (previously known as Thana)
UPHCP	Urban Primary Health Care Project
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.

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.

The **criteria for a valid dose** used in this survey is the criteria recognised 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.

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

Executive Summary

Background

Between January 9-19, 2000 a coverage evaluation survey was conducted by IOCH in the slums of Zones 3, 8, 9 and 10 of Dhaka City Corporation (DCC) to assist (inter alia) an imminent international Urban EPI Review.

Objectives

The principal objectives of the survey were to assess:

- a) the levels of immunization coverage of children (12-23 months);
- b) the levels of TT immunization coverage in women of child bearing age (15-49 years);
- c) the OPV and Vitamin A coverage levels achieved during the sixth round of NIDs conducted in Nov-Dec 1999; and
- d) the measles and OPV coverage achieved during the September 1999 MNT campaign.

Coverage Levels for the Routine Immunization of Children

Access: 83% of the children had 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, 17% of the children did not receive any dose of vaccine.

Crude coverage between 12-23 months: 83% of the children received BCG, 64% received three doses of OPV, 62% received three doses of DPT and 54% were vaccinated against measles.

Valid coverage between 12-23 months: 83% of the children received BCG, 50% received three doses of OPV, 49% received three doses of DPT and 46% received measles vaccine.

Valid coverage by 12 months: 80% of the children received BCG, 47% received three doses of OPV, 45% received three doses of DPT and 39% received measles vaccine.

Reasons for non-immunization and partial immunization of children: The main reasons for non-immunization and partial immunization were the lack of knowledge by the parents/caretakers about the importance of immunization and in particular the need to return for subsequent doses. Fear of side reactions, the lack of knowledge about place and/or time of immunization sessions and family problems, including illness of mothers were also important factors behind low immunization coverage.

Problems detected: Although access to immunization was fairly high, there was a very high drop out rate (25% from DPT1 to DPT3 and 35% from DPT1 to measles vaccine) and a number of invalid doses due to early immunization (13% for DPT1 and 16% for measles vaccine). A small percentage of uncorrected missed opportunities occurred at the immunization sessions (range 1% - 6% for different antigens). Child immunization cards were preserved in only 53% of the cases and they were lost in another 32% cases.

Coverage Levels for the TT Immunization of Women

68% of women of childbearing age (15-49 years) received a first dose of TT. Only 26% received the five doses of TT vaccine. 33% of the women living in these slums did not receive any dose of TT vaccine.

Reasons for non-immunization and partial immunization of the women: The major reasons cited for non-immunization were that the women were not aware of the need for immunization or the place and/or time of immunization sessions were not known to them. Whereas the major reasons for partial immunization were that they were unaware of need of immunization or unaware of need to return for subsequent doses.

Coverage Levels in the 6th NID Campaign

The coverage figures were not particularly good with only 67% of children below the age of 5 years receiving both doses of OPV during the sixth NIDs. It means that there were many children who received only one dose of OPV or no dose of OPV during the 6th NID campaign. This occurred at a time when every child under five years should have two doses of OPV during each NID campaign in order for Bangladesh to achieve its goal of being a “Polio free country”.

Vitamin A capsules were given to 78% of the eligible children on the second round of the sixth NID campaign.

Reasons for non-immunization in the sixth NID campaign: The main causes for non-immunization during NIDs were that parents were not aware of the campaign or they did not know where the NID immunization sites were.

Coverage Levels in the September 1999 MNT Campaign

Only 22% of the eligible children received measles vaccine and 42% received a dose of OPV during the MNT campaign. The lower than the expected figures may have been affected by poor recall as the survey took place four months after the campaign.

Suggested solutions

The survey indicates a need for appropriate information being given to the parents / caretakers in an effective way about the importance of each child being fully immunized (preferably before 12 months) and about how to achieve full immunization (the time and place of immunization sessions, the number of doses required) and promoting the details of the NID and MNT campaigns. The women of childbearing age require more education about how to prevent neonatal tetanus with 5 doses of TT vaccine. 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 counselling parents about EPI.

Introduction

Bangladesh is experiencing one of the highest growth rates in urban population in the world. A major consequence of the surge in this urban population is the rapid growth of slums and squatter settlements with urban poor. There are clear indications that the health situation in most of these areas is worse than in the rural areas^{5,7,8,13}.

In and around urban slums, EPI vaccination is carried out by a variety of private and public providers at fixed (hospitals, clinics, dispensaries, etc.) and at outreach sites. The doses provided are supposed to be reported to the City Corporation health authority on a monthly basis. After compilation, the data is submitted to the Civil Surgeon's office that aggregates it with other district results and sends it on to 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 data is generally unreliable^{5,8} and does not provide specific information on the slums areas. IOCH therefore decided to carry out a survey to obtain data on the status of the immunization coverage of the children and women living in the slums, as well as on the operational profile of the provision of immunization services. In January 2000, this survey was conducted in part of the Dhaka City Corporation (Zones 3, 8, 9 and 10) with the objectives mentioned below. The preliminary results were made available for the international Urban EPI Review that began at the end of January 2000.

