COVERAGE EVALUATION SURVEY 2019

EPI BANGLADESH

Expanded Programme on Immunization (EPI)
Directorate General of Health Services (DGHS)
Mohakhali, Dhaka-1212, Bangladesh

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Vaccine Hero Award for Bangladesh

The Honorable Prime Minister Sheikh Hasina received the "Vaccine Hero" award in recognition of the outstanding success of EPI Bangladesh for immunization, at a colorful ceremony held on 23 September 2019 at the UN Headquarter, New York, USA.

Honorable Minister
Ministry of Health and Family Welfare
Govt. of the People's Republic of Bangladesh

MESSAGE

It gives me immense pleasure to see the completion of the Coverage Evaluation Survey (CES) Report 2019 of Expanded Programme on Immunization (EPI).

Under the leadership of our Hon'ble Prime Minister, Sheikh Hasina, Bangladesh has made a tremendous progress in immunization, child and maternal health. In 2019, Our Prime Minister was awarded the Vaccine Hero Award by Gavi, the Vaccine Alliance for country's contribution to immunization programme. She has been recognized for championing immunization both at national and global level. Her Excellency continues to monitor and support immunization programme.

The success of EPI came through the intense efforts of thousands of health workers and volunteers, unknown heroes, men and women in cities, villages and remote areas. Immunization saved millions of lives and contributed in achieving MDG4 goal. The Government of Bangladesh introduced several new vaccines such as Hepatitis B vaccine (Hep B), Haemophilus influenza type b (Hib), Rubella, Pneumococcal Conjugate Vaccine (PCV) and Inactivated Polio Vaccine (IPV). EPI is now providing vaccines against ten fearsome vaccine preventable diseases reaching every door step of the community through its vaccination sites.

Coverage Evaluation Survey (CES) is a very effective tool to monitor the progress and find out the weaknesses of the vaccination programme. EPI has achieved 83.9% valid full vaccination coverage in 2019 among the under one-year old children which was only 2% in 1985. My heartiest gratitude goes to the dedicated field workers and managers working tirelessly to achieve such a memorable task.

I shall like to take this opportunity to congratulate WHO, UNICEF, GAVI, other immunization supporting partners, all the government and non-government staff, field workers, parents of children, volunteers from all walks of life for their contribution towards this tremendous achievement.

Joy Bangla, Joy Bangabandhu.
Long live Bangladesh.

Zahid Maleque, MP

Secretary
Health Services Division
Ministry of Health and Family Welfare
Govt. of the People's Republic of Bangladesh

MESSAGE

EPI is the gateway to primary health care. Routine vaccination is an effective, safe and cost-effective intervention that has brought a dramatic improvement in the health of women and children. EPI has also been a strong pillar for providing other health interventions.

EPI programme in Bangladesh started in April 07, 1979 with a view to reduce child and maternal mortality and morbidity from six dreadful diseases, such as Childhood Tuberculosis, Diphtheria, Pertussis, Neonatal Tetanus, Poliomyelitis and Measles. The Government of Bangladesh introduced several new vaccines in EPI Programme and has a plan to introduce more new vaccines such as Human papillomavirus Vaccine (HPV) in near future. Presently, EPI has been providing vaccines against 10 vaccine preventable diseases by reaching to community through its fixed and outreach sites to protect children.

The Coverage Evaluation Survey (CES) is an important tool for estimating the levels of immunization coverage at either national or district levels. CES also helps in analyzing gaps between evaluated and administrative coverage. Sources of such datasets helps us in planning and developing strategies for improvement of quality service delivery.

I request all the concerned officials to study the available survey report and identify gaps for action. Following this strengthen the existing strategies to ensure no one is left behind for vaccination.

Finally, I would like congratulate EPI for the incremental success and at the same time express my gratitude to WHO and UNICEF for providing financial and technical support in conducting the Survey.

Md. Abdul Mannan

Director General
Directorate General of Health Services
Mohakhali, Dhaka.

PREFACE

The mission of the Expanded Programme on Immunization (EPI) in Bangladesh is to reduce morbidity and mortality from vaccine-preventable diseases to a level where they are no longer a public health concern by providing high quality EPI services to all the children. The Government of the Peoples' Republic of Bangladesh is committed to provide basic health services to all with special attention to children and women.

It is true that EPI in Bangladesh has brought visible and tangible changes over the years in terms of childhood mortality.

The Coverage Evaluation Survey 2019 report gives area specific reasons for not availing the service and incomplete vaccination in the community. It would help the policy makers, national and local managers and field level staff to compare and analyze the situation in different Districts and City Corporations in order to undertake necessary measures to ensure no one left behind from our services.

I would like to express my sincere thanks to EPI, WHO and UNICEF for their generous support in conducting the EPI Coverage Evaluation Survey 2019.

Finally, I would like to thank Center for Social and Market Research (CSMR) for carrying out this study with high standard of quality. Special thanks go to the respondents who provided their valuable time with required information for the survey without which this study would not have been possible.

Professor Dr. Abul Bashar Mohammad Khurshid Alam

Line Director-MNC&AH
Directorate General of Health Services
Mohakhali, Dhaka

FOREWORD

I feel elated to share my reflections on the recently released data of EPI Coverage Evaluation Survey (CES) 2019. Since 1991 Bangladesh has been conducting nationwide coverage evaluation survey every year. CES established a monitoring tool to assess performances, achievements and progress of the Bangladesh Expanded Programme on Immunization (EPI).

The EPI is always considered as a success story in Bangladesh for its remarkable progress. It provides almost universal access to immunization services measured by the percentage of children under the age of one year receiving BCG, which has increased from a mere 2% in 1985 to over 99.7% in 2019. However, the percentage of children under the age of one year receiving all doses of vaccines at the right time and right interval has been reported to have achieved 83.9%.

The purpose of conducting CES 2019 is to assess the routine childhood vaccination coverage among 12-23 months and 24-35 months old children, TT vaccination coverage among women with children 0-11 months to assess the protection of newborn against Tetanus during birth, TT5 coverage among 18-49 years old women, Vitamin A coverage among 6-59 months old children during vitamin A plus campaign and immunization programme quality assessment.

The survey was carried out between May-December 2019. It was conducted in all 64 districts, 12 City Corporations and 3 slums. The survey results will give us a better picture of districts and CC situation and enable us to analyze the coverage of each district and city corporation. This also gives us an opportunity to identify the performance gap and undertake the special activities to improve the situation.

I would like to thank WHO, UNICEF and EPI personnel for their sincere contribution which helped in writing the CES 2019 report. My sincere thanks go to Center for Social and Market Research (CSMR) for successfully conducting this survey throughout the country and for preparing an authentic report.

We look forward to all concern persons in the country for using the CES 2019 document.

Dr. Md. Shamsul Haque

Program Manager, EPI
Directorate General of Health Services
Mohakhali, Dhaka

ACKNOWLEDGEMENT

EPI of Bangladesh has been conducting nationwide Coverage Evaluation Survey (CES) since 1991. The survey provides deep insight into EPI performance in National, Divisional, District and City Corporation level. In 2019, this survey was conducted in all 64 Districts, 12 City Corporations and 3 slums in Dhaka North, Dhaka South and Chattogram City Corporation.

The survey result has provided us with a detailed picture of Districts and City Corporations vaccination performance. It has also helped us to identify and analyze low performing Districts and City Corporations in order to take appropriate measures to improve the situation. It is evident that vaccination coverage under EPI has been increasing over the past years. Survey results reveal that the national valid full vaccination coverage by 12 months age of children was 82.5 percent in 2015 and 82.3% in 2016. The valid full vaccination coverage increased by 1.6 percentage points (83.9%) in 2019.

The success of EPI is highly praised in both home and abroad. In 2009 Gavi, the Vaccine Alliance presented Bangladesh with an award recognizing its progress in immunization and in 2010, Bangladesh reached the target laid out in the United Nations Millennium Development Goal - 4 reducing under-five mortality by two-thirds. Thus, achieved UN MDG-4 Awards in 2010. The country again achieved GAVI Alliance Award in 2012 for its outstanding performance in improving child immunization status. A battle of nearly 20 years against Polio was won in 2014 when Bangladesh received Polio Free certification status. We have achieved "control status of Rubella and Congenital Rubella syndrome" in 2018 and "Hepatitis B control goal" in 2019. Her Excellency Sheikh Hasina, the Prime Minister of the Peoples' Republic of Bangladesh has been recognized for championing immunization both nationally and globally. Under her leadership Bangladesh has made tremendous strides in immunization and child health. For her supreme contribution, she has been honored with "The Vaccine Hero Award" at the United Nations General Assembly in 2019.

I must congratulate EPI, DGHS personnel for providing support in planning, coordinating, monitoring and technical review of Coverage Evaluation Survey 2019. My special thanks to District, City Corporation, Municipality and Upazila stakeholders for their cooperation during field survey. I express my gratitude and thanks to WHO and UNICEF for their technical support and contribution in this survey. My sincere thanks go to Center for Social & Market Research (CSMR) for supporting EPI for conducting the survey and preparing an authentic report.

Finally, I hope this report would be useful to all the concerned persons.

Dr Mowla Baksh Chaudhury

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ACRONYMS

BBS	Bangladesh Bureau of Statistics
BCG	Bacillus Calmette Guerin
BCC	Barishal City Corporation
BOPV	Bivalent Oral Polio Vaccine
CC	City Corporation
CCC	Chattogram City Corporation
CES	Coverage Evaluation Survey
CI	Confidence Interval
Cum CC	Cumilla City Corporation
DNCC	Dhaka North City Corporation
DSCC	Dhaka South City Corporation
DPT	Diphtheria, Pertussis and Tetanus
EA	Enumeration Area
EPI	Expanded Programme on Immunization
FGD	Focus Group Discussion
FVC	Full Vaccination Coverage
FWA	Family Welfare Assistant
GCC	Gazipur City Corporation
HA	Health Assistant
ICC	Intra-cluster Correlation Coefficient
IDI	In-depth Interview
IPV	Inactivated Polio Vaccine
IU	International Unit
KCC	Khulna City Corporation
MCC	Mymensingh City Corporation
MCV	Measles Containing Vaccine
MNT	Maternal & Neonatal Tetanus
MOV	Missed Opportunity for Vaccination
MR1	Measles and Rubella First Dose
MR2	Measles and Rubella Second Dose
MSD	Measles Second Dose
NCC	Narayanganj City Corporation
NGO	Non-Government Organization
NID	National Immunization Days
NT	Neonatal Tetanus
OPV	Oral Polio Vaccine
PAB	Protected at Birth
PCV	Pneumococcal Conjugate Vaccine

PPS	Probability Proportional-to- Size
RCC	Rajshahi City Corporation
Rang CC	Rangpur City Corporation
SCC	Sylhet City Corporation
SPSS	Statistical Package for the Social Sciences
tOPV	Trivalent Oral Polio Vaccine
TT	Tetanus Toxoid
Td	Tetanus, Diphtheria
UHC	Upazila Health Complex
UNICEF	United Nations Children's Fund
VAC	Vitamin A Capsule
WHO	World Health Organization

GLOSSARY

(Not Arranged Alphabetically)

Target Population

Childhood Vaccination Coverage Survey among 12-23 Months Old: Children who were aged between 12 and 23 months and were born between 1st May 2017 and 30th April 2018

Childhood Vaccination Coverage Survey among 24-35 Months Old Children: Children who were aged between 24 and 35 months and were born between 1st May 2016 and 30th April 2017 were eligible for Childhood Vaccination Coverage Survey among 24-35 Months Old Children

TT Survey: Mothers who had 0-11 month old children and/or who had still or live birth between January 1, 2018 and December 31, 2018 were the subjects of TT survey.

TT5 Coverage Survey: Women aged between 18-49 years were included in the TT5 Vaccination Coverage Survey.

Vitamin A Coverage Survey: Two types of survey subjects were included in CES 2019:

1. Children who were aged between 12 and 59 months (born between 07/3/2014 and 13/02/2018 and,

2. Children who were aged between 06 and 11 months (born between 14/02/2018 and 12/08/2018

Card Retention Rate

Proportion of vaccination card retained by the recipient where, **Denominator:** Number of Card Issue by Vaccinator; **Numerator:** Number of Card Found Available During Survey; **Multiplier:** 100.

E.g. There are two hundred children in the survey. Among them 200 children received vaccination card from the vaccinator (here Denominator). During survey 170 mothers were able to show vaccination card (here Numerator). Therefore, card retention rate would be:

$$\frac{170 \times 100}{200} = 85\%$$

Cluster

The cluster is defined as an enumeration area which constitutes on an average 120 households

Crude Coverage

Crude vaccination coverage is defined as the vaccine given to the children while the exact age for starting vaccination and/or interval between dose(s) meet or do not meet the EPI- recommended schedule.

Crude Full Vaccination Coverage (FVC) by age of 23 months

Crude coverage (includes all doses, whether valid or not) for each respective vaccine by document (vaccination card and/or register) plus history, by the time of the survey by the age of 23 months. The respondents who are missing cards and not registered and recall data are included in the denominator and counted as unvaccinated in the numerator.

Crude Full Vaccination Coverage (FVC) by age of 12 Months

Crude coverage (includes all doses, whether valid or not) for each respective vaccine by document (vaccination card and/or register) plus history, by the time of the survey by the age of 12 months. The respondents who are missing cards and not registered and recall data are included in the denominator and counted as unvaccinated in the numerator.

Confidence Interval (CI)

A range of interval of parameter values around a point estimate is likely to contain the true population parameter. If the experiment was repeated many times without bias, with data collected and analyzed in the same manner and confidence intervals constructed for each repetition, 100X(1-α) % of those intervals would contain the true population parameter.

Drop-Out

A drop-out is defined as not returning for vaccination after scheduled date of consecutive vaccine/s. In other words, children who start but don't complete the immunization schedule is known as drop-out. Drop-out rate could be easily calculated from the table of crude coverage results. For example, if the crude Penta1 coverage estimate is 80% and for Penta3 it is 65%, then the estimate of crude drop-out is (80-65)/80 = 18.8%.

Drop-out From Penta1- Penta3: IF a child received Penta1 but failed to receive Penta3

Drop-out From Penta1- MR1: IF a child received Penta1 but failed to receive MR1

Drop-out From MR1-MR2: IF a child received MR1 but failed to receive MR2

Fully Vaccinated

A child is considered to be Fully vaccinated if s/he has received one dose of BCG, 3 doses of Pentavalent (Diphtheria, Pertussis, Tetanus, Hep-B and Hib), 3 doses of OPV, 3 doses of PCV, and one dose of MR (Measles and Rubella) vaccine.

Fully Vaccinated Child by 12 months of age

A child is considered to be Fully vaccinated if s/he has received all the recommended doses by 12 months of age as per the national immunization schedule.

Hard-to-Reach Area

Hard-to-reach area means char, haor, enclaves, and hilly areas which are geographically partly or fully difficult to reach. An area will be considered as hard-to-reach only when the time required for vaccine transportation from the UHC to the distribution point or from the distribution point to the vaccination side is more than 2 hours by using the existing transport facilities.

Invalid Dose

A dose is considered invalid when it doesn't meet the immunization schedule criteria (dose given before a minimum age, or after a too short interval). For the multi-dose vaccine (Penta, OPV, PCV, IPV), if the document indicates that one of the earlier doses in a sequence was invalid but followed by valid doses then only the later dose will be considered as valid.

INVALID PENTA1/OPV1/PCV1/IPV1: If 1st dose of Penta or 1st dose of OPV, 1st dose of PCV is given before 6 weeks of age of the child

INVALID PENTA2/OPV2/PCV2: 2nd dose of Penta or 2nd dose of OPV/PCV is considered invalid If the interval between 1st dose and 2nd dose is less than 4 weeks

INVALID IPV2: 2nd dose of IPV is considered invalid If the interval between 1st dose and 2nd dose is less than 28 days

INVALID PENTA3/OPV3/PCV3: 3rd dose of Penta or 3rd dose of OPV/PCV is considered invalid If the interval between 2nd dose and 3rd dose is less than 28 days

INVALID MR 1ST DOSE: If 1st dose of MR is given before 270 days of age of the child. MR received between 270 days and 364 days is considered valid by 12 months and between 270 and 730 is considered valid by 23 months.

