



IOCH
Immunization and Other Child Health Project

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

Survey Report No 4

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Acronyms

BASICS	Basic Support for Institutionalizing Child Survival
BCC	Behaviour Change Communication
BCG	Bacillus of Calmette and Guerin
KCC	Khulna City Corporation
CES	Coverage Evaluation Survey
COSAS	Coverage Survey Analysis System
DMA	Data Management Aid
DPT	Diphtheria, Pertussis and Tetanus
EPI	Expanded Program on Immunization
IOCH	Immunization and Other Child Health
LQAS	Lot Quality Assurance Sampling Survey
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
Upazila	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 or 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 15-18, 2000 a coverage evaluation survey was conducted by IOCH in the slums of Khulna City Corporation (KCC), 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 levels 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, 16% of the children did not receive any immunization.

Crude coverage between 12-23 months: 83% of the children received BCG, 76% received three doses of OPV, 74% received three doses of DPT and 63% were vaccinated against measles.

Valid coverage between 12-23 months: 83% of the children received BCG, 59% received three doses of OPV, 57% received three doses of DPT and 59% received measles vaccine.

Valid coverage by 12 months: 83% of the children received BCG, 57% received three doses of OPV, 56% received three doses of DPT and 53% 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. Some of the women did not know the time and place of immunization. Few more had fear about side effects of immunization.

Problems detected: Although the access to immunization was fairly high, there was very high dropout rate (11% from DPT1 to DPT3 and 24% from DPT1 to measles vaccine) and a number of invalid doses due to early immunization (12% for DPT1 and 6% for measles vaccine). A small percentage of uncorrected missed opportunities occurred at the immunization sessions (range 0% - 2% for different antigens). Childhood immunization cards were preserved in only 46% of the cases and they were lost in another 36% cases.

Coverage Levels for the TT Immunization of Women:

67% of women of childbearing age (15-49 years) had received a first dose of TT vaccine. Only 17% had received the five doses of TT vaccine. 33% of the women living in slums did not receive any TT immunization.

Reasons for non-immunization and partial immunization of the women: The major reasons cited for non-immunization were that the women were unaware of the need for immunization and they had a fear of side reactions. Whereas the major reasons for partial immunization were that they were unaware of the need to return for subsequent doses and some women did not have strong urge to complete the 5 doses of TT immunization.

Comparison with earlier surveys: Comparison with earlier surveys (1995 and 1998) shows a declining trend in immunization coverage levels both for children and women living in the slums of KCC.

Coverage Levels in the sixth NID Campaign:

The coverage figures were seemingly good with 82% of children below the age of 5 years receiving both doses of OPV during the sixth NIDs. It still means however that there were many children who received only one dose of OPV or no OPV during the sixth NID campaign. This occurred at a time when every child under five years old should receive one dose of OPV on each round of the NID campaign in order for Bangladesh to achieve its goal of being a “Polio free country”.

Reasons for non-immunization of OPV in the sixth NID campaign: The main cause for non-immunization during NID campaign was that the parents were not aware of the campaign.

Vitamin A capsules were given to 88% of the eligible children on the second round of the sixth NID campaign.

Coverage Levels in the September 1999 MNT Campaign:

24% of the eligible children received measles vaccine and 37% received a dose of OPV during MNT campaign. The lower than the expected figures may have been affected by poor recall as the survey took place three 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 the city corporation, 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 coverage data is generally unreliable^{5,8} and does not provide specific information on the slum areas. IOCH therefore decided to carry out a survey based on the WHO recommended EPI 30 cluster survey method¹ 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 Khulna City Corporation (KCC) slums 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 KCC. 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 KCC 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 53% of children in KCC slum areas received valid measles immunization, then the "true" figure of measles immunization could be anywhere between $(53-10) = 43\%$ and $(53+10) = 63\%$. 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.