Objectives

The overall objective of the survey was to assess the level of immunization coverage in the urban slums of DCC. The specific objectives were to:

- a) assess the level of immunization coverage of children (12-23 months) and find out the reasons for non-immunization and partial immunization
- b) assess TT immunization coverage among women of 15-49 years of age irrespective of their marital status and find out reasons for non-immunization and partial immunization
- c) assess the coverage levels of OPV and Vitamin A during the sixth round of NIDs, and
- d) assess the coverage levels achieved during the MNT campaign conducted in September 1999.

Methodology and its Limitations

The survey followed the WHO recommended 30-cluster survey method¹, 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 from 30 clusters (7 children 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 January 9, 1998 to January 8, 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. Seven women (between 15-49 years of age, irrespective of their marital status) were selected to ascertain their tetanus toxoid vaccination status. Another 7 children of 0-59 months of age (children born between January 9, 1995 and January 8, 2000) were selected for information about the vaccinations they received during the MNT and NID campaigns.

The 30 clusters were chosen randomly from a cumulative list of the populations of DCC slums prepared by UNICEF in 1998. These are identified in **Annex C** and their location is shown on the following map. The WHO standard questionnaire was used in this survey for documenting child and women immunization status. A separate questionnaire was used for collecting data for the NID/MNT campaigns.

“Data Management Aid” (DMA) a local consulting firm with proven experience in conducting similar surveys was hired through a competitive bidding process to collect the information. DMA recruited the surveyors and supervisors. It also provided two days orientation (one day in the office and another day in the field - actually doing a test survey in a slum area in Dhaka City) for the surveyors and supervisors. IOCH/MSH provided technical support for their orientation. In the field there was a team of two surveyors (male/female) of DMA assigned to one cluster per day. They collected information by checking vaccination cards and also by interviewing parents/care takers. One supervisor was assigned to two teams of surveyors. IOCH had its own team in the field for quality control. At the end of each day the quality control team collected all the forms from the surveyors and they then randomly identified two sample respondents from each of the target groups in each cluster and re-interviewed them on the following day to check the quality of data collected. On that evening, discussions took place with the concerned interview team to resolve any inconsistencies.

All checked questionnaires were handed over to IOCH after completion. Data entry and analysis was done by IOCH using COSAS 4.3³ and “EPI Info” programs. The provisional data was shared with the International Urban EPI Review Team in January 2000. The final report was prepared by the Monitoring and Evaluation Unit, IOCH/MSH Project.

Limitations of the 30-cluster survey method

Although the survey's method is relatively simple it has several limitations² that can be grouped into two types:

Linked to the sampling method:

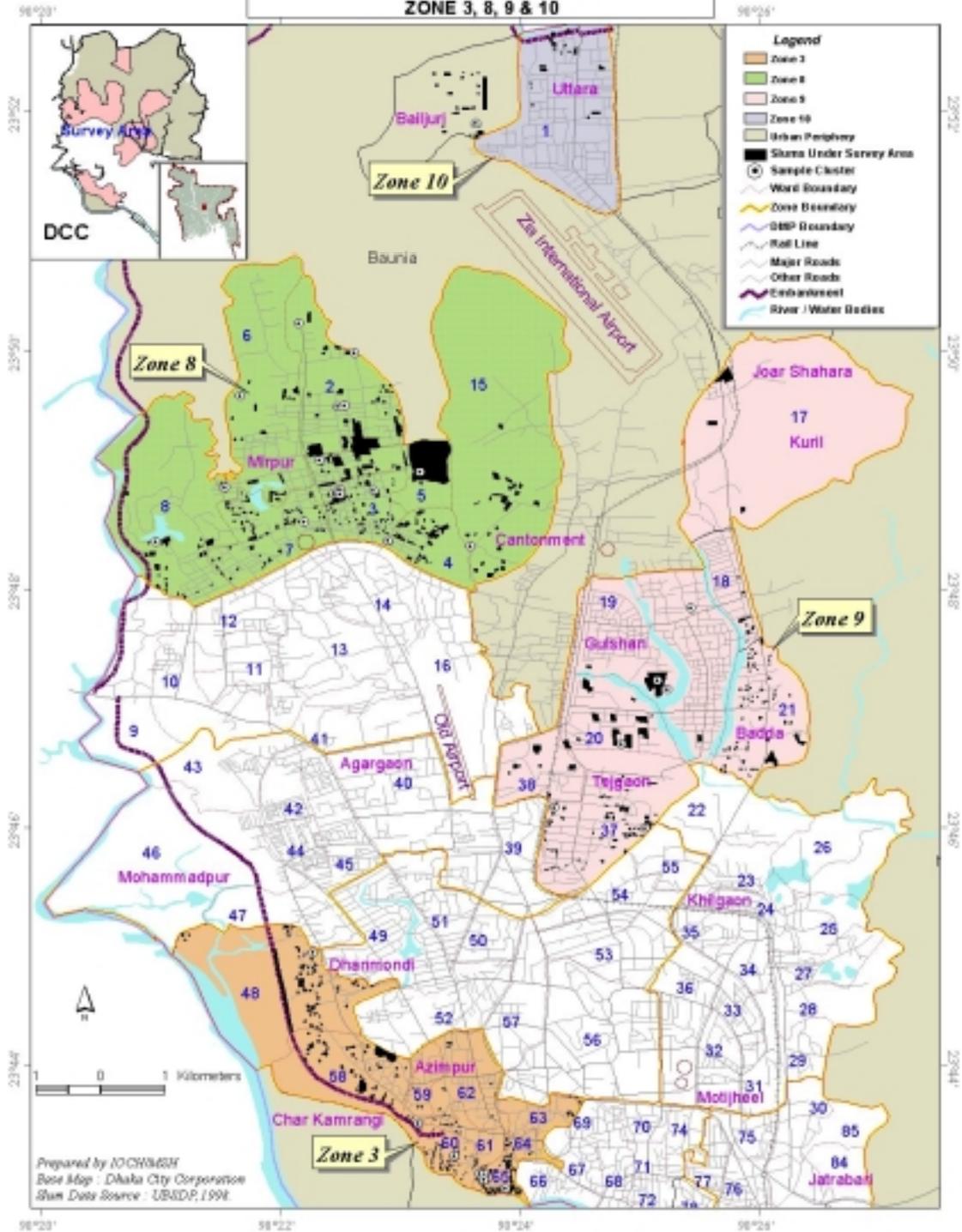
- As an inherent bias in the sampling technique in 30 clusters, bigger slums are more likely to be selected as a cluster. The survey leaves out scattered small slums with usually poor access to services. It also does not reflect the lack of uniformity in service availability or the behavior of particular populations.
- There is a wide confidence interval (+/- 10%). It means that if the result for example, shows 38% of children in DCC slum areas received valid measles immunization, then the "true" figure of measles immunization could be anywhere between $(38-10) = 28\%$ and $(38+10) = 48\%$. 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 survey findings.
- 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 at the centre of the slum to the end of the slum 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 too 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.