INVALID MR 2ND DOSE: If 2nd dose of MR is given before 450 days of age of the child

Minimum age and Minimum Interval	The minimum age and intervals are used to determine if a dose is valid (i.e. physiologically efficacious)
Mohalla	Smallest identifiable neighborhood in the urban area (municipality/city corporation)
Mouza	Smallest identifiable neighborhood for revenue purposes in the rural area
PAB	The newborn is protected if the mother receives two valid doses of TT vaccine at least two weeks before the delivery following the recommended TT protection period.
Replacement of invalid dose by the subsequent dose(s)	In the case of multI-dose vaccine **IF** 1st Dose is invalid and the child has valid 2nd dose, then 1st dose will be replaced by 2nd dose and in that case 2nd dose will be considered as "0". **IF** the sum of gaps of 1st dose and 2nd dose (from birth date to 1st dose and from 1st dose to 2nd dose) is lower than the minimum age of receiving 1st dose, then both the doses will be considered invalid. 1st dose would be **"0"**, also 2nd dose would be considered as **"0"**. E.g. a child received **penta1** at the age of **7 days** and **penta2** after **28 days** of **penta1**. If we look at the case, the child received 2 doses at the age **35 days** (7 days+ 28 days) that does meet the **minimum age of 42 days of 1st dose**. Therefore, both the doses will be considered as invalid. In that case, if the child has 3rd dose, then 3rd dose will be examined and considered as 1st dose. However, age cohort of receiving MR1 is 'between 270 days and 364 days' and MR2 is 'between 15 months and 24 months.' The validity of those two doses is considered following the vaccination schedule. Here, the program considered separate age cohort to administer the two doses instead of interval between the doses. From the perspective of programme it would not be possible to identify how much the program adhere its schedule for two doses of different age cohort. In that case replacement of invalid MR1 with MR2 would not portray the implementation of program in real sense. So, replacement of invalid MR1 with valid MR2 does not take place.
Upazila	Lowest administrative unit (sub-district level)
Vaccination Coverage	The proportion of the vaccinated individuals in the target population
Valid dose	A dose that is administered when a child reaches the minimum age for the vaccine, and is administered maintaining the proper interval between doses, according to the national immunization schedule and is found recorded in the relevant documents (Card and/or register)
Valid Full Vaccination Coverage (FVC) by Age of 12 Months	The proportion of the children (by the age of 12 months) who received valid BCG, 3 doses of Penta, 3 doses of OPV, 3 doses of PCV and 1st dose of MR. Valid coverage for each respective vaccine and of Fully vaccinated children by the time of the survey by 12 months, classifying children without a document as unvaccinated. If both the vaccination card and register data are available but each has a different date of vaccination, it is accepted in this analysis if either of the sources show that the dose was valid. The numerator for valid coverage includes only those children who received the dose when they were age-eligible for it according to the vaccination schedule or children who received all the vaccine following EPI recommended vaccination schedule (Maintaining minimum interval and exact age and receiving vaccine within 12 months).

Valid Full Vaccination Coverage (FVC) by Age of 23 Months	The proportion of the children (by the age of 23 months) who received valid BCG, 3 doses of Penta, 3 doses of OPV, 3 doses of PCV and 1st dose of MR Valid coverage for each respective vaccine and of Fully vaccinated children by the time of the survey by the age of 23 months, classifying children without a document as unvaccinated. If both the vaccination card and register data are available but each has a different date of vaccination, it is accepted in this analysis if either of the sources show that the dose was valid. The numerator for valid coverage includes only those children who received the dose when they were age-eligible for it according to the vaccination schedule or children who received all the vaccine following EPI recommended vaccination schedule (Maintaining minimum interval & age and receiving vaccine within 23 months).
Valid Full Vaccination Coverage (FVC) by Age of 23 Months with MR2	The proportion of the children (by the age of 23 months) who received valid BCG, 3 doses of Penta, 3 doses of OPV, 3 doses of PCV and 2 doses of MR (Maintaining minimum interval & age and receiving vaccine within 23 months). Valid coverage for each respective vaccine and of Fully vaccinated children by the time of the survey by 23 months, classifying children without a document as unvaccinated. If both the vaccination card and register data are available but each has a different date of vaccination, it is accepted in this analysis if either of the sources show that the dose was valid. The numerator for valid coverage includes only those children who received the dose when they were age-eligible for it according to the vaccination schedule or children who received all the vaccine following EPI recommended vaccination schedule (Maintaining minimum interval and age and receiving vaccine between 15 and 23 months).

EXECUTIVE SUMMARY

With a view to reduce child mortality and morbidity from vaccine preventable diseases, EPI was officially launched on 7th April 1979 in Bangladesh. Although vaccination coverage under EPI was quite low till 1984, but with the passing of time, EPI has gained momentum and is now approaching to meet its objectives and targets set at different times. Coverage Evaluation Survey (CES) 2019 indicates that in terms of vaccination coverage, valid full vaccination coverage by the age of 12 months was 83.9 percent while it was only 2.0 percent in 1984. Similarly, crude full vaccination rate has become 95.3 percent which was 76.0 percent in 1995. Despite its tremendous success, EPI could not achieve its coverage target set by its own. Considering the global, regional and country contexts, EPI has fixed a target of full vaccination coverage among under one-year children with at least 95 percent nationally and at least 90 percent in each district; and TT5/TD5 coverage among women of child bearing age reached at least 80 percent nationally and at least 75 percent in each district.

As one of the most important monitoring tools to oversee the programme implementation status and also for taking appropriate measures to reach the desired goals and objectives set by EPI, the GoB periodically conducts EPI Coverage Evaluation Surveys (CES), which provide an evidence-based scientific appraisal of the programme. This report of CES 2019 presents the findings obtained from the household survey.

Both primary and the secondary stakeholders participated as survey respondents in this study. They were mothers/caregivers of children aged 0-11 months, 12-23 months, 24-35 months, 6-59 months, and women aged 18-49 years. The study was carried out between April 2019 and December 2019.

The objectives of CES 2019 were to assess:

- Childhood vaccination coverage among 12-23 months old children under routine EPI
- Childhood vaccination coverage by the age of 23 months among 24-35-month-old children considering Measles Rubella Second Dose (MR 2) under routine EPI
- Status of TT Vaccination Coverage and one's protection at birth among the women having children aged less than one year
- TT5 coverage among the women of 18-49 years of age to assess the progress of the TT5 programme Vitamin A Coverage during the Vitamin A Plus campaign held on February 9, 2019
- Drop-out rates and quality (percentage of invalid doses, vaccination card availability, reasons for left-out and drop-out and equity)
- Trends in the vaccination coverage and drop-out rates at the national, divisional, city corporation, and district levels
- Information as a basis for making concrete recommendations and planning for improving routine immunization activities.

The findings are discussed in detail in seven different chapters from Chapter 3 to Chapter 9 of this report

METHODOLOGY

The WHO new sampling methodology was followed in the study. The study was mainly quantitative in nature, where data were collected through face-to-face interviews with Mothers/Caregivers of children & women by visiting community households. In addition, Focus Group Discussion (FGD) and In-depth Interview (IDI) were conducted in DNCC and DSCC to find out the causes of being dropped out and left out. There were five individual surveys targeting six different survey subjects. CES 2019 included 79 survey units, comprising of 64 districts, 12 city corporations and 3 slums in Bangladesh: two in Dhaka and the others in Chattogram City Corporation. A total of 183,048 interviews were conducted in 5,925 randomly selected mouzas/mahallas across the country. Seventy-five clusters from each survey unit were selected by following the systematic random sampling technique with Probability Proportion to Size (PPS). Respondents from each cluster were identified through a household listing operation and were selected randomly to administer the Questionnaire.

FINDINGS

Childhood Vaccination Coverage among 12-23 Months Old Children

National Coverage

Crude Full Vaccination Coverage by the Age of 23 Months: Nationwide, by the age of 23 months, 95.3 percent children had received all the eligible vaccines, irrespective of whether the EPI-recommended age for administration and/or the interval between consecutive doses were met. BCG, the first antigen to be administered, had the highest coverage (99.7 percent), Penta1 had same coverage (99.7 percent) as BCG, but with each subsequent dose, the rate progressively increased (Penta2: 99.3 percent and Penta3: 98.7 percent), with MR1 falling almost 3 percentage points to 95.9 percent (see Figure 1). A little variation in crude full vaccination coverage was observed between rural (95.9 percent) and urban (93.3 percent) areas (see Figure 2).

Crude Full Vaccination Coverage by the Age of 12 Months: A little over ninety-five percent (95.3 percent) of the children received all the eligible vaccines by the age of 12 months, irrespective of whether the EPI-recommended age for administration and/or the interval between consecutive doses were/was met. Again, BCG had the highest coverage (99.7 percent), which was followed closely by the Pentavalent doses, but falling considerably for MR1 at 95.9 percent (see Figure 3). The urban-rural analysis shows little variation in the crude coverage between rural (95.9 percent) and urban (93.3 percent) areas (see Figure 4).

Valid Full Vaccination Coverage by the Age of 23 Months: Valid coverage was defined as vaccines administered according to the EPI-recommended minimal age of the child and the recommended interval between doses. Nationally, 88.0 percent of the children received all the doses of all antigens as scheduled, with the highest coverage for BCG and Penta1 at 99.7 percent, Penta2 coverage at 99.3 percent, and Penta3 at 93.3 percent. The coverage for MR1 at 92.8 percent was 6.9 percentage points lower than BCG (see Figure 5).

Valid Full Vaccination Coverage by the Age of 12 Months: Overall, by the age of 12 months, 83.9 percent of the children country-wide received all the scheduled vaccines, following the EPI-recommended minimal age for administration and valid intervals between doses. Valid BCG coverage, at 99.7 percent, was the same at 23 months, and the Penta1 and OPV1 coverage was almost the same. Among all the antigens, valid MR1 coverage was the lowest with 88.6 percent (see Figure 7). By area, coverage of MR1 was lower in the urban areas (84.6 percent) than that in the rural areas (89.5 percent) (see table 4). By vicinity, the

urban-rural analysis shows that rural children were more likely to receive valid doses (85.0 percent) compared to their urban counterparts with 79.2 percent (see Figure 8).

Coverage by Division

Crude Full Vaccination Coverage by the Age of 23 Months: Crude full vaccination coverage was the highest in Barishal (98.5 percent) and the lowest in Mymensingh (92.9 percent) division. Rajshahi division achieved the second highest position with 96.0 percent coverage. The crude coverage was 95.8 percent in Sylhet, 95.6 percent in Khulna, 95.5 percent in Chattogram, 95.2 percent in Rangpur, and 94.7 in Dhaka (see Figure 9). The data indicate that the number of drop-outs from vaccination services attributed to the lower crude coverage.

Valid Full Vaccination Coverage by the Age of 12 Months: Barishal division had the highest valid full vaccination coverage (91.8 percent), while Rajshahi division attained the second highest position, with 86.0 percent coverage. The valid vaccination coverage was 85.8 percent in Sylhet, 84.8 percent in Khulna, 83.9 percent in Rangpur, 82.4 in Dhaka, 82.2 in Chattogram, and 80.4 percent in Mymensingh (see Figure 9a). The coverage analysis and computation of valid coverage show that low drop-out rate, as well as the act of administering higher valid doses, contributed to the higher valid vaccination coverages.

Coverage by City Corporation

Crude Full Vaccination Coverage by the Age of 23 Months: Nationally, urban coverage was observed to be 93.3 percent in CES 2019. Among the city corporations, crude vaccination was found to be the highest in Rajshahi City Corporation (RCC) with 99.8 percent and the lowest in Sylhet City Corporation (SCC) with 87.6 percent. The crude vaccination coverage in other city corporations ranged between 96.1 percent and 88.1 percent (see Figure 10).

Valid Full Vaccination Coverage by the Age of 12 Months: Among all the city corporations, Rajshahi City Corporation achieved the highest coverage, at 92.4 percent. The lowest coverage was observed in Sylhet City Corporation (SCC) with 63.8 percent. Valid coverage in other city corporations was between 65.6 percent and 83.9 percent (see Figure 10a).

Coverage by Hard-to Reach Areas and Ownership of Mobile Phones

Valid Full Vaccination Coverage by Hard-to Reach Areas: A hard-to-reach area was defined as an area where two or more hours were required to reach from the Upazila headquarters. Valid Full vaccination coverage was 2.3 percentage points higher in non-hard-to-reach areas than that in hard-to-reach areas (84.1 percent vs. 81.8 percent), which was true across all antigens (see Figure 11).

Full Vaccination Coverage by the Age of 12 Months by the Ownership of Mobile Phones: In CES 2019, there was an analysis of the vaccination coverage by mobile phone ownership. It was observed that full vaccination coverage was slightly higher among those who owned mobile phones (84.2 percent) than those who did not (82.4 percent). As expected, coverage of each antigen was also lower among those who did not have a mobile phone. The rate of difference varied between 0.3 percentage point for Penta1 coverage and 1.6 percentage points for MR1. The ownership of the mobile phones ensured higher vaccination coverage due to easy access to mothers/caregivers to follow up and ensure subsequent doses. Thus, it reduced drop-out rates against those whose mothers/caregivers didn't own it (see Figure 12).

Programme Quality

Incidences of Invalid Doses: A dose or antigen is invalid when the vaccine is administered without complying with the exact EPI-recommended minimal age for starting the vaccine or with the minimum interval between the two consecutive doses. CES 2019 estimated the invalid doses for Penta1, Penta2, Penta3, and MR vaccines. Invalid doses were found to be the most prominent for MR1 (7.8 percent) and the least prominent for Penta2 and Penta3 (1.0 percent) across the country. A slight variation of invalid doses was noticed between urban and rural areas, with those in urban areas being higher in comparison to those in rural areas for both Penta and MR1 vaccines. Invalid Penta1 was 5.6 percent, Penta2 was 1.3 percent and invalid Penta3 was 0.9 percent in the urban areas as against 3.0 percent invalid Penta1, 1 percent invalid Penta2, and another 1 percent invalid Penta3 doses in the rural areas. Invalid MR1 was 10.1 percent in urban areas and 7.4 percent in the rural areas (see Figure 52). The highest proportion of invalid Penta1 was administered in Chattogram division (4.6 percent) and the lowest in Barishal division (1.7 percent). However, the highest invalid Penta2 (1.2 percent) was administered in Rangpur and Khulna divisions, and the lowest in Barishal division (0.3 percent). Similarly, highest invalid Penta3 (1.4 percent) was administered in Khulna division and the lowest in Barishal division (0.3 percent).

Regarding invalid MR1, it needs to be mentioned here that Mymensingh division administered the highest invalid dose (9.6 percent); the lowest was in Barishal with 4.8 percent (see Appendix Table 9). Among the city corporations, overall the highest invalid doses were found in DNCC, with 16.5 percent invalid Penta1, 2.6 percent invalid Penta2, 0.7 percent invalid Penta3, and 13.3 percent invalid MR1. The lowest invalid doses were in RCC (see Figure 54).

Vaccination Drop-out Rate: CES 2019 estimated the drop-out rates for Penta1-Penta3 and Penta1-MR1. The drop-out rate from Penta1-Penta3 was defined as the proportion of children who received Penta1 but failed to receive Penta3. The drop-out rate from Penta1-MR1 was defined as the proportion of children who received Penta1 but failed to receive MR1. In the country, the Penta1-Penta3 drop-out rate was found to be 1.0 percent and the Penta1- MR1 drop-out rate was 3.8 percent as a whole (see Figure 55). Across the eight divisions, the Penta1-Penta3 drop-out rate was the highest in Mymensingh division (1.5 percent) and the lowest in Barishal division (0.3 percent). Regarding Penta1-MR1 drop-out rate, it needs to be mentioned that it was the highest in Mymensingh division (6.3 percent) and the lowest in Barishal division (1.2 percent). In other divisions, Penta1-MR1 drop-out rates were between 4.7 percent and 2.8 percent (see Table 8). Among the city corporations, the highest Penta1-Penta3 drop-out rate was observed in CCC (3.2 percent). However, the lowest Penta1-Penta3 drop-out rate was observed in RCC (0.2 percent). Barishal City Corporation obtained the second highest position with 0.9 percent drop-out rate. In contrast, Penta1-MR1 drop-out rate was found to be the highest in GCC (11.6 percent), and the lowest in RCC (0.2 percent). In other city corporations, Penta1-MR1 drop-out rates were between 9.6 percent and 3.1 percent (see Figure 57).

Card Retention Rate: Card retention rate was defined as the proportion of cards available during the survey against the total number of cards issued at the time of first vaccination. Nationally, 97.7 percent of the children received the vaccination card and 87.1 percent of the mothers/caregivers retained it (see Figure 49). Card retention rate was considerably higher in the rural areas (89.4 percent) than that in the urban areas (77.8 percent). Among the divisions, card retention rate was the highest in Barishal (96.4 percent), and the lowest in Chattogram division (78.4 percent). Across the city corporation, card retention rate was the highest in RCC (95.3 percent) and the lowest in CCC (54.3 percent) (see figure 49-51).