Results

A. Routine Immunization coverage of children

Coverage Levels (card plus history data of COSAS analysis)

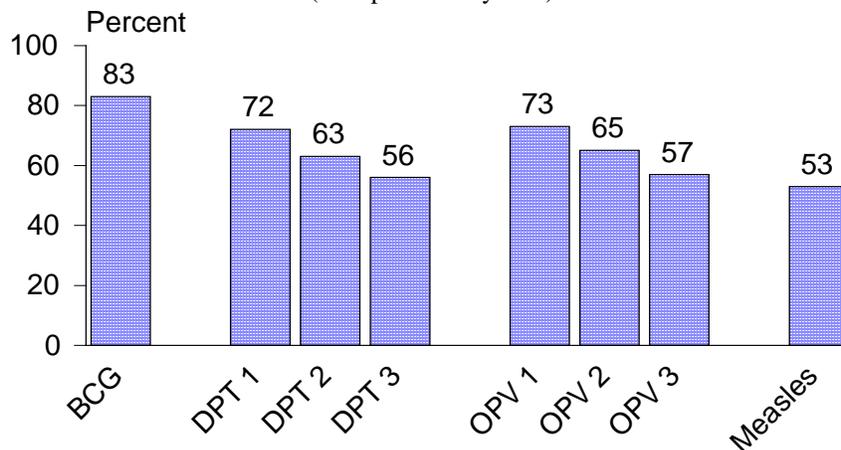
Table 1 shows the coverage levels of children between 12-23 months and their vaccination status at 12 months of age. The crude data figures for the 12-23 month age group indicate that 76% of the children received three doses of OPV, 74% received three doses of DPT and 63% were vaccinated against measles. The valid coverage levels are however considerably lower (except BCG and measles vaccine), only 59% of children received three doses of OPV, 57% received three doses of DPT and 59% were vaccinated against measles. The reasons for this and other comments on the coverage levels are given below. 16% 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 (card plus history data)

	Coverage (%) Immunized by 23 months		Coverage (%) Immunized by 12 months Valid data
	Crude data (Access)	Valid data	
BCG	83%	83%	83%
Polio 1	83%	73%	73%
Polio 2	79%	65%	65%
Polio 3	76%	59%	57%
DPT 1	83%	73%	72%
DPT 2	77%	63%	63%
DPT 3	74%	57%	56%
Measles	63%	59%	53%
Zero dose	16%		

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

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

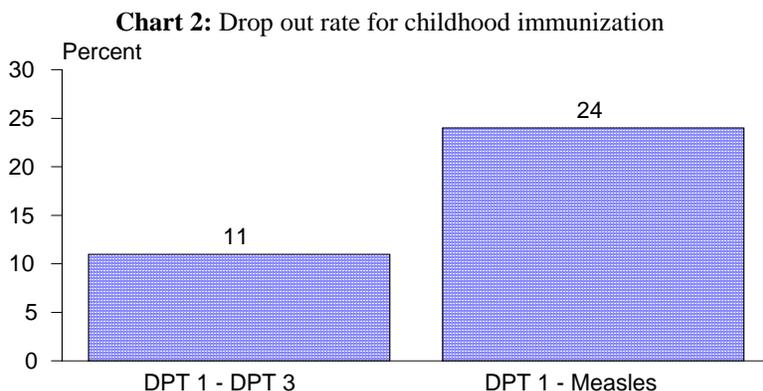


Program access [(percent of the children surveyed who received DPT 1st dose (crude data - by card or history)]

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

Program continuity (dropout rate)

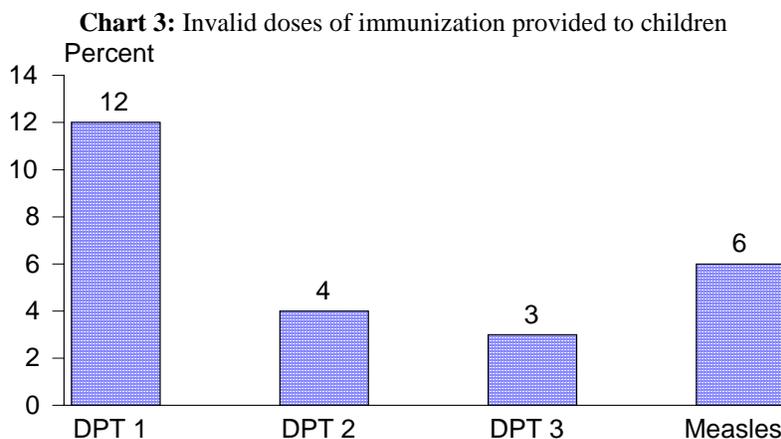
Crude data for antigens received by 12-23 months of age is used for calculating the dropout rate. In this survey, the DPT1 to DPT3 dropout rate was 11% and DPT1 to measles dropout rate was 24% (**Chart 2**). It should be kept in mind however, that slum populations have been described as highly mobile 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 quality. 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 73% (valid data) for children between 12-23 months of age. A similar trend is seen for the other antigens (except BCG). 12% of children received an invalid dose⁴ of DPT1 and another 6% received an invalid dose of measles vaccine. Eight children (4%) received DPT second dose less than 4 weeks after the first dose of DPT and another seven children (3%) received third dose of DPT less than 4 weeks after the second dose of DPT (**Chart 3**).