**URBAN SLUMS EPI COVERAGE SURVEY AREAS
DHAKA CITY CORPORATION
ZONE 3, 8, 9 & 10**



Results

A. Routine Immunization coverage of children

Coverage Levels (card plus history data of COSAS analysis)

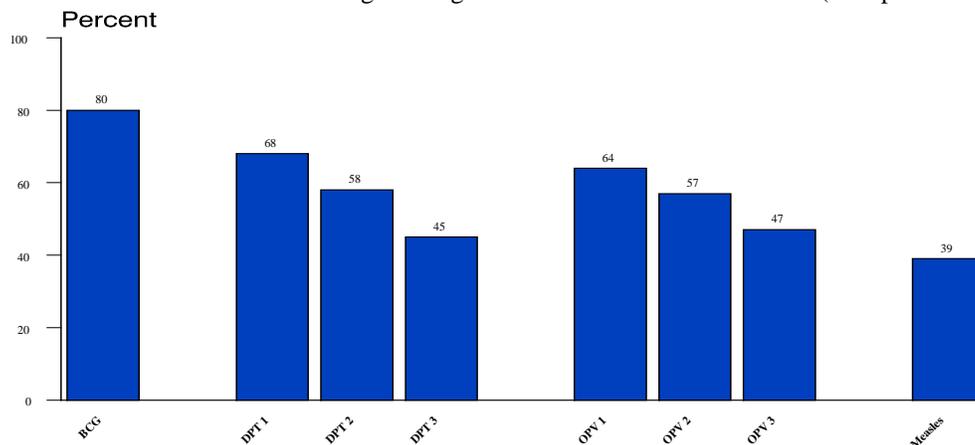
Table 1 shows the coverage levels of children between 12-23 months and their vaccination status at 12 months of age. The crude data figures for the 12-23 month age group indicate that 64% of the children received three doses of OPV, 62% received three doses of DPT and 54% were vaccinated against measles. The valid coverage levels are considerably lower (except BCG), only 50% of children received three valid doses of OPV, 49% received three doses of DPT and 46% were vaccinated against measles. 17% of the children had not been immunized at all by 23 months and were therefore not reached by the routine EPI program.

Table 1: Routine immunization coverage levels of children in DCC slums (card plus history data)

	Coverage (%) Immunized by 23 months		Coverage (%) Immunized by 12 months
	Crude data (Access)	Valid data	Valid data
BCG	83%	83%	80%
OPV 1	79%	68%	64%
OPV 2	73%	59%	57%
OPV 3	64%	50%	47%
DPT 1	83%	72%	68%
DPT 2	73%	61%	58%
DPT 3	62%	49%	45%
Measles	54%	46%	39%
Zero dose	17%	--	--

Table 1 shows little difference (except for Measles) between the valid data of immunization of 12-23 months age group and the valid data by 12 months. **Chart 1** shows the actual coverage for children less than 12 months.