Reasons for Never Having Vaccination: Among the surveyed children, less than 1 percent did not receive any vaccine. Table 5 presents reasons for never vaccinating the children, the reasons mentioned by the

mothers/caregivers. The figure shows that about one-third of the mothers reported that they did not know that their children should be vaccinated followed by other major causes: not believing in vaccination (16.3 percent), and also the child being sick, could not be taken to the vaccination centre (19.6 percent), and mothers/ caregivers were unaware about vaccination sites (10 percent).Reasons for never having vaccination by the rural division and city corporation are presented in Table 6 and Table 7 respectively.

Reasons for Partial Vaccination: Across the country, 4 percent of the surveyed children received partial vaccination. While asked for reasons, 16.5 percent (15.3 percent in urban and 16.9 percent in rural) of the mothers reported that they were busy with household chores.

Among the other causes, illness of child (13.0 percent) was prominent, followed by mothers/caregivers forgetting to vaccinate their children (12.8 percent), scared of side effects (9.7) percent) by mothers/caregivers, mothers/caregivers being unaware of the fact that the child should be given vaccine (9.1 percent), not knowing when to go for vaccine of Measles (5.2 percent), the vaccinator not being able to give vaccine to the child as the child was sick (4.4 percent), vaccinating the child in future (3.9 percent), session time being inconvenient for mothers/caregivers (3.7 percent), mothers/caregivers being unaware of the schedule of 2nd dose (3.7 percent), thinking that the vaccinator would come at home (1.6 percent). Another 1.6 percent of the mothers/caregivers reported that they were not at home. Further, 1.5 percent of them reported that they became sick. A detailed description of the reasons for partial vaccination by rural division and city corporations are presented in Table 9 and Table 10.

Knowledge about the Common Side-effects of Vaccination

Regarding the safety issue, it can be mentioned here that vaccination can cause minimal side-effects, such as fever or local reaction at the injection site. CES 2019 assessed the knowledge of mothers/caregivers regarding minor side-effects of vaccination. Most mothers/caregivers reported "Fever" as the side-effect after vaccinating their children. Overall, 89.3 percent of the mothers/caregivers - 87.3 percent from the urban areas and 89.8 percent from the rural areas reported this (see Figure 65).

Vaccination Coverage Including Measles Rubella Second Dose (MR2) by the age of 23 months among 24-35 Months Old Children

Measles elimination by 2020 is a global partnership initiative which was formed in 2001. WHO targeted to accelerate Measles-Rubella coverage among the countries of 5 regions through EPI routine immunization programme. Strengthening surveillance system is one of the ways to assess the incidence as well as prevalence rate of both Measles and Rubella which is currently being practiced in Bangladesh. However, it is crucial to know the proportion of children who got immunity against Measles and Rubella in order to identify bottlenecks and design micro-plan accordingly. EPI CES is an important means in this aspect. Therefore, MR2 coverage among 24-35 months old children was added in CES 2019 similar to childhood vaccination coverage survey among 12-23 months old to assess the Measles-Rubella second dose coverage among 24-35 months old children. The children who were born between May 1, 2016 and April 30, 2017 were the target audience of MR2 coverage evaluation Survey. The methodology was similar to childhood vaccination survey among 12-23 months old children. And, the sample was drawn from the same cluster where childhood vaccination survey was conducted.

Vaccination Coverage by the age of 23 months among 24-35 Months Old Children

Crude Full Vaccination Coverage among 24-35 months old children: About 93 percent of the children received all vaccines including MR2 by the age of 23 months across the country. As individual antigen, crude MR2 coverage was found to be 92.6 percent with slight variation between the urban and the rural areas (91.1 percent in urban and 93.0 percent in the rural areas). However, no variation was observed between the male and the female across the country regarding MR2 coverage. If we take a look at Crude Full Vaccination Coverage including MR2 by residence, children from rural areas were more likely to receive all the recommended vaccines than those from urban areas (92.9 percent vs. 90.8 percent) (see Figure 78).

Valid Full Vaccination Coverage among 24-35 months old children: Across the country, 82.4 percent of the children received all the scheduled doses of all antigens with BCG coverage being at 99.8 percent. Penta1 coverage was 99.7 percent, Penta2 98.6 percent, and Penta3 94.5 percent. A gradual decreasing trend between two consecutive doses indicates how many children dropped-out from subsequent doses. However, MR1 coverage revealed 91.7 percent which was 8.1 percentage points lower than that of BCG (99.8 percent). Likewise, valid MR2 coverage was 10.7 percentage points lower than that of BCG coverage (BCG 99.8 percent and MR2 was 89.1 percent). By residence, MR2 coverage was 85.7 percent and 89.9 percent respectively in the urban and the rural areas. However, difference was less pronounced between the males and the females (89.0 percent vs. 89.4 percent).

As a whole, valid full vaccination coverage was 75.6 percent in the urban and 83.7 percent in the rural areas. However, compared to area type, the differential was found lower between the males and the females (82.1 and 82.7 percent respectively). Among the rural areas by division, valid coverage was the highest in Barishal (89.6 percent) and the lowest in Dhaka (79.4 percent). In urban areas by city corporations, the highest valid full vaccination coverage was observed in RCC (95.1 percent) and the lowest in CCC (60.3 percent).

Drop-out Rate from MR1 to MR2

Drop-out case from the subsequent dose(s) of the same antigen or different antigen was the most notable obstacle in achieving the desired coverage target. A child was considered as a drop-out from MR1, if s/he had failed to receive MR2 after experiencing MR1. Across the country, the MR1-MR2 drop-out rate was 4.5 percent, with almost the same rate in the rural areas (4.4 percent) and the urban areas (5.0 percent) (see Figure 90). By sex, there was no difference in the MR1-MR2 drop-out rates among the males and females across the country (see Figure 90).

Among the eight divisions, the MR1-MR2 drop-out rate was the highest in Mymensingh (8.3 percent) and the lowest in Rajshahi (0.4 percent). In the other divisions, it ranged between 7.1 percent and 3.6 percent.

TT Vaccination Coverage among the Mothers with 0-11 Months Old Children

Crude Coverage

A little over sixty-four percent (64.2%) of the mothers having 0-11-month-old children received 5 doses of TT vaccine across the country. More than ninety-eight of them received TT1; 97.2 percent, TT2; 89.8 percent, TT3; 78.3 percent, TT4 respectively (see Figure 93).

Valid Coverage

Nationwide, 54.9 percent of the mothers received 5 doses of valid TT. Valid TT2 vaccination coverage was 97.1 percent, TT3 87.7 percent, and TT4 73.0 percent. The urban-rural analysis shows that TT1, TT2, TT3, and TT4 coverage were slightly higher in the rural areas than those in the urban areas. The coverage of TT5 was 4.3 percentage points higher in the rural areas, compared to those in the urban areas (55.8 percent vs. 51.5 percent) (see Figure 96).

Protection at Birth (PAB)

CES 2019 data show that countrywide 94.6 percent of the children were protected against Tetanus at birth, where urban children were slightly ahead of the rural children in this context (96.2 percent vs. 94.1 percent). Among the rural divisions, children from Barishal (96.6 percent) were more protected at birth (PAB) against Tetanus than those from any other division. Children from Khulna division had the lowest proportion (92.0 percent) in PAB against Tetanus. Among the city corporations, PAB was almost universal in BCC (99.6 percent). The lowest PAB was observed in KCC with 85.6 percent (see Figures 116 to 118).

TT Vaccination Card Retention Rate

Across the country, 36.5 percent of the TT vaccination cards were found to be retained. Card retention rates were higher in the rural areas than those in the urban areas (38.5 percent vs. 28.9 percent). Overall, in 91.1 percent of the cases, cards were issued at the time of TT vaccination. About fifty eight percent cards were available during the period of data collection, while 33.3 percent of recipients reported that they had lost those (see Figure 107).

TT5 Vaccination Coverage

Crude TT5 Vaccination Coverage: Across the country, 58.7 percent of the women received all the five doses of TT vaccines, with 4.8 percentage points difference in the coverage between rural and urban women (59.8 percent in the rural areas and 55.0 percent in the urban areas). Regarding the completion of TT5, it may be mentioned that there had been a steep downward trend in the crude coverage of TT doses. Having started with TT1 at 95.9 percent nationwide, the rate dropped at 86.3 percent for TT3 and 74.3 percent for TT4 doses. A similar picture was observed both in the rural and the urban areas. In the rural areas, crude coverage rates of TT1, TT2, TT3, TT4, and TT5 were 96.6 percent, 94.9 percent, 87.3 percent, 75.6 percent, and 59.8 percent, respectively. The corresponding figures were 93.5 percent, 92.1 percent, 82.7 percent, 69.9 percent, and 55.0 percent, respectively, in urban areas (see Figure 129).

Valid TT5 Coverage: Less than half (47.4 percent) of the surveyed women received all the five doses of valid TT vaccine- 45.3 percent in the urban areas and 48.1 percent in the rural areas. Like crude TT coverage, valid TT coverage for the subsequent doses was also found to have decreased substantially - from 95.9 percent for TT1 to 47.4 percent for TT5 (see Figure 130). By residence, valid TT coverages were higher in the rural areas than those in the urban areas for all TT doses.

Vitamin A Supplementation Coverage

Vitamin A Supplementation Coverage Among 6-59 Months Old Children: Vitamin A Plus campaign was held in February 2019. Nationally, 91.3 percent of the infants aged 6-11 months and 94.7 percent of the children aged 12-59 months received Vitamin A capsules. No remarkable variation in the coverage was observed between the urban areas and the rural areas (see Figure 147).

Qualitative Findings

As a part of the programme, CES 2019 captured some qualitative data through In-depth Interviews and Focus Group Discussions. Findings suggest that administrative problem such as the shortage of vaccines, tally sheets, and registers book was the main problem from the supply side. However, lack of awareness about the vaccination center, mothers'/caregivers' preoccupation with household chores and their migration from one area to another were found as the prime causes of dropped-out rates.

Discussion and Recommendations

Discussion: Nationwide, 95.3 percent children received all the eligible vaccines by the age of 23 months, irrespective of age for starting the vaccination and/or minimum intervals between doses. Bangladesh is attempting to reach at least 95 percent valid vaccination coverage at the national level, and 90 percent in each district by the age of 12 months. However, CES 2019 result shows that nationwide, 83.9 percent of the children received it. The urban-rural analysis shows that rural children (85.0 percent) were more likely to receive the valid doses compared to their urban counterparts (79.2 percent).

Across the divisions, both crude and valid vaccination coverages were the highest in Barishal division (98.5 percent and 91.8 percent, respectively). Crude coverage was found to be the lowest in Mymensingh division (92.9 percent). Similarly, the lowest valid coverage was also in Mymensingh division (80.4 percent). The second highest performing division is Rajshahi (86.0 percent). Only Barishal division has reached the district target of at least 91.8 percent.

For the districts, the objective is that all reach at least 90 percent. In Bangladesh, out of 64 districts, eight districts have reached the target of full vaccination coverage of 90 percent in 2019 while there were four districts with 90 percent coverage in 2016. So, sustaining the high coverage rate is also a challenging task which demands special attention from EPI.

The data show that those who were left-out and who dropped out of the vaccination schedule contributed to the lower crude coverage. For BCG, the first dose of childhood vaccination schedule, coverage was 99.7 percent, which indicates that about <1.0 percent of the surveyed children still remained unvaccinated. However, crude fully vaccination coverage was 95.3 percent nationwide, which means that 4.7 percent of the surveyed children dropped out before receiving any subsequent dose of vaccination after receiving BCG. Since the national finding is the reflection of the divisional findings and the divisional findings point towards district coverage, the same interpretation can be applicable in general to the divisions and districts. However, the left-out and drop-out rates do vary from one district to another. As an example of the impact the drop-out rate can have, it may be mentioned here that crude coverage was the lowest in Bandarban district (88.7 percent) among all the districts, with Penta1-MR1 drop-out rate of 7.8 percent, the second highest among all the districts and significantly limiting the district's crude coverage. Because of the impact it could have on the crude vaccination rate, reducing the drop-out rate should be given special attention by the EPI programme.

Further, the act of administering lower invalid doses accelerates the rise in vaccination coverage. Nationwide, valid coverage was 11.4 percentage points lower than crude coverage (83.9 percent and 95.3 percent, respectively), with 3.5 percent of Penta1, 1.0 percent of Penta2, 1.0 percent of Penta3, and 7.8 percent of MR1 found to be invalid. The highest valid vaccination coverage was observed in Bhola district (95.6 percent), where invalid rates by antigen were for Penta1 1.9 percent, Penta2 0 percent, Penta3 0 percent, and MR 1.4 percent. In contrast, among the districts, the lowest valid vaccination coverage was found in Khagrachari (64.9 percent). It was the district that also had the higher drop-out rate; its invalid Penta1 was 6.5 percent, Penta2 1.4 percent, Penta3 2.6 percent, and MR1 24.5 percent. The analysis reveals that both the drop-out rate and the invalid dose contributed to the lower full vaccination coverage in Khagrachari- a combination common in districts where full valid vaccination coverage was poorer. Since the act of administering invalid doses was mainly caused by the supply side, EPI should identify the causes of administering invalid doses and address those causes properly.

CES 2019 included MR2 vaccination coverage survey among 24-35 months old children who was born between May 1, 2016 and April 30, 2017. The finding shows that about 93 percent of the children received all the vaccines including MR2 by the age of 23 months across the country. As individual antigen, crude MR2 coverage was found to be 92.6 percent with slight variation between the urban and the rural areas (91.1 percent in urban and 93.0 percent in the rural areas). Taking a look at Crude Full Vaccination Coverage by residence, children from rural areas were more likely to receive all the recommended vaccines than those from urban areas (92.9 percent vs. 90.8 percent). Regarding Valid Full Vaccination Coverage including MR2, 82.4 percent of the children received all the scheduled doses of all antigens as per EPI recommended vaccination schedule. Antigen specifically, BCG coverage was 99.8 percent. Penta1 coverage was 99.7 percent, Penta2 98.6 percent, and Penta3 94.5 percent across the country. The gap between Crude MR1 and Valid MR2 coverage was 8 percentage points. It indicates high incidence of administering invalid dose as well as dropout from MR1 to MR2.

Overall, 92.6 percent of the children received crude MR2, with 89.1 percent children receiving the valid doses of MR2. However, nationwide MR1-MR2 drop-out rate was found to be 3.5 percent. Like other antigens under current EPI Childhood vaccination schedule. EPI has also disease reduction objectives. One of the objectives is to eliminate Measles through ensuring at least two doses of MR vaccines (MR2).

Therefore, people engaged in the programme should provide more attention to increase both MR1 and MR2 vaccination coverage through minimizing the drop-out rate from MR1 to MR2 as well.