BCG vaccination

83% children surveyed received BCG vaccine based on card plus history data. 71% of the children were found with a BCG scar. 14% of the children with BCG vaccine did not produce a visible scar. 14% of the children had received BCG vaccination before 6 weeks of age.

Missed opportunities of immunization

The prevalence of uncorrected missed opportunities for immunization was low (range 0% for BCG to 2% for DPT1).

Availability of documentation of immunization

Childhood immunization cards were preserved in only 46% of the cases and were lost in another 36% cases.

Reasons for non-immunization and partial immunization of children

Table 2 shows that parents of the children cited the following reasons for non-immunization: a) unaware of the need for immunization (63%); b) fear of side reactions (25%), c) place and or time of immunization unknown (16%) and d) no faith in immunization (16%). Whereas the major reasons cited by parents for partial immunization were: a) unaware of need to return for second and third dose (48%), b) don't feel need for subsequent doses of immunization (31%) and c) fear of side reactions (11%).

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

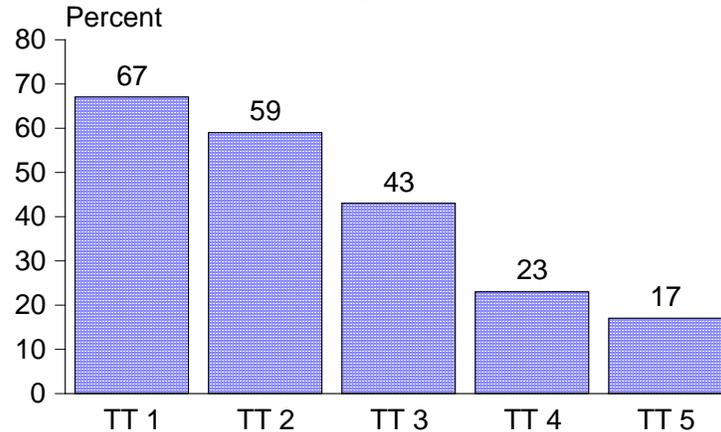
Reasons		Non immunized	Partially immunized
Lack of Information	Don't feel need for immunization	63%	31%
	Unaware of need of return for 2 nd or 3 rd dose	-	48%
	Place and/or time of immunization unknown	16%	2%
	Fear of side reactions	25%	11%
	Wrong ideas about contraindications	3%	-
	Others	3%	2%
Lack of motivation	Postponed until another time	3%	5%
	No faith in immunization	16%	2%
	Rumours	3%	-
	Place of immunization too far	-	2%
Obstacles	Time of immunization inconvenient	-	3%
	Vaccine not available	-	3%
	Mother too busy	3%	10%
	Family problem, including illness of mother	6%	3%
	Child ill, not brought	6%	3%
	Child ill, brought but not given immunization	-	2%

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

B. Routine TT immunization coverage of women

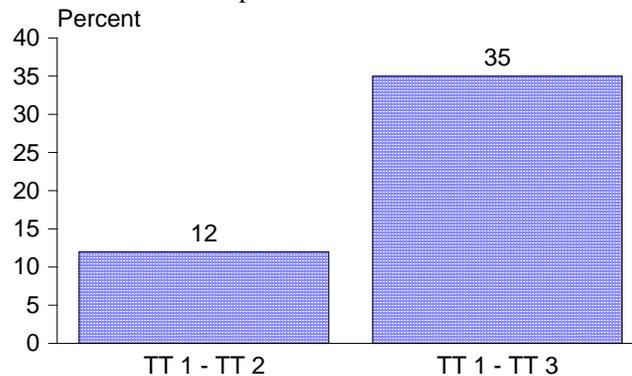
67% of the women had access to a first dose of TT vaccine (based on crude data). 59% of the women received two or more doses of TT vaccine. Only 17% had received all the 5 required doses (**Chart 4**). 33% of the women surveyed had not received any doses of TT vaccine.