Chart 1: Immunization coverage among children less than 12 months old (card plus history data)

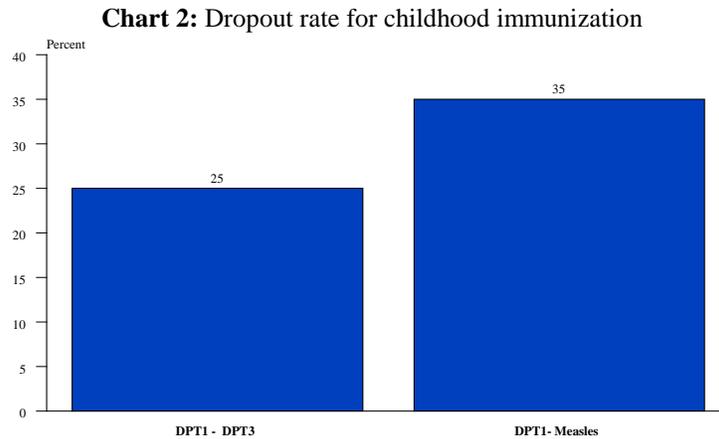


Program access [(percent of children surveyed who received DPT 1st dose (crude data - by card plus history)]

Access to immunization was fairly good, as 83% of children received a 1st dose of DPT.

Program continuity (dropout rate)

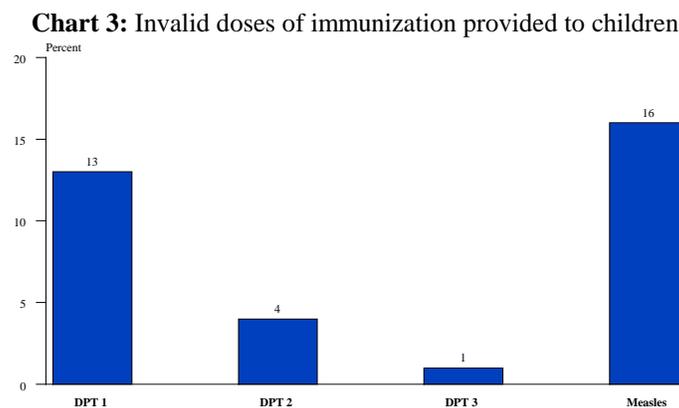
Crude data for antigens received by 12-23 months of age is used for calculating the dropout rate. In this survey, the DPT1 to DPT3 dropout rate was 25% and DPT1 to measles dropout rate was 35% (**Chart 2**). It should be kept in mind, however, that slum populations have been described as highly mobile and that children may move away by the time that they are eligible for another dose.



Program quality

Adherence to the immunization schedule – invalid doses

Adherence to the immunization schedule is generally considered to be the major indicator of program quality⁴. The data indicates that the provider’s performances reduced the coverage of DPT1 from an initial access of 83% measured by crude data to a coverage of 72% (valid data) for children between 12-23 months of age. A similar trend is seen for the other antigens excepting BCG (**Table 1**). 13% of children received an invalid dose of DPT1 and another 16% received an invalid dose of measles vaccine due to vaccinations given to them before the minimum required age. 4% of children received DPT second dose less than 4 weeks after the first dose of DPT, and another 1% received DPT3 less than 4 weeks after they received DPT2 (**Chart 3**).



BCG vaccination

83% children surveyed received BCG vaccine based on card plus history data. 73% of the children were found with a BCG scar. 12% of the children with BCG vaccine did not produce a visible scar.

Missed opportunities of immunization

The prevalence of uncorrected missed opportunities for immunization was low (range 1% for BCG, DPT1 and DPT2 to 6% for measles). The overall measles coverage would therefore be 6% higher than the survey finding if there had been no missed opportunities. However, the total missed opportunities (uncorrected plus corrected) were relatively higher, ranging from 2% for BCG and OPV2 to 10% for Measles. (**Table 2**).

Table 2: Missed opportunities of vaccination at the vaccination sessions

Vaccine	Uncorrected missed opportunity	Corrected missed opportunity	Total missed opportunity
BCG	1%	1%	2%
DPT1	1%	3%	4%
DPT2	1%	2%	2%
DPT3	3%	1%	5%
OPV1	3%	4%	7%
OPV2	1%	2%	3%
OPV3	2%	1%	3%
Measles	6%	4%	10%

Availability of documentation of immunization

Only 53% of child immunization cards were available. Immunization cards were issued but lost in another 32% of cases.

Reasons for non-immunization and partial immunization of children

Table 3 shows that parents of children cited the following reasons for non-immunization: a) unaware of the need for immunization (79%); b) fear of side reactions (26%); c) place and/ or time of vaccination session was unknown (11%) and d) family problems, including illness of mothers (11%). Whereas the major reasons cited by parents for partial immunization were: a) unaware of need of return for second and third dose (46%); b) unaware of need for immunization (18%) and c) parents were too busy (9%).