Recommendation

Based on the detailed discussion on the findings of the various survey components of CES 2019 presented above, the EPI authorities may consider the following recommendations for further improvement of the programme:

- Intervention towards identification of low performing areas, tracking and vaccinating un-vaccinated and partially vaccinated children can increase the vaccination coverage
- Refreshers training for both the government and non-government health managers and frontline health workforces would be helpful to minimize invalid doses
- Paying more attention to strengthening supervision and monitoring at all levels would bring positive changes in vaccination coverage
- Apart from pen and paper monitoring, technology-based monitoring system could be more effective to improve the vaccination coverage, both in quantitative and qualitative aspects.
- Strengthening coordination with Ministry of Local Government, City Corporations, NGOs, and private health facilities would ensure increased vaccination coverage among in the urban and the slum population
- Despite good proportion of protection at birth against Neonatal Tetanus and high coverage for Td1 and Td2, Td campaign programme in schools, colleges, and garments factories could be established to ensure reproductive life time protection against Tetanus
- Full Vaccination Coverage (FVC) was found to be lower in urban, slum and hard-to-reach areas than national average. Equity focused strategy needs to be developed to increase the vaccination coverage in urban, slum and hard-to-reach areas
- Considering the current childhood vaccination schedule under EPI, Full Vaccination Coverage (FVC) may be estimated by including: one dose of BCG, 3 doses of OPV, Pentavalent, and PCV, 2 doses of IPV, and 2 doses of MR

Table 1: Findings of Key Indicators

Childhood vaccination coverages among 12-23 months old children

Indicators		BCG	Penta	OPV1	PCV1	OPV2	Penta2	PCV2	Penta3	OPV3	PCV3	MR1	FVC
Crude Vaccination Coverage by Age of 23 Months	National	99.7	99.7	99.7	99.7	99.3	99.3	99.3	98.7	98.7	98.2	95.9	95.3
	Urban	99.8	99.4	99.4	99.4	98.8	98.8	98.8	99.7	99.7	97.2	93.9	93.3
	Rural	99.8	99.8	99.8	99.8	99.5	99.5	99.5	98.9	98.9	98.5	96.4	95.9
By Division	Barishal	100.0	99.9	99.9	99.9	99.8	99.8	99.8	99.6	99.6	99.4	98.7	98.5
	Chattogram	99.1	99.1	99.1	99.1	98.9	98.9	98.9	98.3	98.3	98.1	96	95.5
	Dhaka	100	99.9	99.9	99.9	99.5	99.5	99.5	98.5	98.5	98	95.2	94.7
	Khulna	99.7	99.7	99.7	99.7	99.2	99.2	99.2	98.6	98.6	97.9	96.4	95.6
	Mymensingh	100	99.9	99.9	99.9	99.4	99.4	99.4	98.4	98.4	97.8	93.6	92.9
	Rajshahi	99.9	99.9	99.9	99.9	99.5	99.5	99.5	99.2	99.2	98.8	96.3	96
	Rangpur	100	100	100	100	99.6	99.6	99.6	98.7	98.7	98.2	95.7	95.2
	Sylhet	99.3	99.3	99.3	99.3	99.1	99.1	99.1	98.7	98.7	98	96.5	95.8
Valid Vaccination Coverage by Age 12 Months	National	99.7	99.7	99.7	99.7	99.2	99.2	99.2	93.3	93.3	92.5	88.6	83.9
	Urban	99.4	99.4	99.4	99.4	98.6	98.6	98.6	90.1	90.1	89.4	84.6	79.2
	Rural	99.8	99.8	99.8	99.8	99.4	99.4	99.4	94.0	94.0	93.2	89.5	85.0
	Male	99.7	99.7	99.7	99.7	99.2	99.2	99.2	93.2	93.2	92.0	88.7	83.8
	Female	99.7	99.6	99.6	99.6	99.2	99.2	99.2	93.5	93.5	92.4	88.6	84.0
By Division	Barishal	99.9	99.9	99.9	99.9	99.8	99.8	99.8	97.4	97.4	97.1	94.1	91.8
	Chattogram	99.1	99.1	99.1	99.1	98.7	98.7	98.7	91.6	91.6	91.2	88.4	82.2
	Dhaka	99.9	99.9	99.9	99.9	99.3	99.3	99.3	92.3	92.3	91.8	87.4	82.4
	Khulna	99.7	99.7	99.7	99.7	99.2	99.2	99.2	93.5	93.5	92.6	89.7	84.8
	Mymensingh	100	99.9	99.9	99.9	99.1	99.1	99.1	93.2	93.2	92.6	84.7	80.4
	Rajshahi	99.9	99.8	99.8	99.8	99.4	99.4	99.4	95.0	95.0	92.6	89.6	86.0
	Rangpur	100	100	100	100	99.5	99.5	99.5	93.4	93.4	92.8	88.7	83.9
	Sylhet	99.3	99.3	99.3	99.3	98.9	98.9	98.9	94.4	94.4	93.5	89.5	85.8

	National	Urban	Rural	Barishal	Chattogram	Dhaka	Khulna	Rajshahi	Mymensingh	Rangpur	Sylhet
Drop-out Rate											
Penta1-Penta3	1.0	1.7	0.9	0.3	0.8	1.4	1.1	0.7	1.5	1.3	0.6
Penta1-MR1	3.8	5.5	3.4	1.2	3.1	4.7	3.3	3.6	6.3	4.3	2.8
Incidence of Invalid Dose											
Invalid Penta1	3.5	5.6	3.0	1.7	4.6	4.4	1.7	2.8	3.2	2.4	1.7
Invalid Penta2	1	1.3	1.0	0.3	1.1	1.1	0.5	0.9	1.2	0.8	0.3
Invalid Penta3	1	0.9	1.0	0.3	1.2	0.8	1	0.8	1.1	0.8	0.3
Invalid MR1	7.8	10.1	7.4	4.8	8.8	8.5	8.4	7.1	7.4	7	4.8
Card Retention Rate	87.1	77.8	89.4	96.4	78.4	83.9	91.0	90.0	90.3	95.8	85.4

	National	Urban	Rural	Barishal	Chattogram	Dhaka	Khulna	Rajshahi	Mymensingh	Rangpur	Sylhet
TT Vaccination Coverage among Mothers with 0-11 Months Old Children											
Crude TT1	98.6	97.8	98.8	97.8	99.5	98.8	97.4	98.6	98.6	99.4	99.5
Crude TT2	97.2	96.5	97.4	94.8	98.3	97.4	95.9	96.8	97.9	98.9	97.2
Crude TT3	89.8	86.8	90.6	80.3	93.5	92.5	86.4	88.6	91.4	92.1	87.5
Crude TT4	78.3	74.3	79.3	61.6	80.9	81.9	74.9	77.2	80.7	79.5	75
Crude TT5	64.2	61	65	44	62.3	68	60.2	62.4	68.2	64.1	61.7
Valid TT1	98.6	97.8	98.8	97.8	99.5	98.8	97.4	98.6	98.6	99.4	99.5
Valid TT2	97.1	96.5	97.3	94.8	98.3	97.4	95.8	96.8	98	98.6	97.1
Valid TT3	87.7	83.3	88.8	72	92.6	90.4	82.8	86.4	90.4	91	85.4
Valid TT4	73	69.9	73.8	54.6	75.9	76	69	70.7	77.7	75	69.3
Valid TT5	54.9	51.5	55.8	34.7	54.3	57	51.1	51.8	62	56.1	51.8
Children Protected at Birth	94.6	96.2	94.1	96.3	95.6	95.2	91.9	94.9	93.8	93	95.4
TT5 Vaccination Coverage among aged 18-59 Years Old											
Crude TT1	95.9	93.5	96.6	97.8	96.2	94	96.8	96.5	97.5	95.8	95.3
Crude TT2	94.3	92.1	94.9	96.2	95	92.3	95.4	94.8	96.2	93.4	93
Crude TT3	86.3	82.7	87.3	89.6	89.8	82.2	87.8	85.9	88.7	82.6	88.2
Crude TT4	74.3	69.9	75.6	79.8	80.3	68.7	74.9	71.6	75.9	71.6	78.6
Crude TT5	58.7	55	59.8	63	65.7	53	59.7	54.4	58.3	56.9	66.5
Valid TT1	95.9	93.5	96.6	93.9	97.8	96.2	94	96.8	96.5	97.5	95.8
Valid TT2	94.1	91.9	94.7	92.5	96.1	94.9	92	95.3	94.8	96.1	93.2
Valid TT3	83.2	79.2	84.4	75.6	88	88	78.5	84.9	80.5	86.1	78.7
Valid TT4	66.3	63.6	67.1	54.6	70.8	72.4	60.8	67.4	63	68	62
Valid TT5	47.4	45.3	48.1	34.4	49.8	51.7	43.1	47.8	44.7	48.5	44.4

CHAPTER 1
INTRODUCTION

INTRODUCTION

1.1 PROFILE OF BANGLADESH

History

Bangladesh, as an independent sovereign country, has emerged in the world atlas in 1971, after a nine-month War of Liberation in which 3 million people sacrificed their valuable lives. The Government of Bangladesh (GoB) is run by the Constitution passed in 1972 and amended later. The head of the state is the President, which is a largely ceremonial position; and, the head of the government is the Prime Minister. In this country, there is a 300-seat unicameral national parliament, which is known as the Jatiya Sangsad, whose members are directly elected from the respective constituencies for a five-year term. Being geographically located in Southern Asia, Bangladesh is bordered by India to the north, west, and the east, Myanmar to the southeast, and the Bay of Bengal to the south. The country has a land of 147,570 square kilometers (56,977 square miles). Rather a low-lying country and occupying one of the largest river deltas in the world, Bangladesh comprises primarily floodplains, with scattered hills in its eastern and northern parts. In this country, approximately 89 percent of the population is Muslims, with the rest of the population comprising Hindus (9.6 percent), Buddhists (0.6 percent), and Christians (0.3 percent). Although over 98 percent of the people speak Bangla, English is widely spoken by the people today. The country's rich cultural tradition is found in its archaeological sites, sculptures, terracotta, architecture, museums, archives, libraries, classical music, dance, paintings, dramas, folk arts, festivals, and ethnic diversities. Regarding the population and demography, it may be mentioned here that the population of Bangladesh is 162.7 million. Bangladesh is one of the most densely-populated countries in the world, with 1,077 people living per square km at present. About 34 percent of the population lives in the urban areas. Here life expectancy at birth in the case of both sexes is 72 years. In this country, the average household size is 4,352. The area of Bangladesh is divided into eight administrative divisions, in which there are 64 districts. Each district is subdivided into a number of upazilas (490), each of which, in turn, consists of several unions (4,553). Under each union there are nine wards. Again, there are several villages in one ward. Here city corporations and municipalities are denoted as urban areas. At present, there are 12 city corporations and 327 municipalities in the country . The city corporations are divided into different zones and wards. In each ward of the city corporation, there are several neighborhoods known as paras/mohallas. Similarly, each municipality is divided into different wards, each of which comprises several paras/mohallas.

1.2 BACKGROUND OF EPI

In Bangladesh, EPI was formally launched on 7th April 1979 when only eight thanas were included. In 1985, the Government of Bangladesh (GoB) made its commitments for the Global Universal Child Immunization Initiative (UCI), and began a phase-wise process of EPI intensification from 1985-1990. During this period, EPI was intensified throughout 476 upazilas, 92 major municipalities, and 6 city corporations. In 1990, EPI was made available to all the target groups (infants and pregnant mothers). In 1993, EPI initially started TT5 dose schedule for women of child-bearing age (from 15 to 45 years); later the age extended from 15 to 49 years. As part of polio eradication, the first National Immunization Day (NID) was conducted in 1995. Under the EPI disease surveillance, Acute Flaccid Paralysis (AFP), Measles, and Neonatal Tetanus surveillance was initiated in 1997. Based on disease burden, a good number of new and underutilized vaccines (Hep-B in 2003; Hib containing Pentavalent in 2009; Measles-Rubella (MR) in

[1] Health Bulletin 2018, DGHS

2012; Pneumococcal Conjugate Vaccine (PCV) and Inactivated Polio Vaccine (IPV) in 2015; switching from tOPV to bOPV in 2016 and Td in 2019) have been incorporated in EPI during the last two decades or less time-frame. Gavi, the vaccine alliance, has come forward to support in this regard. With a view to ensure injection safety, AD (Auto Disable) syringes were introduced in the programme from 2004. In the rural areas, EPI programme is implemented by the Ministry of Health and Family Welfare (MoHFW), while in the urban communities, it is implemented by the Ministry of Local Government, Rural Development and Cooperatives although MoHFW is providing all the logistic support. Overall, EPI is providing its routine vaccines to all its target children and women of child-bearing age through 134,000 EPI outreach sites across the country. Bangladesh is a unique example in the world for good coordination between GoB and its partners like Unicef, WHO, and other stakeholders to run the EPI programme effectively. In addition to the routine immunization, EPI conducts need-based supplementary immunization activities like National Immunization Day (NID), Maternal and Neonatal Tetanus (MNT) elimination campaign, Measles catch-up campaign, Measles-Rubella (MR) campaign, etc. as a part of achieving disease reduction objectives. Since its official launching in 1979, in Bangladesh EPI has obtained tremendous success in attaining both the good vaccination coverage and in combating some vaccine preventable diseases in the country. The success stories include: Achieving Neonatal Tetanus elimination status in 2008, receiving regional polio-free certificate along with other member countries of WHO SEAR in 2014, controlling Congenital Rubella Syndrome in 2018 and controlling Hepatitis-B in 2019. However, EPI has incorporated various strategies for the successful implementation of different activities. Based on its past experiences as well as its scientific evaluation of the programme, the Coverage Evaluation Survey (CES) has proved to be the essential means for monitoring and evaluating the programme. Since 1991, EPI has conducted CES every year, except in 1996, 2004, 2008, 2012, 2017, and 2018. The last CES (22nd CES) was conducted in 2016.

1.3 OBJECTIVES OF EPI CES

Objectives of CES 2019 were to assess the following:

- Childhood vaccination coverage among 12-23 months old children
- Childhood vaccination coverage including Measles Rubella Seconed Dose (MR2) by the age of 23 months among 24-35 months old children
- TT Vaccination Coverage among the women having children less than one year old
- TT5 coverage among the women aged 18-49 years to assess the progress of the TT5 coverage
- Vitamin A coverage during the Vitamin A Plus campaign held in February 2019
- Drop-out rates and quality (percentage of invalid doses, vaccination card availability, reasons for left-out and drop-out cases and equity)
- Provide information as a basis for making concrete recommendations and planning for improving routine immunization activities.

However, as a routine EPI performance appraisal, CES 2019 was conducted by the Center for Social and Market Research (CSMR), Bangladesh, and was funded by WHO while the technical collaborative support was provided by WHO, UNICEF and EPI.

1.4 ORGANIZATION OF THE REPORT

The CES 2019 report is organized in line with the objectives of the study, beginning with the Executive Summary as a stand-alone and a relatively comprehensive write-up that contains all the relevant key findings and their brief analysis. The report consists of 9 chapters. **Chapter 1**, Introduction, presents a brief overview of the report. **Chapter 2** deals with the methodological aspects, which include data collection

techniques, sample size determination, distribution of sample size, and sampling. **Chapter 3** presents the findings of Childhood Vaccination Coverage among 12-23 months old children survey. **Chapter 4** describes the results gathered from Childhood vaccination Coverage by the age of 23 months among 24-35-month-old children considering Measles Rubella Second Dose (MR 2) survey. **Chapter 5** describes the findings of TT vaccination coverage of mothers with children aged 0-11 months. **Chapter 6** presents the findings of the TT5 vaccination coverage survey of women aged 18-49 years. **Chapter 7** shows the coverage of Vitamin A during the Vitamin A Plus Campaign. **Chapter 8** presents the qualitative findings of the study. The major key findings and recommendations of the study are finally presented in **Chapter 9**. The text part of the report contains a total of 22 tables and 150 figures.

CHAPTER 2

METHODOLOGY

METHODOLOGY

2.1 SURVEY DESIGN

CES 2019 intends to capture multiple Target Groups. And, its inferential goal is the estimation of coverage of the major indicators, which includes Childhood Vaccination Coverage among 12-23 months old children, among 24-35-months-old children considering Measles Rubella Second Dose (MR 2), TT Vaccination Coverage among 18-49 years old women, TT Vaccination Coverage among the mothers with children aged 0-11 months, percentage of children protected at birth (PAB), Vitamin A Coverage during the Vitamin A Plus Campaign held in February, 2019. As the Survey objectives of all the Target Groups are an estimation of coverages, quantitative method was followed in CES 2019. In terms of operation, the survey estimated a feasible sample size to capture all the Target Groups from the same cluster following the minimum Sample of WHO guidelines. However, regarding the level of survey, it needs to be mentioned here that it was conducted at the district level with the statistically representative sample size.

2.2 INDIVIDUAL SURVEYS

Under CES 2019, the following five individual surveys were conducted:

- Childhood vaccination coverage among 12-23 months old children
- Childhood vaccination coverage including Measles Rubella Seconed Dose (MR2) by the age of 23 months among 24-35 months old children
- Tetanus Toxoid Vaccination Coverage Survey (TT Survey) among the mothers with 0-11-month-old children
- Tetanus Toxoid Vaccination Coverage Survey among the women who were 18-49 years old (TT5 Survey)
- Vitamin A Coverage Survey among the 6-59 months old children

2.3 SURVEY SUBJECT

CES 2019 included five individual surveys targeting six different survey subjects. The survey subjects are shown below by different individual surveys.

Childhood Vaccination Coverage Survey among 12-23 months old children: According to EPI programme, a child should be vaccinated with all the eligible antigens within 1 year after his/her birth. Therefore, children who were aged between 12 and 23 months and were born between 1st May 2017 and 30th April 2018 were the subjects of CES 2019.

Childhood Vaccination Coverage Survey among 24-25 months old children considering Measles-Rubella Second Dose (MR2): MR2 should be received between 15 and 23 months after one's birth. Therefore, children who were aged between 24 and 35 months and were born between 1st May 2016 and 30th April 2017 were eligible for Measles-Rubella Second Dose survey in CES 2019.