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



The dropout rate from first dose of TT vaccine to second dose of TT vaccine was 12% and the dropout rate from first dose of TT vaccine to third dose of TT vaccine was 35% (**Chart 5**). Survey findings indicate that 6% women missed an opportunity for the first dose of TT immunization during their antenatal check-ups. Only 24% women had TT immunization cards.

Chart 5: Drop out rate for TT immunization



Reasons for non-immunization and partial TT immunization of women

Table 3 indicates that the major reasons cited for non-immunization of women were as follows: a) unaware of the need for immunization (70%), b) fear of side reaction (24%) and c) no faith in immunization (16%). Whereas the major reasons cited for partial immunization of women were as follows: a) unaware of need to return for subsequent doses (58%), b) did not feel need for subsequent TT immunization (31%) and c) fear of side reactions (10%).

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

Reasons	Not Immunized	Partially Immunized
Don't feel need for immunization	70%	31%
Fear of side reactions	24%	10%
No faith in immunization	16%	2%
Unaware of need to return for subsequent doses	-	58%
Next dose is not yet due	-	3%
Place and/or time of immunization unknown	8%	5%
Wrong ideas about contraindications	2%	-
Others reasons related to lack of information	-	2%
Postponed until another time	-	2%
Time of immunization inconvenient	-	3%
Vaccine not available	2%	-
Mother too busy	8%	2%
Nobody took the women to the EPI centre	3%	2%
Family problem, including illness of mother	3%	-
Women ill, brought but not given immunization	3%	-
Long waiting time	2%	-

* Multiple answers were accepted.

C. Coverage Levels in the sixth NID Campaign

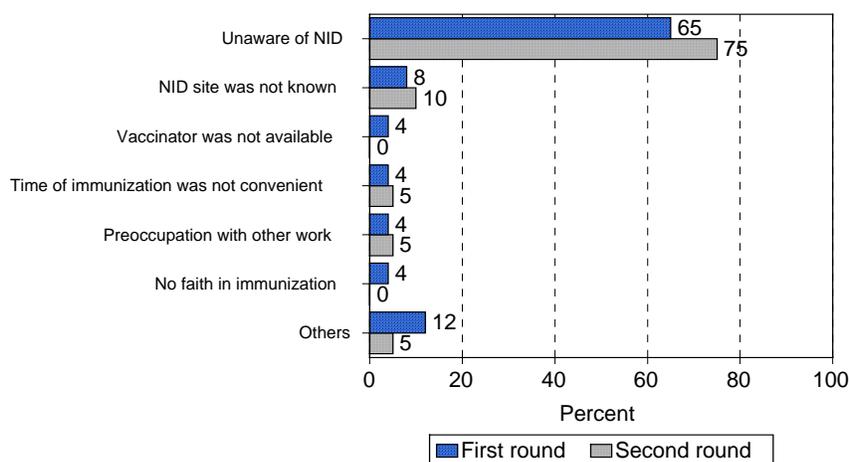
OPV coverage

88% of children below 5 years of age received OPV during the first round and 90% during the second round of the sixth NID campaign. 82% of the children received OPV in both rounds of the NID campaign.

Reasons for non-immunization of OPV

The main reason invoked for not being immunized at the sixth NIDs (first and second round) was the lack of knowledge of the campaign. **Chart 6** shows the reasons for non-immunization of OPV during the sixth NIDs.

Chart 6: Reasons for non-immunization during the sixth NIDs



High potency Vitamin A coverage

During the second round of the sixth NID campaign a high potency vitamin A capsule was also administered to 88% of the children between one and five years of age.

Reasons for not receiving Vitamin A

Table 4 indicates the major reasons given by the 25 parents for their child not having the vitamin A capsule: a) unaware of NID campaign (74%), b) NID site was not known to them (4%).