Table 3: Reasons for non-immunization and partial immunization of children *

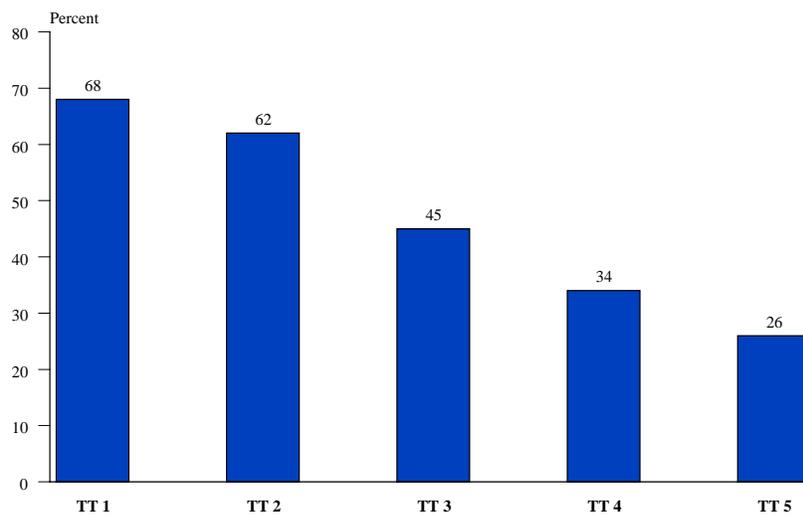
Reasons	Non immunized	Partially immunized
Unaware of need for immunization	79%	18%
Unaware of need of return for 2 nd or 3 rd dose	-	46%
Place and/or time of immunization unknown	11%	6%
Fear of side reactions	26%	4%
Wrong ideas about contraindications	-	4%
Other reasons related to lack of information	-	7%
No faith in immunization	5%	-
Rumours	-	-
Postponed until another time	-	2%
Place of immunization too far	-	4%
Time of immunization session inconvenient	-	1%
Vaccinator was absent	-	5%
Mother too busy	-	9%
Family problem, including illness of mother	11%	-
Child ill, not brought	-	6%
Child ill, brought but not given immunization	-	5%
Long waiting time	-	1%
Other reasons related to obstacles	11%	6%

* Almost but not all mothers /caretakers provided answers. *Multiple answers were accepted.*

B. Routine TT immunization coverage of women

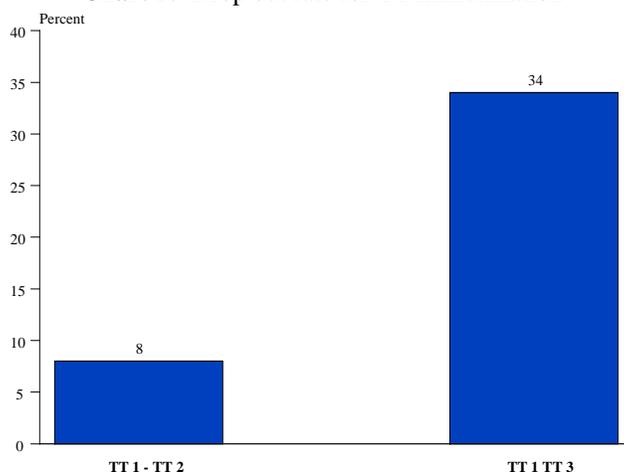
68% (based on crude data) of the women had access to a first dose of TT. 62% of the women received two or more doses of TT vaccine. Only 26% had received all the 5 required doses (Chart 4). 33% of the women surveyed had not received any doses of TT vaccine.

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



The dropout rate from TT first dose to TT second dose was 8% and the dropout rate from TT first dose to TT third dose was 34% (**Chart 5**). Survey findings also indicate that 4% women missed an opportunity for TT (first dose) immunization during their antenatal check-ups. Only 18% of the women had TT immunization cards.

Chart 5: Drop out rate for TT immunization



Reasons for non-immunization and partial TT immunization of women

Table 4 indicates that the major reasons cited for non-immunization of women were as follows: a) don't feel need for immunization (89%); b) place and/ or time of immunization unknown(11%); and c) no faith in immunization (11%). Whereas the major reasons cited for partial immunization of women were as follows: a) don't feel need for immunization (44%); b) unaware of need of return for subsequent doses (35%); c) mother was too busy; and c) place and time of immunization were unknown (5%).

Table 4: Reasons for non-immunization and partial immunization for TT of women aged 15-49 years*

Reasons	Not Immunized	Partially Immunized
Don't feel need for immunization	89%	44%
Fear of side reactions	5%	5%
No faith in immunization	11%	2%
Unaware of need of return for subsequent doses	-	35%
Next dose is not yet due	-	5%
Place and/or time of immunization unknown	11%	5%
Wrong ideas about contraindications	-	2%
Others reasons related to lack of information	9%	2%
Rumours	2%	2%
Others reasons related to lack of motivation	2%	4%
Place of immunization too far	2%	-
Mother was too busy	-	5%
Family problem including illness of women	2%	3%
Nobody took the women to EPI center	-	2%
Other reasons related to obstacles	2%	3%

* Multiple responses were accepted.