TT Survey: Bangladesh achieved the Neonatal Tetanus (NT) elimination status in 2008. To uphold and sustain this elimination status, EPI monitored TT coverage through assessing mothers' TT vaccination status. Therefore, mothers who had 0-11-month-old children and who delivered their children between January 1, 2018 and December 31, 2018 were the subjects of TT survey.

TT5 Coverage Survey: In the case of women, TT vaccination starts with the first dose after one attains the age of 15 years, and it takes 2 years and 7 months to complete all the 5 doses of TT vaccine. To estimate

the TT5 coverage, women aged between 18-49 years were included in the TT5 Vaccination Coverage Survey.

Vitamin A Coverage Survey: Two types of survey subjects were included in CES 2019:
1. Children who were aged between 12 and 59 months (born between 07/3/2014 and 13/02/2018 and,
2. Children who were aged between 06 and 11 months (born between 14/02/2018 and 12/08/2018)

2.4 SAMPLE SIZE

Sample size of CES 2019 has been estimated by following the World Health Organization (WHO) latest guideline. Anticipated coverage, ICC (Intracluster Correlation) Coefficient, design effect and non-response rate were considered to calculate the Sample size. EPI Programme has separate coverage target objective for each Target Group. Anticipated coverage was not the same for all the Survey Groups. Sample size has been estimated with 95% confidence interval (±7% error margin for child survey). WHO-suggested Table B-1 (Appendix D) which was used to calculate the effective Sample size.

By using the above-mentioned table, design effects and non-response rates, 75 clusters were estimated with seven eligible Households for Child, and MR2, 6 households for TT5, 3 households with mothers 0-11-month-old children for TT survey, 3 and 5 households respectively for children 0-6 months and 12-59 months old for Vitamin A Coverage Survey. Therefore, 75X7 = 600 Samples were estimated to produce District/city corporation Survey Unit-wise result for each childhood vaccination and MR2 coverage surveys. Four hundred fifty households (75X6 = 450) for TT5 vaccination coverage survey, 225 mothers having children with 0-11 months for TT vaccination coverage survey, 225 (75X3) samples for children 06-11 months and 375 (75X5) children aged 12-59 months old were estimated for Vitamin A coverage Surveys. A total of 183,675 samples were estimated for 6 different groups of survey subjects and 183,048 samples were achieved.

Table 2: Summary Table of Estimated Sample Size

Divisions/City Corporations/ Municipalities/ Peri-urban/ slum areas	Number of Survey Units	Number of clusters	Number of 12-23 months old children (child sample)	Number of 24-35 months old children (MR2 sample)	Number of mothers of 0-11 months old Children (TT sample)	Number of women of 18- 49 yrs age (TT5)	Number of Children Aged 06-11 Months (Vitamin A Sample)	Number of Children Aged 12-59 Months (Vitamin A Sample)
			1	2	3	4	5	6
Barishal Division	6	450	3,150	3,150	1,350	2,700	1,350	2,250
Chattogram Division	11	825	5,775	5,775	2,475	4,950	2,475	4,125
Dhaka Division	13	975	6,825	6,825	2,925	5,850	2,925	4,875
Khulna Division	10	750	5,250	5,250	2,250	4,500	2,250	3,750
Mymensingh	4	300	2,100	2,100	900	1,800	900	1,500
Rajshahi Division	8	600	4,200	4,200	1,800	3,600	1,800	3,000
Rangpur Division	8	600	4,200	4,200	1,800	3,600	1,800	3,000
Sylhet Division	4	300	2,100	2,100	900	1,800	900	1,500
City Corporations	12	900	6,300	6,300	2,700	5,400	2,700	4,500
Slum of DNCC, DSCC and CCC	3	225	1,575	1,575	675	1,350	675	1,125
Total	**79**	**5,925**	**41,475**	**41,475**	**17,775**	**35,550**	**17,775**	**29,625**

[2] Vaccination Coverage Cluster Surveys: Reference Manual, Version 5, Page B1-16

Table 2a: Summary Table of Achieved Sample Size

Divisions/City Corporations/ Municipalities/ Peri-urban/ slum areas	Number of Survey Units	Number of clusters	Number of 12-23 months old children (child sample)	Number of 24-35 months old children (MR2 sample)	Number of mothers of 0-11 months old Children (TT sample)	Number of women of 18- 49 years age (TTS)	Number of Children Aged 06-11 Months (Vitamin A Sample)	Number of Children Aged 12-59 Months (Vitamin A Sample)
			1	2	3	4	5	6
Barishal	6	450	3,118	3,154	1,355	2,687	1,434	2,495
Chattogram	11	825	5,534	5,600	2,544	4,848	2,460	4,216
Dhaka	13	975	6,670	6,687	2,954	5,791	2,906	5,089
Khulna	10	750	5,058	5,061	2,276	4,462	2,208	3,819
Mymensingh	4	300	2,041	2,053	891	1,764	882	1,494
Rajshahi	8	600	4,081	4,125	1,816	3,489	1,812	3,084
Rangpur	8	600	4,129	4,145	1,851	3,605	1,803	3,125
Sylhet	4	300	2,026	2,034	917	1,737	878	1,593
City Corporations	12	900	6,035	6,074	2,715	5,367	2,582	4,670
DNCC Slum	1	75	5,12	510	510	433	225	373
DSCC Slum	1	75	5,21	524	524	450	225	377
CCC Slum	1	75	5,22	525	525	450	222	376
Total	79	5,925	40,247	40,492	18,878	35,083	17,637	30,711

2.5 SAMPLING

Selection of Primary Sampling Units and Survey Subjects

A Systematic Random Sampling technique was followed in CES 2019. Bangladesh Bureau of Statistics (BBS) developed the list of all mouzas and mohallas. By using this list, a sampling frame with all mouzas and mohallas in a district/city corporation was prepared. Then each mouza/mohalla was segmented with 120 households, which was denoted as Enumeration Area (EA) of CES 2019, from which 75 EAs were selected for each survey unit. In total, 5,925 clusters were selected country-wide. The detailed sampling technique is discussed below.

The following steps were taken for selecting the samples under CES 2019:

Step 1: Taking into consideration all the mouzas and mohallas available, a sampling frame was prepared. Following the segmentation method, a mouza/mohalla was divided into segments in such a way that each segment comprised 120 households. A total number of segment/EA in a district was prepared. Then 75 segments/EAs were selected by using the systematic random sampling technique with Probability Proportion to Size (PPS) and were considered to be the final Primary Sampling Units of CES 2019.

Step 2: A list of all the eligible households was prepared separately for each category of survey through a household listing exercise. Finally, 7 households for Child, 6 households for TTS, 3 for TT, 5 households for Vitamin A coverage surveys among the 12-59 months old children and 3 households for Vitamin A Coverage surveys among the 06-11 months old children were selected randomly from each category and then the questionnaire was administered.

Step 3: Interviews were conducted with the pre-selected samples without replacement through a pre-designed questionnaire.

2.6 QUESTIONNAIRE

Structured questionnaires were used to obtain data for CES 2019. Each questionnaire was pre-tested to check the consistency, language, time, and other difficulties that would be encountered during the interviews. Findings from pre-testing were incorporated into the questionnaire and were finalized with technical assistance from WHO, UNICEF, and EPI-DGHS. Five separate survey tools were prepared for five individual surveys: Child form 1; Child form 2; TT form; TT5 form; and Vitamin A Plus Campaign form. In addition, the household listing form was prepared and used. All types of questionnaires are attached in the Appendix as ready reference.

2.7 IMPLEMENTATION OF THE SURVEY

2.7.1 Recruitment

Recruitment of quality control officers, supervisors, and interviewers took place in March 2019. One's educational attainment, previous experiences in conducting CES or similar kind of study, honesty and sincerity, team spirit, and ability to work in any place for a long period, results of the written test, mock test, and field test as well as one's performance during the period of training were considered. The best performers were selected as Quality Control Officers and Supervisors.

2.7.2 Training

A nine-day exclusive participatory training programme was held for the field personnel from 22-30 April 2019. In addition, refresher's training was conducted with Field Supervisors on June 10, 2019. The training programme included classroom lectures (using multimedia), demonstration interviews, role-playing, field practices, and reviewing of problems. Line Director Maternal, Neonatal, Child &Adolescent Health; Programme Manager, EPI and Surveillance; Deputy Programme Manager, EPI & Surveillance; Medical Officer and Training Officer, EPI was present in the training programme as resource persons. In addition, officials from WHO and UNICEF also provided technical input as resource persons.

2.7.3 Field Work / Data Collection

The data collection for CES 2019 was carried out over a period of 120 days, which started in May 2019 and ended in September 2019. Seventy-nine teams were involved in the data collection process, each team comprising three members: one Supervisor and two Field Interviewers. Moreover, 20 interviewers and 10 supervisors worked as reserve field resources. In addition to the supervisors, 12 Quality Control Officers were involved in maintaining quality control, and one consultant was engaged to monitor and check data quality from time to time over the entire period of field activities. Field visits were also accompanied by personnel from EPI-DGHS, MOHFW, and WHO to monitor the field activities.

2.7.4 Data Management and Statistical Analysis

A Statistical Package for Social Sciences (SPSS) was used for analyzing the data. A series of activities were undertaken to manage and analyze the data, which included the following: data cleaning, processing, coding, data punching, quality control, and final analysis to obtain the required output. Data obtained from the field under CES 2019 were handled by using the database software FOXPRO version 2.6 and cleaning was done by using the software Clipper Version 5.3.

2.8 WEIGHTING

Weight was assigned for estimating the national, division, and district coverage for each indicator of every survey component. Weight was calculated following WHO Vaccination Coverage Cluster Survey- reference manual.

2.9 LIMITATIONS OF THE SURVEY

In compliance with the WHO New Guidelines, CES 2019 was conducted. Despite exerting tremendous efforts, the survey faced some limitations.

Limitations of varied nature were faced at different stages of the survey. During the period of data collection, relatively lengthy procedures for the replacement of sample households along with the pre-selection of households at the Central level temporarily affected the data collection. Longer time was taken in capturing photographs of vaccination cards and getting information from the Health Register where vaccination cards were not available.

The survey required several visits at different times and dates to conduct interviews with non-response households. Survey findings revealed that overall 87.1 percent of the cards were retained by the recipients. Information from health register were collected through survey (where cards were not available) as outlined in the guideline. It was very difficult and time-consuming to collect all the information in that way as the health register pertaining to the reference year was not available; rather, it required registers which pertained to 1 to 2 years back.

Non-availability of records of the surveyed children was another barrier as those records were under different sub-blocks/areas. In addition, health workers were busy with their routine work and they were unable to provide time to the Field Interviewers during the period of data collection.

In some clusters of remote hilly areas where there was lack of electricity, the surveyors failed to capture pictures. Moreover, due to technical problems, some pictures were spontaneously deleted from the database. In some cases, mobile phone sets were lost, thus resulting in difficulties capturing pictures of the vaccination cards in those areas. During the period of data collection, there were two biggest Muslim festival holidays in the country. Besides, incidents of flash flood restricted field work. Further, network connectivity problems also affected the work- GPS location of some the clusters could not be found.

CHAPTER 3

CHILDHOOD VACCINATION COVERAGE AMONG 12-23 MONTHS OLD CHILDREN

CHILDHOOD VACCINATION COVERAGE AMONG 12-23 MONTHS OLD CHILDREN

3.1 CHILDHOOD VACCINATION

Children may inherit some immunity against some specific infections from their mothers to protect themselves, with variant durability, against those diseases. In course of time, this type of immunity eventually comes to a point where it requires active or passive immunization to have the desired immunity to protect oneself from the specific disease. At present, EPI in Bangladesh deals with vaccines against a number of fatal diseases under the routine childhood vaccination schedule. These diseases are: Childhood Tuberculosis, Diphtheria, Pertussis, Tetanus, Hepatitis B, Hemophilus Influenza type b, Poliomyelitis, Pneumococcal Pneumonia, Measles, and Rubella.

BCG vaccine provides protection against Childhood Tuberculosis; Oral Polio Vaccine (OPV) and IPV provide protection against Poliomyelitis; Pentavalent (DPT+Hep-B+Hib) vaccine provides protection against Diphtheria, Pertussis, Tetanus, Hepatitis B, and Hemophilus Influenza type b, PCV provides protection against Pneumococcal disease; and, Measles and Rubella (MR) vaccine provides protection against Measles and Rubella. For a quick understanding about the current childhood vaccination schedule under EPI in Bangladesh, the following table can be studied. The table provides information about the diseases protected by the vaccines, number of dose(s), minimum interval between the doses, and the starting time of the doses

Table 3: EPI Childhood Vaccination Schedule

Name of Diseases	Name of vaccine	Number of doses	Minimum interval between doses	Starting time
Tuberculosis	BCG	1	-	At Birth
Diphtheria, Pertussis, Tetanus, Hepatitis-B, Haemophilus Influenza type b(Hib)	Pentavalent (DPT, Hep-B, Hib)	3	4 weeks	6 weeks
Poliomyelitis	OPV	3	4 weeks	6 weeks
Pneumococcal Pneumonia	PCV`	3	4 weeks	6 weeks
Poliomyelitis	IPV	2	8 weeks	6 weeks
Measles and Rubella	MR	2	-	9 months (270 days), 15 months

3.2 CHILDHOOD VACCINATION COVERAGE AMONG 12-23 MONTHS OLD CHILDREN

A child who has received all the doses of all antigens, as recommended in the EPI programme under the childhood vaccination schedule, is full vaccinated. The EPI has a WHO-recommended vaccination schedule to administer and complete the required doses of all antigens. According to the EPI childhood vaccination

schedule, a child should receive all the eligible vaccines within one year of age, thus complying with the recommended minimal age for starting the vaccines and the intervals between the consecutive doses. Two types of coverage – crude and valid – were determined and analyzed as per the WHO guideline and were presented in CES 2019.

Valid coverage informs us that the first dose of a vaccine was given at the recommended age and the recommended minimum interval between the doses was maintained. Therefore, any dose of a scheduled vaccine received by a recipient that was administered at the appropriate age and at the minimum time interval between the doses was considered as a valid dose. If any child received all the valid doses within the age of 12 months, CES termed it as the valid coverage by the age of 12 months. And, if s/he received all the valid doses within the age of 23 months, CES termed it as valid coverage by the age of 23 months. Conversely, the coverage was defined as crude when a child received all the scheduled vaccines, whether the recommended starting age or intervals between the doses were complied with as recommended by EPI Bangladesh.

3.3 COVERAGE RATES FROM CARD AND HISTORY

The total coverage is an aggregated result which was obtained from the vaccination cards, register, and history. Information about CES 2019 was gathered from these three sources: card, register, and history. Regarding children who didn't have any vaccination card, their vaccination information was recorded by taking their history from their mothers/caregivers. CES 2019 analyzed the coverage of three sources separately. The findings are presented below.

3.3.1 Levels of Crude Full Vaccination Coverage by Age of 23 Months

Crude vaccination coverage was defined as the vaccines given to the children when the exact age for starting the vaccination and/or the interval between the doses as recommended in the EPI schedule were or were not met. Information about the child's vaccination was obtained from the children aged 12-23 months, of whom 87.1 percent had retained their vaccination cards. Figure 1 presents crude vaccination coverage separately obtained from three sources: card, register, and history.

Nationwide, 95.3 percent of the children received all the eligible vaccines, irrespective of the exact age for starting the antigen and/or the minimum interval between the two doses. Following the order by which the EPI schedule recommended doses, as shown in Figure 1, BCG had the highest coverage (99.7 percent), which was followed by Penta1, Penta2, Penta3, and MR1. The difference between BCG and MR1 was the most prominent (3.8 percentage points), while the difference was the least prominent between BCG and Penta2 (0.4 percentage point). And, it was a pattern common in all the variations of vaccination coverage. The differences gradually narrowed in the case of the subsequent doses. The gap in the coverage between the two antigens/doses might be caused by the drop-outs from subsequent doses.