Table 4: Reasons for not accepting the Vitamin A capsule during the sixth NIDs

Reasons	Percent
Unaware of NID	74%
NID site was not known	4%
Time of immunization was not convenient	4%
Child's/mother's sickness	5%
Others	13%

Places of immunization during the sixth NIDs

The majority of the children received the OPV and Vitamin A capsules from the NID vaccination sites (**Table 5**). A few however, were given OPV and Vitamin A during the house-to-house search conducted after the NID campaign.

Table 5: Places of immunization during the sixth NIDs

		NID Site	Home	Railway station	Others
OPV	1 st round	86%	5%	2%	7%
	2 nd round	88%	4%	2%	7%
Vitamin A capsule	2 nd round	89%	2%	2%	7%

D. Coverage Levels in the MNT Campaign

The MNT campaign was conducted in the slums of KCC in September 1999. 24% of eligible children received measles vaccine during that campaign. 37% of children received a dose of OPV. The result might be affected by a recall bias, as the data was collected more than three months after the MNT campaign.

Reasons for non-immunization

Table 6 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.

Table 6: Reasons for non-immunization during the MNT Campaign

Reasons	Measles vaccine	OPV vaccine
Unaware of MNT	78%	77%
MNT site was not known	13%	13%
Child's/mother's sickness	1%	1%
Preoccupation with other work	2%	3%
Fear of side effects	1%	1%
Others	6%	6%

Places of immunization during the MNT campaign

Table 7 shows that the majority of children who received OPV and the measles vaccine during the MNT campaign, received it from MNT vaccination sites.

Table 7: Places of immunization during the MNT Campaign

	MNT site	Home
OPV	97%	3%
Measles	92%	8%

Discussion

The survey showed that 83% of the children of 12-23 months of age had access to routine immunization. This was a significant achievement for slum areas. 14% of the children had received 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. 11% from DPT1 to DPT3 and 24% from DPT1 to measles vaccine) and by the number of invalid doses (12% for DPT1 and another 6% for measles vaccine). 14% of the children with BCG vaccine, did not produce a visible scar. Apparently those children were not revaccinated at the time of measles immunization⁴. Significantly, 16% of the children had not been immunized at all. These are indicative of the poor quality of the EPI services. Childhood immunization cards were preserved in only 46% of the cases and they were lost in another 36% cases. Only 24% women had TT immunization 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.

The coverage figure in this survey was compared with earlier slum surveys carried out by the BASICS project¹⁰ in 1995 and survey conducted by UPHC Project¹² in 1998. The UPHC Project survey report is not yet published. The BASICS project used LQAS methodology, which is different from the standard 30-cluster survey methodology in many ways. So, crude data of 12-23 months age group was therefore used for comparison. BCG coverage figure was 98% in 1995, 92% in 1998 and 83% in the year 2000 survey. On the other hand, measles vaccine coverage was 83% in 1995, 78% in 1998 and 63% in the year 2000 survey. TT2 vaccination coverage was 83% in 1995 and 59% in the year 2000 survey. Comparison with different surveys shows a declining trend in immunization coverage levels both for childhood and TT immunization over time among the slum dwellers of KCC.

It is a fairly good achievement that 82% of the children surveyed between 0 – 5 years in the slums were given 2 doses of OPV during the sixth round of NIDs. But, this figure still means that there were children who 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 of age with two doses of OPV.

Conclusions and Recommendations

Coverage levels for routine immunization of children

Access to routine immunization

This survey found that the access to routine immunization for children in the slums of Khulna City Corporation was fairly good. 83% of the children received the 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 the high drop out rates and also to a lesser extent to the number of invalid doses and uncorrected 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. 48% of the children dropped out simply because their parents/care takers did not know that they were required to return to the EPI center for subsequent doses. Another 11% of the children were not taken for immunization because the child was ill. Parents therefore need to be advised that minor illness is not a contraindication to vaccination.
- Reviewing the EPI session times and perhaps rescheduling them to enable working mothers to attend vaccination sessions out of working hours. 10% of mothers did not bring their children for immunization because they were too busy.
- 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.

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, 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.