C. Coverage Levels in the 6th NID Campaign

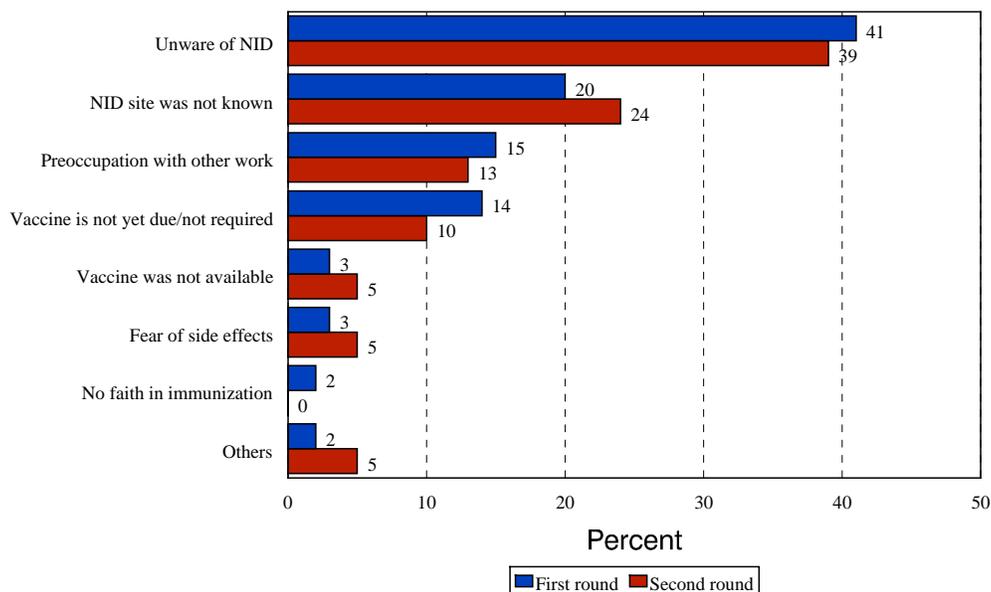
OPV coverage

70% of children below 5 years of age received OPV during the first round and 81% during the second round of the 6th NID Campaign. 67% of the children were covered by both rounds.

Reasons for non-immunization

The main reason invoked for not being immunized at the NIDs was the lack of knowledge of the campaign. This together with the other reasons is shown in **Chart 6**.

Chart 6: Reasons for non-immunizations during the 6th NIDs



High potency Vitamin A coverage and reasons for not receiving Vitamin A

During the second round of the 6th NID campaign, a high potency vitamin A capsule was also administered to 78% of the children between one and five years.

Table 5 indicates the major reasons given by the parents for their child not having the vitamin A capsule: a) unaware of NID campaign (33%); b) NID site was not known to them (26%) and c) they felt that vitamin-A was not yet due or required for their children (16%).

Table 5: Reasons for not accepting the Vitamin A capsule during the 6th NID

Reasons	Percent
Unaware of NID	33%
NID site was not known	26%
Preoccupation with other works	14%
Vitamin A is not yet due/required	16%
Fear of side reactions	5%
Others	3%

Places of vaccination during the 6th NIDs

The majority of the children received the OPV and Vitamin A capsules from the NID vaccination sites (**Table 6**). A few, however, were vaccinated and received Vitamin A during the house-to-house search conducted after the NIDs.

Table 6: Places of vaccination during the 6th NIDs

		NID site	Home	Road	Railway station	Others
OPV	1 st round	85%	5%	5%	1%	4%
	2 nd round	91%	4%	2%	1%	3%
Vitamin A capsule	2 nd round	90%	5%	2%	1%	2%

D. Coverage Levels in the MNT Campaign

Coverage levels

The MNT campaign was conducted in the slums of DCC in September 1999. 22% of eligible children received measles vaccine during that campaign. 42% of children received a dose of OPV. It may be noted that the survey was conducted 4 months after the MNT Campaign, and as such recall bias might have contributed to underestimation of coverage level.

Reasons for non-immunization

Table 7 indicates that the majority of parents of the children who were not immunized for OPV and/or measles were either unaware of the MNT campaign or did not know where the MNT site was. A sizable number of parents believed that the vaccine was not required.

Table 7: Reasons for non-immunization during the MNT Campaign

Reasons	Measles vaccine	OPV vaccine
Unaware of MNT	38%	48%
MNT site was not known	20%	24%
Vaccine was not available	4%	4%
Preoccupation with other work	6%	5%
Vaccine was not due or required	19%	15%
Fear of side effects	5%	2%
Vaccine not available	4%	4%
No faith in immunization	1%	1%
Others	6%	-

Places of vaccination during the MNT campaign

Table 8 shows that the majority of children who received OPV and the measles vaccine during the MNT campaign, received it from MNT vaccination sites. A few children were vaccinated at home or other places.