[2] Vaccination Coverage Survey Cluster Surveys Reference Manual, Version 5, Page B1-16

Figure 1: Crude Full Vaccination Coverage by Age of 23 Months at National Level by Card, Register and History in 2019

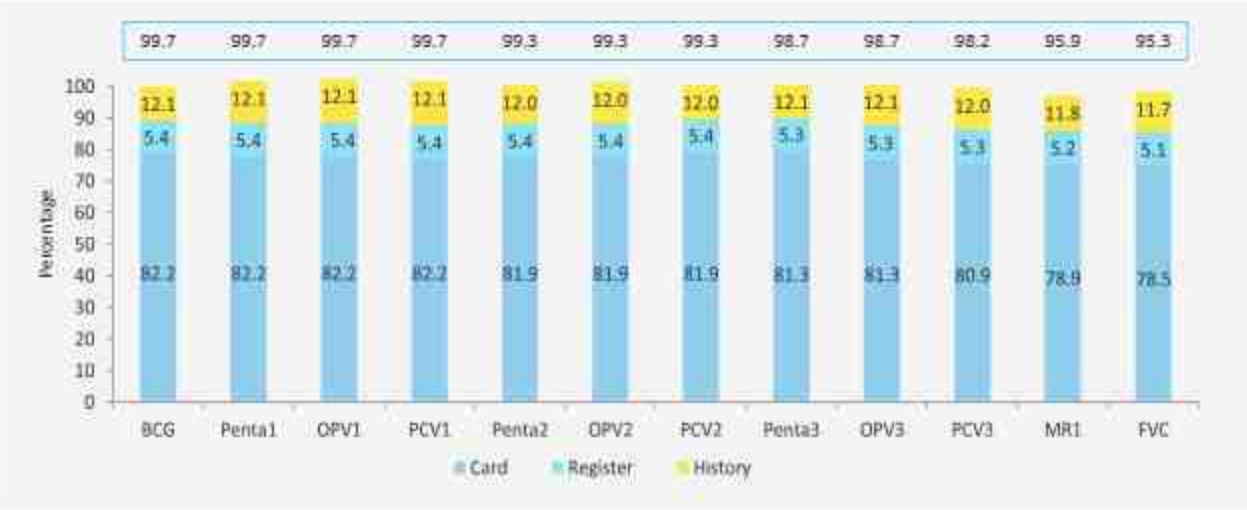
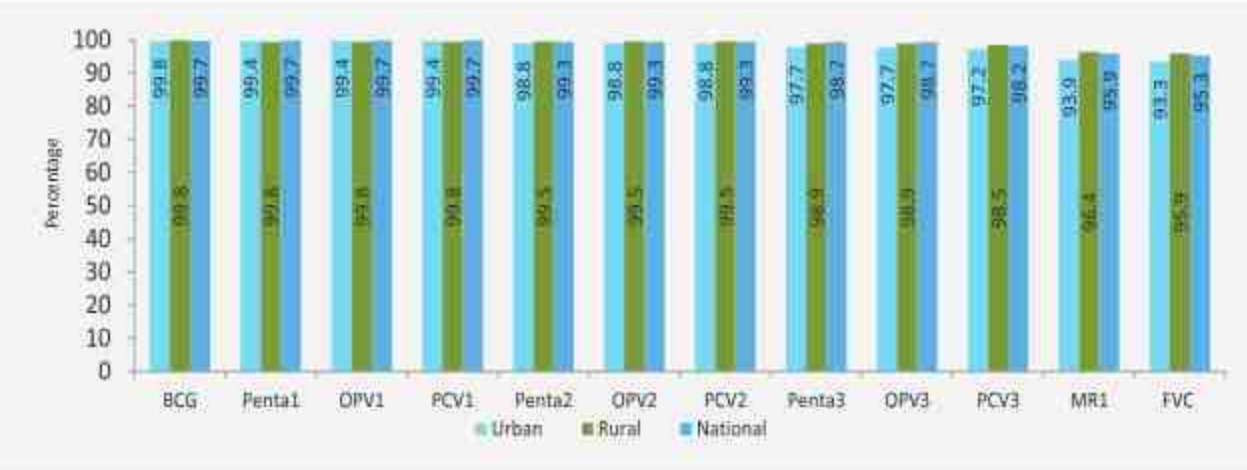


Figure 2: Crude Full Vaccination Coverage by Age of 23 Months by National, Rural and Urban Areas in 2019



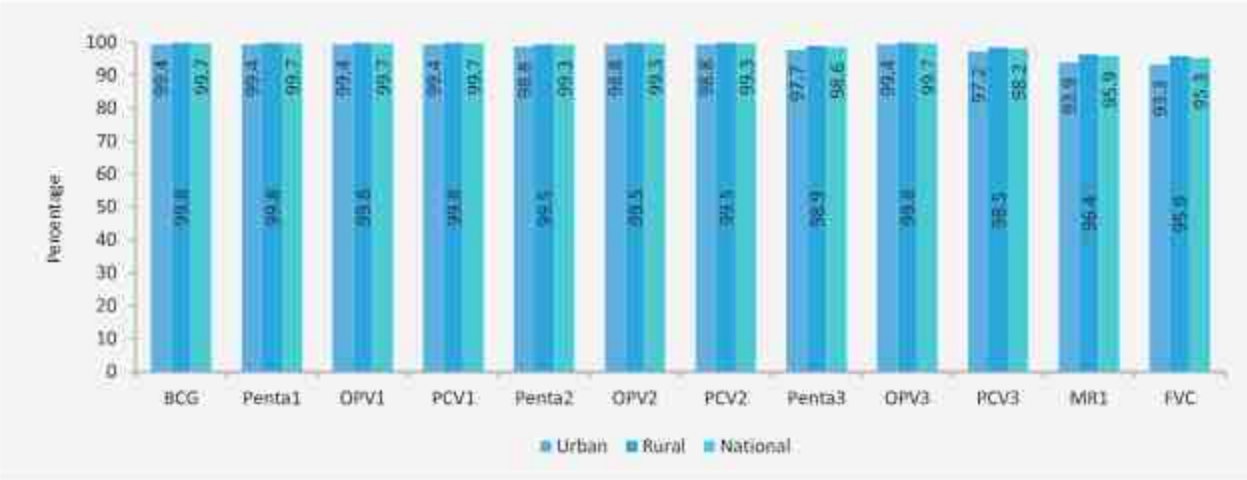
3.3.2 Crude Full Vaccination Coverage by Age of 12 Months

Ninety-five percent of the children received all the eligible vaccines by the age of 12 months, irrespective of whether the age for starting the antigen and/or the minimum interval between the consecutive doses was recommended or not. Following the order by which the EPI schedule recommended doses, as shown in Figure 3, the coverage ranged from BCG at 99.7 percent, with a gradual decrease to Penta3 at 98.6 percent, and then a 3.8 percentage points drop for MR1 (95.9 percent).

Figure 3: Crude Full Vaccination Coverage by Age of 12 Months at National Level by Card, Register and History in 2019

The urban-rural analysis shows little variation between the rural areas and the urban areas, with rural children more likely to receive the crude vaccine by the age of 12 months than children residing in the urban areas (95.9 percent vs. 93.3 percent, respectively) (see Figure 4).

Figure 4: Crude Full Vaccination Coverage by Age of 12 Months by National, Rural and Urban Areas in 2019



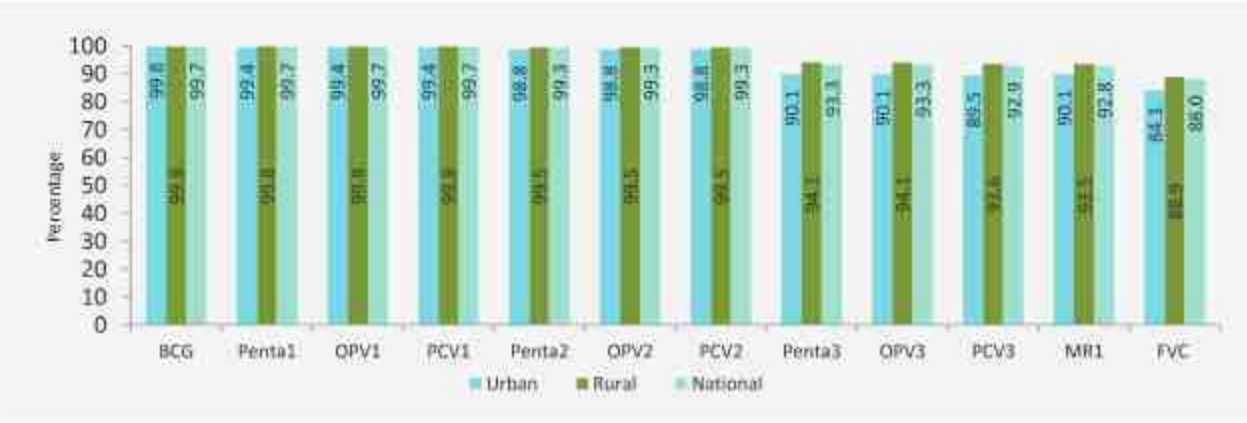
3.3.3 Levels of Valid Full Vaccination Coverage by Age of 23 Months

Figure 5 presents Valid Full Vaccination Coverage by the age of 23 months. Valid coverage was defined as vaccines received by following the EPI-recommended age and dose interval for each antigen. Nationally, 88.0 percent of the children received all the scheduled doses of all antigens with BCG coverage being at 99.7 percent. Penta1 coverage was 99.7 percent, Penta2 99.3 percent, and Penta3 93.3 percent. Moreover, MR1 coverage (92.8 percent) was revealed to be 6.9 percentage points lower than BCG (99.7 percent).

Figure 5: Valid Full Vaccination Coverage by Age of 23 Months at National Level by Card, Register and History in 2019

By residence, Valid Full Vaccination Coverage was 4.8 percentage points higher in the rural areas (88.9 percent), compared to those who residing in the urban areas (84.1 percent) (see Figure 6).

Figure 6: Valid Full Vaccination Coverage by Age of 23 Months by National, Rural and Urban Areas in 2019



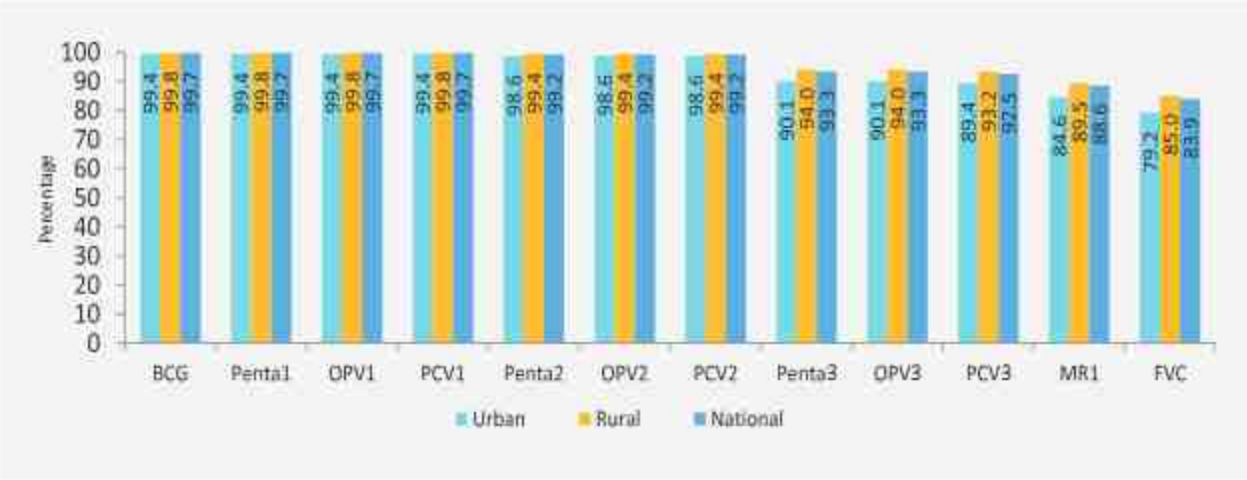
3.3.4 Valid Full Vaccination Coverage by Age of 12 Months

Figure 7 presents the Valid Full Vaccination Coverage by the age of 12 months. It is evident from the figure that nationally 83.9 percent of the children received all the scheduled vaccines by the age of 12 months, following the EPI-recommended age and dose intervals for each antigen. The gap between BCG coverage (99.7 percent) and pentavalent 3 administrations (Penta1 99.7 percent), Penta2 (99.2 percent), and Penta3 (93.3 percent) was 6.4 percentage points. Valid MR1 coverage (88.6 percent) was 11.1 percentage points lower than the BCG coverage. The act of administering vaccines without following the EPI-recommended minimum age and/or intervals between subsequent dose(s) caused invalid doses as well as drop-outs from BCG; and, the subsequent dose of OPV, PCV, and Pentavalent vaccines attributed to the lower MR1 as well as valid full vaccination coverage.

Figure 7: Valid Full Vaccination Coverage by Age of 12 Months at National Level by Card, Register and History in 2019

Like Valid Full Vaccination Coverage by the age of 23 months, Valid Full Coverage by the age of 12 months was higher among the children living in the rural areas. Eighty-five percent of children in rural areas received all valid full vaccines by the age of 12 months, as against 79.2 percent of those residing in urban areas (see Figure 8).

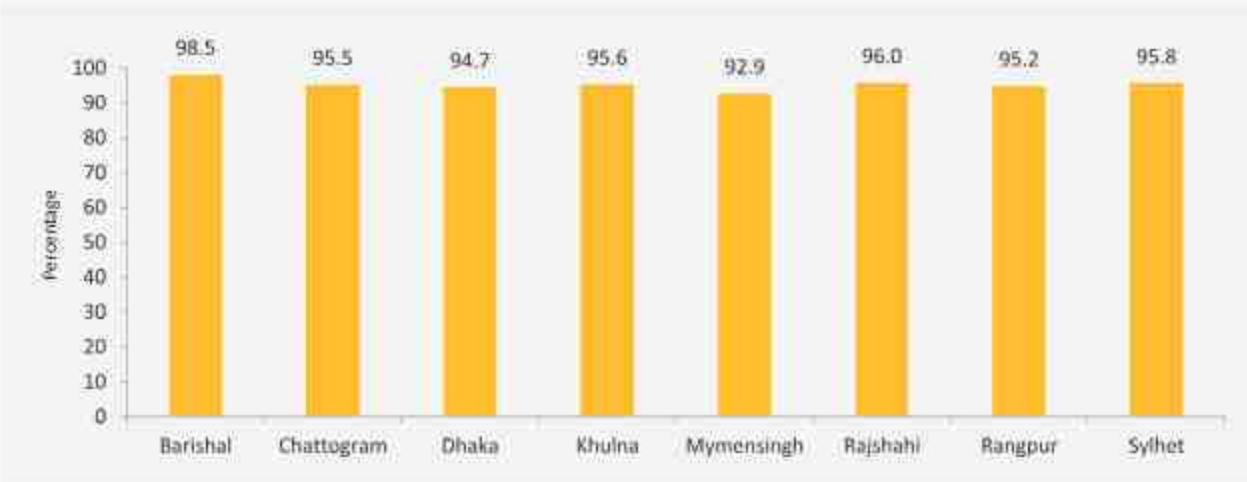
Figure 8: Valid Full Vacination Coverage by the Age of 12 Months by National Rural and Urban Areas



3.3.5 Crude Full Vaccination Coverage by Age of 23 Months by Division

Figure 9 presents Crude Full Vaccination Coverage by 23 months of age, by division. It shows that crude vaccination coverage was the highest in Barishal (98.5 percent) and the lowest in Mymensingh (92.9 percent) divisions. Elsewhere, the coverage ranged between 96.0 percent and 94.7 percent.