Children not being immunized (zero-dose)

16% of the children were not immunized at all. The main reasons were that parents did not feel the need for immunization (63%), that they did not know the time and place of immunization (16%) or they fear side reactions of immunization (25%). This situation may be improved by:

- undertaking appropriate BCC activities to reach this still un-reached population to increase the awareness and motivation of the parents for immunization

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 67% for TT1 reduced to 17% for TT5 and 33% had not been immunized at all. 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 of the TT vaccination requirements

Coverage levels for the sixth round of NIDs

The coverage levels of the sixth NID campaign were at a satisfactory level (82% receiving both doses). But, it still means that a significant number of children received only one dose of OPV or Zero-dose. 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 of age 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

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. Henry Perry, Robert Weierbach, Iqbal Hossain, Rafiq-ul Islam, 1997, Immunization coverage in Zone – 3 of Dhaka City, Bangladesh, Working paper No. 25, Dhaka: ICDDR’B.
10. Henry Perry, The BASICS Project Experience in supporting EPI and Child Survival Activities in Bangladesh, 1994-1999. A report presented to USAID/Bangladesh in June 1999.
11. Therese Blanchet, Perceptions of childhood diseases and attitudes towards immunization among slum dwellers, Dhaka, June 1989. AID Contract No. DPE-5927-C-50698-00.
12. Unpublished data of immunization coverage: UPHC Project survey among urban poor group living in cities, 1999.
13. Mitra and associates: UFHP NGO impact assessment survey, 1998.

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 C

Immunization and other Child Health Project / Management Sciences for Health

EPI Coverage Survey in the Urban areas of Bangladesh

List of clusters identified for survey

Area: Khulan City Corporation Slums

Cluster #	Ward #	Name of Slum	Address of slum	Number of Household	Total population
1	3	Palpara Bihari, Islambagh	Islambagh, Jessore road, Daulatpur	16	88
2	5	Belal Nazir Bandh and Belaler bari	Pabla dafadarpara	41	224
3	6	Golam Rahaman-er bari	Pabla Keshablal Road	48	263
4	7	Nurjahan Bastee	Burma Eastern Road, Kashipur	15	82
5	8	Sweeper colony bastee	Crescent Jute Mill residential area	170	930
6	9	Khondokar Keramot-ali's bari	Goal Khali	26	142
7, 8		Bastuhara Colony	KDA Mohona Sarak	1200	6564
9	11	Pastala colony's side (north side of road)	Khalishpur	38	208
10	12	Camp 1	Housing estate Khalishpur, (Commissioner's Office)	355	1942
11	13	Khaleque Chowdhury and Jaman	Alam nagar pora masjid	23	126
12	14	Najir, Khairunnesa, Tuku Biswas-er bastee	Purba Baira, East side of Custom office	145	793
13	15	Rail line bastee – 6	Khalishpur Mucca Masjid Road, Alam nagar bazaar rail line	128	700
14	15	Alamnagar bastee (Anwar+Bashabo)	Khalishpur Amrakandi Road, South side	338	1849
15	15	Boroitala bastee	Within the rail station	40	219
16	16	Ekram-er bari	Nur nagar	1000	5470
17	17	Md. Khan and Ali Ashraf Siddiqi's house	Baira cross road, sonadanga residential area	10	55
18	17	Taher Malakar's house	Sonadanga Road	25	137
19	17	Sofi Mollah and Khorshed Driver	Alamnagar Pora Masjid, adjacent to rail line	72	394
20	19	Khoka Hazir Bastee	Hazi Ismail Road, Shaik para cross road	22	120
21	20	Akram Jamidar	Sheik Para Bagan Bari	30	164
22	20	Railway colony bastee	Daulatpur Rail Gate	126	689
23	21	Railway Hospital bastee	South side of Railway hospital	150	821
24, 25	22	Natun Bazar Char bastee	West side of Wapda Beri badh	1400	7658
26	24	Mannan and Kawsar Ali Fakir	Nirala Housing Estate, Sabujbag	9	49
27	27	House of Yousuf Gani	Mistry para, Alamin Road	12	66
28	27	House of Abu Bakar and Majid	Rokonuddin Road, Idgah Bi lane	20	109
29	30	Back of Shahid Club	Tutpara Main road	62	339
30	31	Labon Chara Bastee	Shibir hat Ghat, laban Chara	63	345

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