Table 8: Places of immunization during the MNT Campaign

	MNT site	Home	Road	Railway station	Others
OPV	89%	5%	4%	-	3%
Measles	83%	2%	7%	2%	5%

Discussions

The survey showed that 83% of the children had access to routine immunization and that is a significant achievement for slum areas. 27% had received a valid BCG vaccination before 6 weeks of age, which is a testimony of some parent's awareness of the need for vaccinating their children at the earliest opportunity. But the promising start was eroded by the very high dropout rate (e.g. 25% from DPT1 to DPT3 and 35% from DPT1 to Measles vaccine) and by the number of invalid doses (13% for DPT1 and 16% for measles vaccine). Significantly, 17% of the children surveyed had not been immunized at all. This is indicative of the poor quality of the EPI services. Immunization cards of children were found in 53% cases during the survey. Another 32% child immunization cards were lost. 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.

The coverage of the 6th NID campaign in the slums of DCC, particularly in the Zones 3, 8, 9 and 10 was not satisfactory. Only 67% of the children surveyed between 0 – 5 years in the slums were given 2 doses of OPV. This implies that one-third of the children 0-59 months did not receive any or only one dose of OPV. This occurred at a time when the goal of each of the NID campaigns is to vaccinate each and every child under five years with two doses of OPV.

Conclusions and Recommendations

Coverage levels for routine immunization of children

Access to routine immunization

Access to routine immunization for children in the slums of Dhaka City Corporation was found to be satisfactory, given the practical constraints in health services delivery systems in DCC. 83% of children received the first dose of DPT. But this level of coverage 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 the high drop out rates and also to the number of invalid doses and missed opportunities.

The dropout rates

The high dropout rates may be reduced to an acceptable level^{5,6,9,11} by:

- providing better counseling to parents/caretakers about the importance of each child receiving all the required antigens before 12 months. They also require advice about when and where they should take their child for the next dose. Most children will need to attend 4 immunization sessions. Nearly half of the parents of the children (46%) who dropped out reported that it was because they did not know that they were required to return to the EPI center with their children for subsequent doses. The other important reasons for dropout include sickness of the child or other family problems, including mother's illness.
- 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 and women of child bearing age about immunization. It is apparent from the results of the survey that they lack the relevant technical skills and/or motivation for counseling. Some parents reported that they had never received any immunization information from a health worker and others complained that they had not been talked to at all. A significant proportion of parents reported that they were never informed of the place and/or time of vaccination sessions, and were never asked to return for 2nd or 3rd doses.

Invalid doses

A number of the 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, more than 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 and to remind them about the correct ages and intervals for immunizations
- strengthening the support given to the service providers through supervision;
- emphasizing the need to retain and use vaccination cards.

Children not being immunized (zero dose)

17% of the children surveyed were not immunized at all. The main reasons were that parents were not aware of need for immunization (79%), that the mothers were afraid of side reactions (26%) or place and/or time of vaccination session were unknown (11%). This situation may be improved by undertaking appropriate BCC activities to reach this still un-reached population and to increase the awareness of the parents for the need for immunization.

Missed Opportunities

The rate of uncorrected missed opportunities for immunizations was low (range varied from 1% and 6%). The missed opportunities could still be reduced further by:

- checking children's immunization records at each immunization session and immunizing them for doses if eligible
- providing appropriate training to the service providers

Coverage levels for TT vaccination

Access to TT vaccine (TT1) was low and the rate of drop out after the second dose was very high. The coverage of 68% for TT1 reduced to 26% for TT5, and 33% of the women surveyed had never received any dose of TT vaccine. A woman of reproductive age needs to receive 5 doses of TT to acquire immunity for rest of her reproductive life. TT coverage is likely to be improved by:

- checking 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 giving a dose of TT if it is required
- undertaking appropriate BCC activities to increase awareness of the women of child bearing age of the need for 5 doses of TT vaccinations
- providing refresher training to the service providers on the TT vaccination requirements

Coverage levels for the 6th round of NIDs

The coverage levels of the 6th NID campaign were not at a satisfactory level (only 67% receiving both doses) and so a significant number of children did not receive two doses of OPV. This occurred at a time when every child under five years should receive two doses of OPV in each NID campaign in order for Bangladesh to achieve its goal of being a "Polio free country". Improvements might be made by:

- increasing and improving the BCC activities to ensure that each parent/caretaker is aware that each and every child under 5 years must receive polio vaccine during both rounds of each NID campaign planned in 2000;
- paying particular attention to immunizing the slum populations.

Reference and Resource Materials

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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."