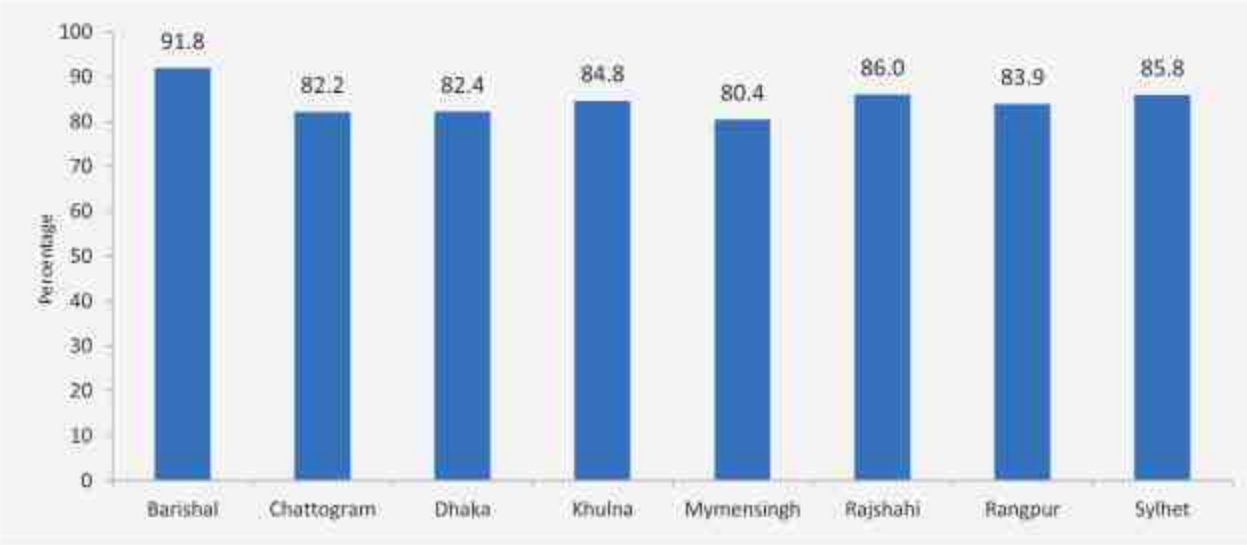
Figure 9: Crude Full Vaccination Coverage by Age of 23 Months by Division in 2019



3.3.6 Valid Full Vaccination Coverage by Age of 12 Months by Division

Valid Full Vaccination Coverage by the age of 12 months is displayed in Figure 9a. Barishal division had the highest valid vaccination coverage (91.8. percent) and Mymensingh division the lowest (80.4 percent). Conversely, higher drop-out rates and administering invalid doses contributed much to the lower valid vaccination coverage.

Figure 9a: Valid Full Vaccination Coverage by Age of 12 Months by Division in 2019



3.3.7 Crude Full Vaccination Coverage by Age of 23 Months in Urban Areas by City Corporation and Municipality

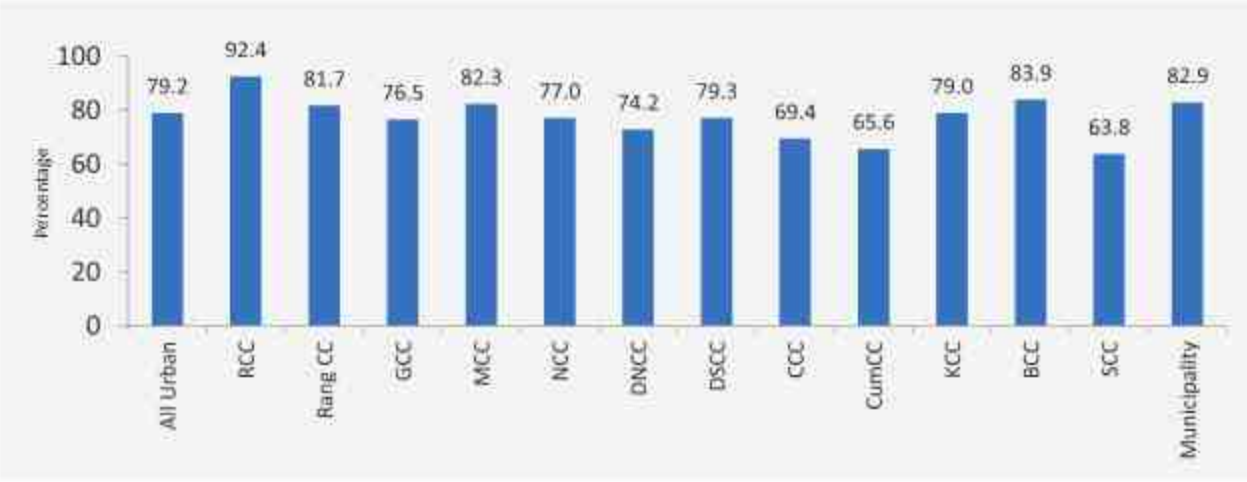
Figure 10 presents Crude Full Vaccination Coverage by the age 23 months by City Corporation and Municipality. It shows that crude vaccination coverage was the highest in RCC (99.8 percent) and the lowest in SCC (87.6 percent). Elsewhere, the coverages ranged from 96.1 percent to 88.1 percent.

Figure 10: Crude Full Vaccination Coverage by Age of 23 Months in Urban Areas by City Corporation and Municipality in 2019

3.3.8 Valid Full Vaccination Coverage by Age of 12 Months in Urban Areas by City Corporation and Municipality

Valid Full Vaccination Coverage by the age of 12 months is displayed in Figure 10a. The figure shows that RCC had the highest Valid Full Vaccination Coverage (92.4 percent) and SCC had the lowest (63.8 percent).

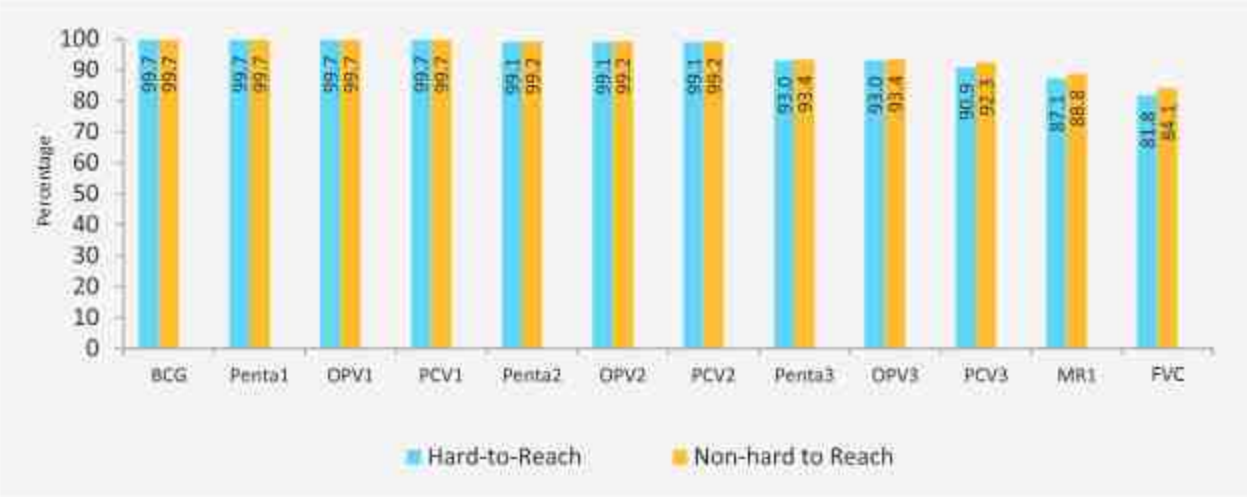
Figure 10a: Valid Full Vaccination Coverage by Age of 12 Months in Urban Areas by City Corporation and Municipality in 2019



3.3.9 Valid Full Vaccination Coverage by Hard-to Reach Areas

A hard-to-reach area was defined as an area where two or more hours are required to reach from the Upazila headquarters. Figure 11 indicates that the vaccination coverage was 2.3 percentage points higher in non-hard-to-reach areas than those in hard-to-reach areas.

Figure 11: Valid Full Vaccination Coverage by Age of 12 Months by Hard-to-Reach Area in 2019



3.3.10 Differential in Valid Vaccination Coverage by Age of 12 Months by Background Characteristics

Table 4 presents the Valid Vaccination Coverage by the age of 12 months, by background characteristics, such as gender and areas, which showed little variation; here the education of mothers had greater influences upon the coverage. There was slight gender disparity, with valid vaccination coverage at 83.8 percent for males and 84.0 percent for females. As for the residence, 6.0 percentage points difference was noticed between the rural (85.0 percent) and the urban areas (79.2 percent).

However, regarding the educational attainment of mothers, valid vaccination coverage was higher among those children whose mothers had higher education. Coverage was considerably higher among the children whose mothers had more than ten years of education (85.8 percent), compared to those with five years' education (83.0 percent) and those with no education (80.0 percent). Valid Vaccination Coverage of children with mothers having Graduate or master's level of education noticed a decrease compared to those whose mothers' education was between 10 and 12 years (82.4 percent for Graduate and 83.7 percent for Masters).

In terms of income, remarkable variation in the Valid Full Vaccination Coverage was observed between the highest and the lowest income groups. Valid Full Vaccination Coverage was the highest in the lowest income group (89.6 percent). And, the second lowest coverage (84.9 percent) was revealed among the people belonging to the middle-income group. The Valid Full Vaccination Coverage was 83.7 percent among the highest income group. And, the coverage was 84.4 percent among those belonging to the second and fourth wealth quintile. The above findings suggest that the lower income group is almost parallel to the highest income group as regards to vaccination of their children. It also points towards the efforts of EPI programme in Bangladesh to ensure equity here.

The Valid Vaccination Coverage was also assessed by wealth quintile, which was calculated by using a principal component analysis. Similar to the analysis by income, the vaccination coverage was higher in the poorer wealth quintiles. The coverage was 82.5 percent in the richest wealth quintile, which was actually about 1.6 percentage points lower than the first, and 1.7 percentage point from the second, 1.4 percentage points from the fourth, and 2.3 percentage points from the middle quintile.

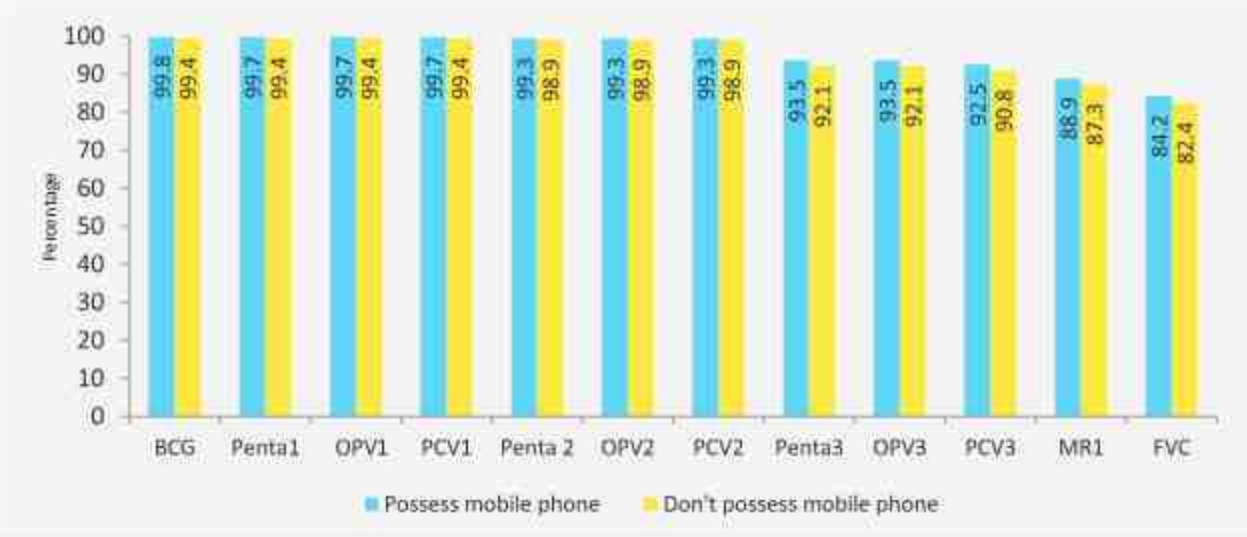
Table 4: Percentage Distribution of Children who received all Valid Vaccine by Age of 12 Months by Background Characteristics

BACKGROUND CHARACTERISTICS	BCG	OPV1	PENTA1	PCV1	OPV2	PENTA2	PCV2	OPV3	PENTA3	PCV3	MR1	FVC	Number
Sex													
Male	99.7	99.7	99.7	99.7	99.2	99.2	99.2	93.2	93.2	92.0	88.7	83.8	21,155
Female	99.7	99.6	99.6	99.6	99.2	99.2	99.2	93.5	93.5	92.4	88.6	84.0	19,337
Residence													
Urban	99.4	99.4	99.4	99.4	98.6	98.6	98.6	90.1	90.1	89.2	84.6	79.2	9,724
Rural	99.8	99.8	99.8	99.8	99.4	99.4	99.4	94.1	94.1	92.9	89.5	85.0	29,209
Education of Mothers													
Illiterate	99.6	99.6	99.6	99.6	98.8	98.8	98.8	91.0	91.0	91.9	84.9	80	2,851
Primary	99.8	99.8	99.8	99.8	99.1	99.1	99.1	91.5	91.5	92.6	87.5	83	11,275
Secondary	99.8	99.8	99.8	99.8	99.3	99.3	99.3	92.7	92.7	93.8	89.2	84.7	16,891
SSC/Dhakil/O level	99.6	99.6	99.6	99.6	99.3	99.3	99.3	92.9	92.9	93.8	89.6	84.9	5,240
HSC/Alim/A level	99.7	99.7	99.7	99.7	99.3	99.3	99.3	92.3	92.3	93.9	90.5	85.8	2,741
Degree/Fazil	99.6	99.6	99.6	99.6	98.9	98.9	98.9	90.2	90.2	93.2	88.9	82.4	858
Masters/Kamil	99.2	99.2	99.2	99.2	99.0	99.0	99.0	92.6	92.6	93.6	88.3	83.7	636
Monthly Income													
Upto 3000	99.8	99.8	99.8	99.8	99.8	99.8	99.8	96.1	96.1	92.4	91.4	89.6	250
3001 - 5000	99.9	99.9	99.9	99.9	99.2	99.2	99.2	93.5	93.5	89.3	89.3	84.4	696
5001 - 7000	99.9	99.9	99.9	99.9	99.1	99.1	99.1	93.3	93.3	91.6	89.9	84.9	1,669
7001 - 10000	99.8	99.8	99.8	99.8	99.3	99.3	99.3	93.8	93.8	92.6	88.9	84.4	10,049
10000+	99.7	99.7	99.7	99.7	99.2	99.2	99.2	93.1	93.1	92.2	88.3	83.7	26,269
Wealth Quintile													
Lowest	99.8	99.7	99.7	99.7	99.0	99.0	99.0	93.5	93.5	92.9	88.2	84.1	7,758
Second	99.7	99.7	99.7	99.7	99.4	99.4	99.4	93.7	93.7	92.5	88.9	84.2	8,106
Middle	99.8	99.8	99.8	99.8	99.4	99.4	99.4	94.1	94.1	92.8	89.4	84.8	8,172
Fourth	99.8	99.8	99.8	99.8	99.1	99.1	99.1	93.2	93.2	91.9	88.7	83.9	8,304
Highest	99.5	99.4	99.4	99.4	99.2	99.2	99.2	91.9	91.9	90.8	87.8	82.5	8,152
Hard-to-Reach Area													
Yes	99.7	99.7	99.7	99.7	99.1	99.1	99.1	93.0	93.0	90.9	87.1	81.8	3,021
No	99.7	99.7	99.7	99.7	99.2	99.2	99.2	93.4	93.4	92.3	88.8	84.1	37,471
Mobile Ownership													
Yes	99.8	99.7	99.7	99.7	99.3	99.3	99.3	93.5	93.5	92.5	88.9	84.2	34,126
No	99.4	99.4	99.4	99.4	98.9	98.9	98.9	92.1	92.1	90.8	87.3	82.4	6,366

3.3.11 Valid Full Vaccination Coverage by Age of 12 Months by the Ownership of Mobile Phones

In CES 2019, vaccination coverage was also analyzed by mobile phone ownerships. A slight difference in the coverage was noticed between those who owned mobile phones (84.2 percent) and those who did not (82.4 percent). As it has been expected, the coverage of each antigen was also lower among those who did not have a mobile phone. The rates of difference varied from 0.1 percent for Penta1 coverage to 1.6 percent for MR1. Ownership of a mobile phone set ensured higher vaccination coverage as it contributed much to the easy access to mothers/caregivers to follow up and ensure the subsequent doses. It lowered drop-out from vaccination compared to those whose mothers/caregivers don't own it.

Figure 12: Valid Full Vaccination Coverage by Age of 12 Months by Ownership of Mobile Phone



3.3.12 Trends in Coverage

Over the last two decades, enormous changes in terms of programme implementation strategies and introduction of new vaccines have taken place in the EPI programme. Those changes might act as influencing factors to ascertain higher coverage. CES 2019 analyzed the trend in the coverage by using time series data produced in the previous CESs since 2001. A tremendous improvement in the coverage with some fluctuations was observed over time. A detailed discussion of the trend in crude and valid coverage is given below.

Crude Full Vaccination Coverage by Age of 23 Months

Figure 13 presents the trend in Crude Vaccination Coverage by the age of 23 months over the last one and half decades - from 2001 to 2019. The figure indicates that crude coverage increased by 20 percentage points, beginning at 75.0 percent in 2001, with fluctuations as low as 74.0 percent in 2003. However, since 2003, the trend has been gradually increasing in coverage, with the exception in 2011- the rate had climbed to 94.2 percent in 2015 and 95.3 percent in 2019.