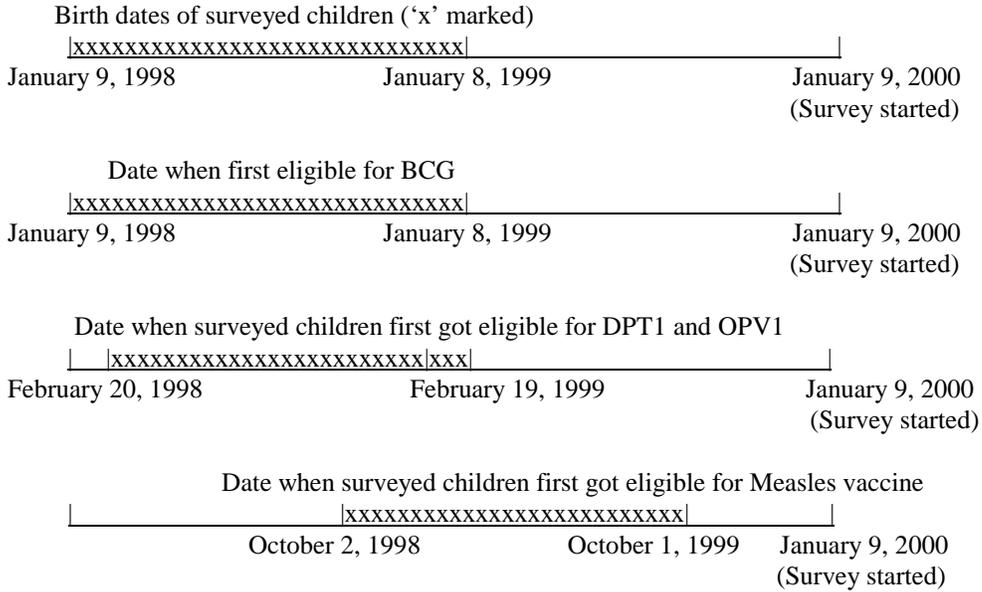
"A second problem concern sampling weights. However, since measures of size in sampling frames are often inaccurate due to census errors and changes in population since the census was taken, application of the standard EPI Cluster Survey method does not automatically result in a self weighting sample. 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:



Annex C

List of selected slum clusters in the zones 3, 8, 9 and 10 of DCC

Cluster #	Ward	Name of Slum	Address	No. of HHs	Total Population
1	48	Mina Ahmed er Bari	227/1/A Modhu Bazar, West Dhanmondi.	26	142
2	59	Hossain Uddin Basteer	58/2 Hossian Uddin Khan 1st Lane	1978	10820
3	60	Prof. Kuddus er Bari	135 Shahid Nagar	11	60
4	65	Kalu Mistri er Bari	58/12A Purbo Islambag	11	60
5	65	Hafiz Molla er Bari	70/28 Kha Paschim Islambag	9999	54695
6					
7					
8	2	B Block Basteer	Sec 12 Block B Mirpur	1633	8933
9	2	Balur Math 6 No. Basteer	12E Mirpur	580	3173
10	2	Kurmitola Bihari Camp	Dhakin Kalsi Sec 12 Mirpur	1600	8752
11	2	School Camp	D Block Sec 12 Mirpur	150	821
12	3	Harun ur Rashid er Bari	10 No. B Block Road 5 House 17 Mirpur	11	60
13	3	Hazi Azim Saheber Bari	46/1 Baishtek	45	246
14	5	Biniabad Punarbhashan Prokolpa Basteer	Sec 11 Pallabi Mirpur	10221	55909
15					
16					
17	5	Muslim Camp Basteer	Sec. 10 Block A Mirpur	255	1395
18	5	Talab Camp+Irani Camp	Sec 11 Block B Mirpur	668	3654
19	6	Nabab Ali Matbor+Alomgir	22 Duary Para Mirpur	300	1641
20	6	Fazer Ali Matbor/West side of Zhil	Road 7 to 12 Shialbari Mirpur	1200	6564
21	7	Mamun er Bari	Plot 7 No.1 Hazi Road Mirpur 2, Shailbari	15	82
22	8	Navir Basti/Unus Chan Molla/ Razzak	Block H, Gudaraghat, Behind Bazar, Mirpur	81	443
23	15	Mongol Member/Nagor Miah/Felu	Basteer 1 Vashantek Cantonment	350	1915
24	19	Gulshan No. 1 Taltala park busstand	1 No. Gulshan	354	1936
25	19	Kuril Basteer	19 No. Ward Gulshan	6050	33094
26	19	Momin Bhashani Vasteer	1 No. Gulshan Taltala More	44	241
27	20	Sattala Dakhin para Basteer	Sattala Dakkin para Basteer, Mohakhali.	1150	6291
28	37	Abdur Rab, Emdad Hoain, Shahidullah	22-6 A-3 22/Ka, 22/6/1/Ka Modhya Kuni	119	651
29	37	Tejgaon Supply Gate	Truck Stand, Tejgaon	28	153
30	1	Bailjhuri Basteer (Sonargaon Road Sang)	Sec 13 Uttara	112	613

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