Figure 13: Annual Trend in National Crude Full Vaccination Coverage by Age of 23 Months among 12-23 Months old Children from 2001 to 2019

Valid Full Vaccination Coverage by Age of 23 Months

Figure 14 shows Valid Vaccination Coverage by the age of 23 months since 2005, thus portraying a gradual improvement in valid vaccination coverage. Valid vaccination coverage increased by 17.8 percentage points - from 69.0 percent in 2005 to 88.0 percent in 2019.

Figure14: Annual Trend in National Valid Full Vaccination Coverage by Age of 23 Months among 12-23 Months old Children from 2005 to 2019

Valid Full Vaccination Coverage by Age of 12 Months

Improvement of valid coverage by the age of 12 months is the ultimate goal of EPI. The programme has set a target of achieving 90.0 percent vaccination coverage nationally and at least 85.0 percent in each district. Figure 15 indicates the increasing trend in the coverage from 2001 to 2019. A remarkable increase in the vaccination coverage has occurred in the last 15 years. It increased up to 31.9 percentage points - from 52 percent in 2001 to 83.9 percent in 2019. The trend analysis indicates that gradual improvement in BCG, Penta3, and Measles/MR coverage attributed to the continuous improvement in the Full Valid Vaccination Coverage.

Figure 15: Annual Trend in National Valid Full Vaccination Coverage by Age of 12 Months among 12-23 Months old Children from 2001 to 2019

3.3.13 Trend in Vaccination Coverage by Division

An analysis of the divisional trends will help district and divisional health managers understand the performances in the vaccination coverage over time in their respective divisions. Similar to the trends in the national coverage, trends in the divisional coverage are discussed below. For each division, three figures are presented: the first one depicts the crude coverage; the second one the valid coverage by the age of 23 months; and the third one shows the valid coverage by the age of 12 months.

Barishal Division

Crude coverage in Barishal division was found to fluctuate widely between 2001 and 2003, as shown in Figure 16. Crude coverage declined from 75.0 percent in 2001 to 60.0 percent in 2003. A substantial improvement in the crude coverage was noticed between 2003 and 2005, when it rose from 23 percentage points - to 83.0 percent. Since then, an uninterrupted increase with some fluctuation in the coverage resulted in the rate of 98.5 percent in 2019.

Valid coverage by age of 23 months, as shown in Figure 17, also had a significant increase, of 26.0 percent with some fluctuations, since 2005. In just the period between CES 2015 and CES 2019, valid coverage increased by 5.7 percentage points.

The trend in the valid coverage by the age of 12 months, as presented in Figure 18, was similar to that found in the crude vaccination coverage, in that it fluctuated considerably between 2001 and 2003, but has steadily increased since then. After a jump from 50.0 percent in 2003 to 67.0 percent in 2005, the coverage steadily rose to another 8.9 percentage points and reached 91.8 percent in 2019.

Figure 16: Annual Trend in Crude Full Vaccination Coverage by Age of 23 Months in Barishal Division from 2001 to 2019

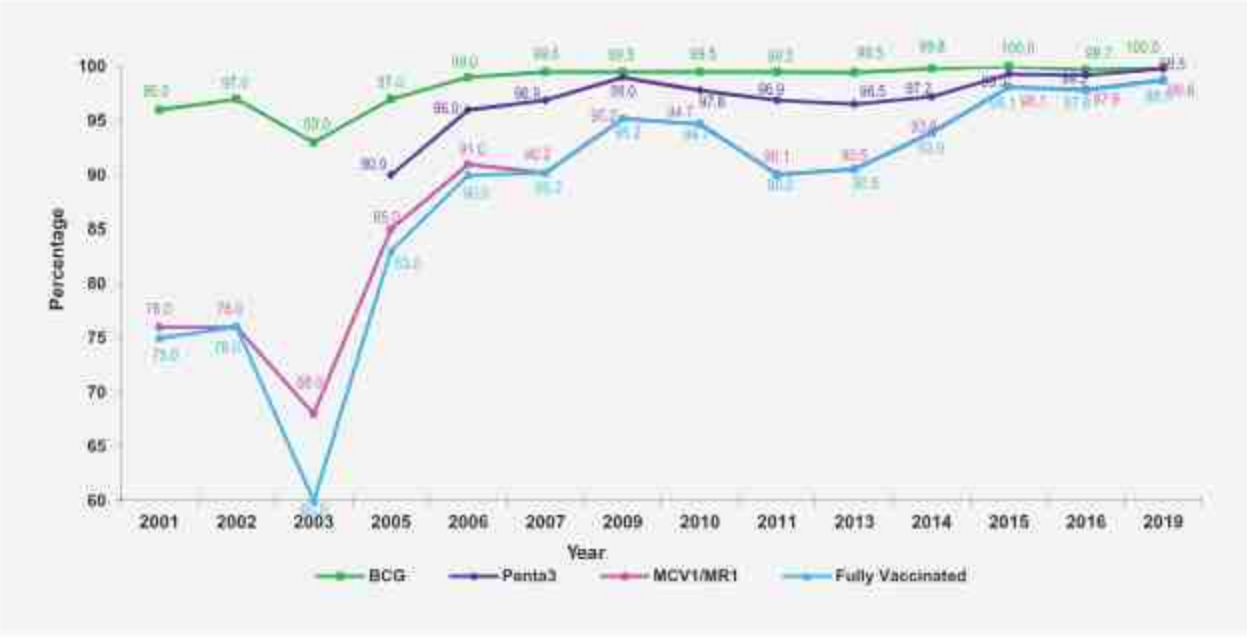


Figure 17: Annual Trend in Valid Full Vaccination Coverage by Age of 23 Months in Barisal Division from 2005 to 2019

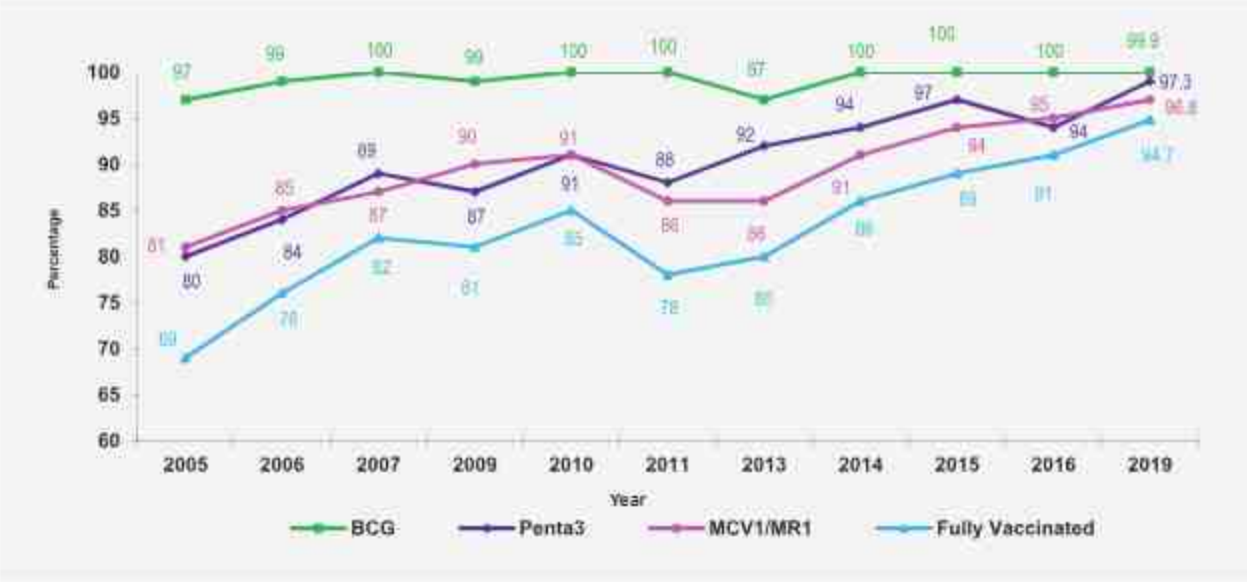
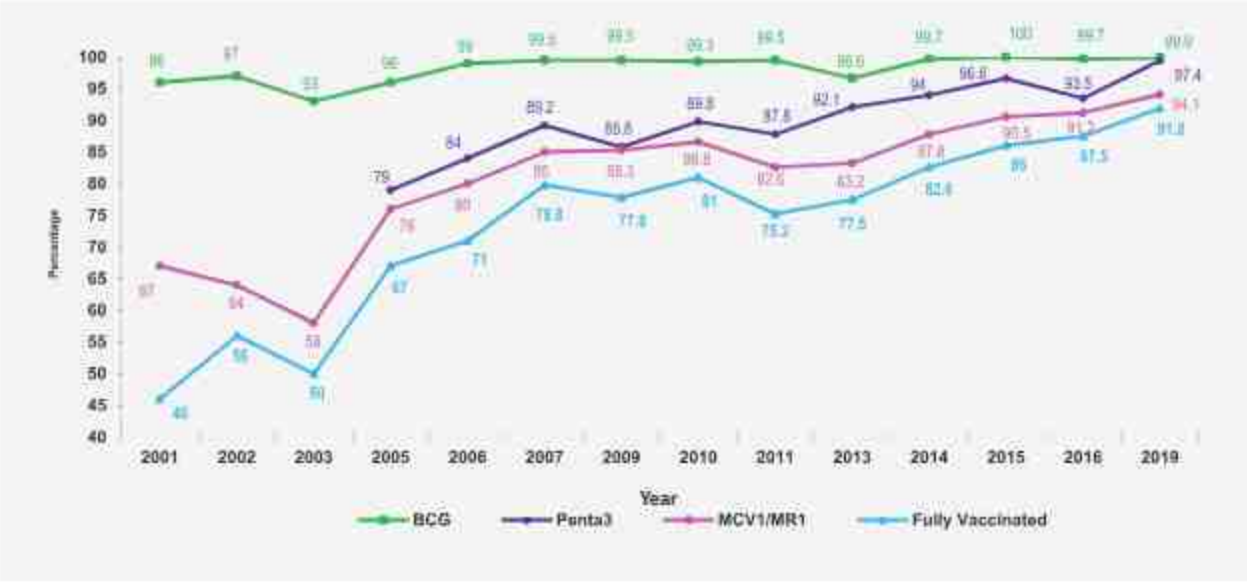


Figure 18: Annual Trend in Valid Full Vaccination Coverage by Age of 12 Months in Barishal Division from 2001 to 2019



Chattogram Division

The trend in the Crude Vaccination Coverage in Chattogram division is presented in Figure 19, which indicates a sharp 10 percentage points increase in the coverage between the years 2001 and 2002 - from 67.0 percent to 76.0 percent. After a considerable decline, it reached 71.0 percent in 2003. Since then, the trend has been towards a substantial improvement and has increased by 24.5 percentage points from 71 percent in 2003 to 95.5 percent in 2019. However, compared to CES 2016, the division experienced 1.2 percentage points lower coverage in 2019.

Figure 20 presents valid coverage by the age of 23 months, which increased by 16.5 percentage points, with some fluctuations, in the last decade. Having started at 69.0 percent in 2005, the rate increased up to 86.7 percent in 2019. The valid coverage decreased by 1.3 percentage points between 2016 and 2019.

Similar to crude vaccination coverage by the age 23 months, a sharp increase in valid coverage by the age of 12 months between 2001 and 2003 was noticed. The valid coverage substantially increased since then. Between 2001 and 2019, it increased by 35.2 percentage points - from 47.0 percent to 82.2 percent in 2019 with 1.3 percentage points decrease in 2016 (see Figure 21).

Figure 19: Annual Trend in Crude Full Vaccination Coverage by Age of 23 Months in Chattogram Division from 2001 to 2019

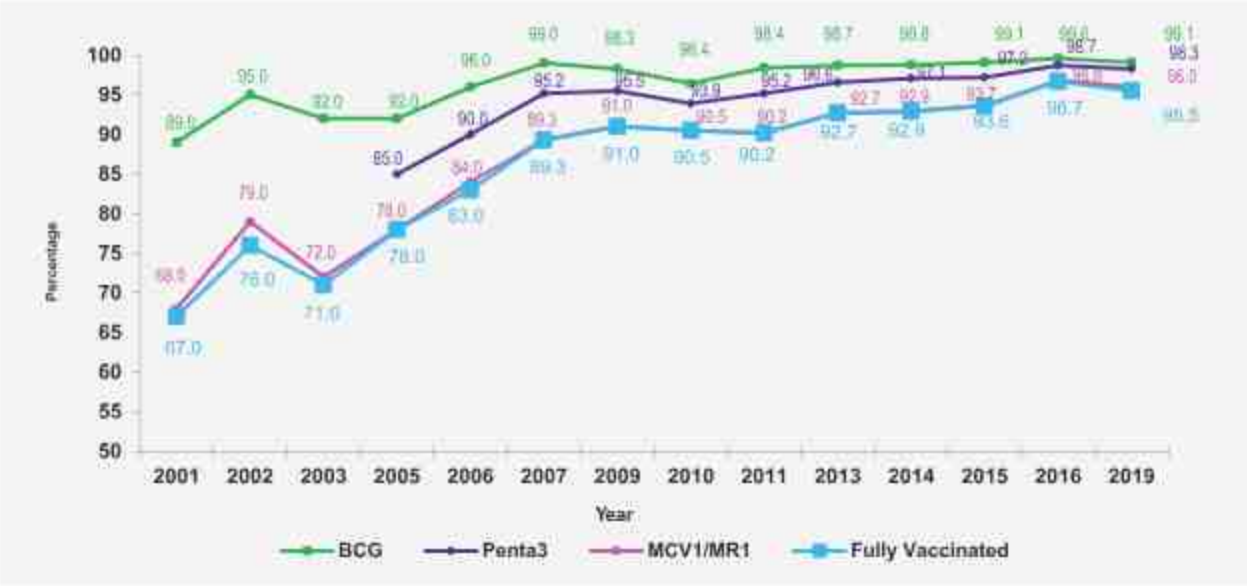


Figure 20: Annual Trend in Valid Full Vaccination Coverage by Age of 23 Months in Chattogram Division from 2005 to 2019

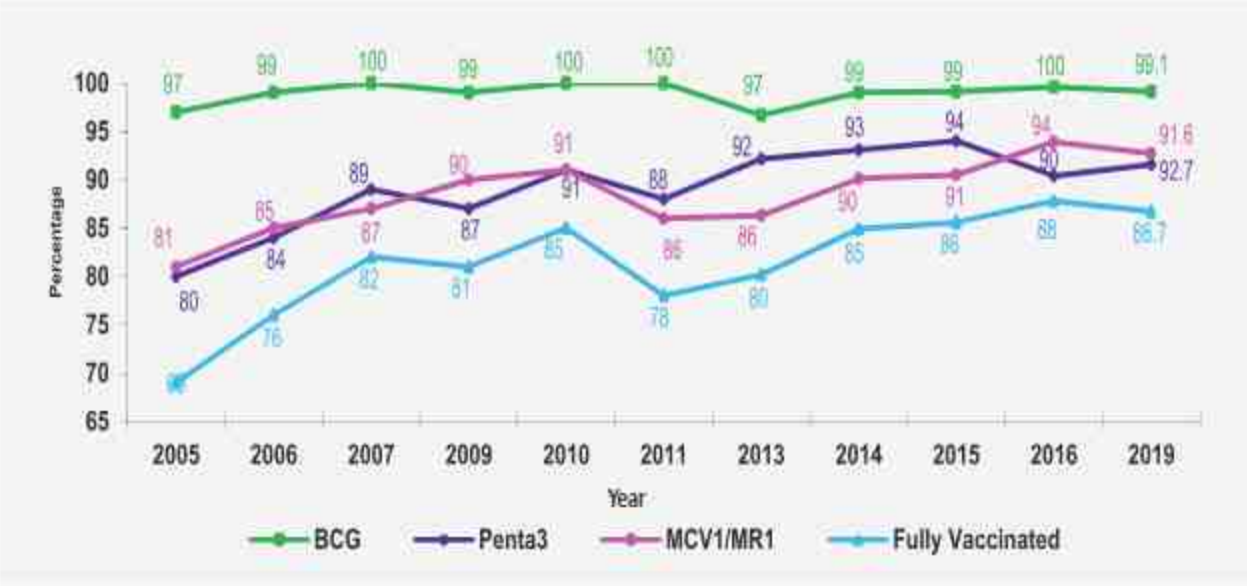
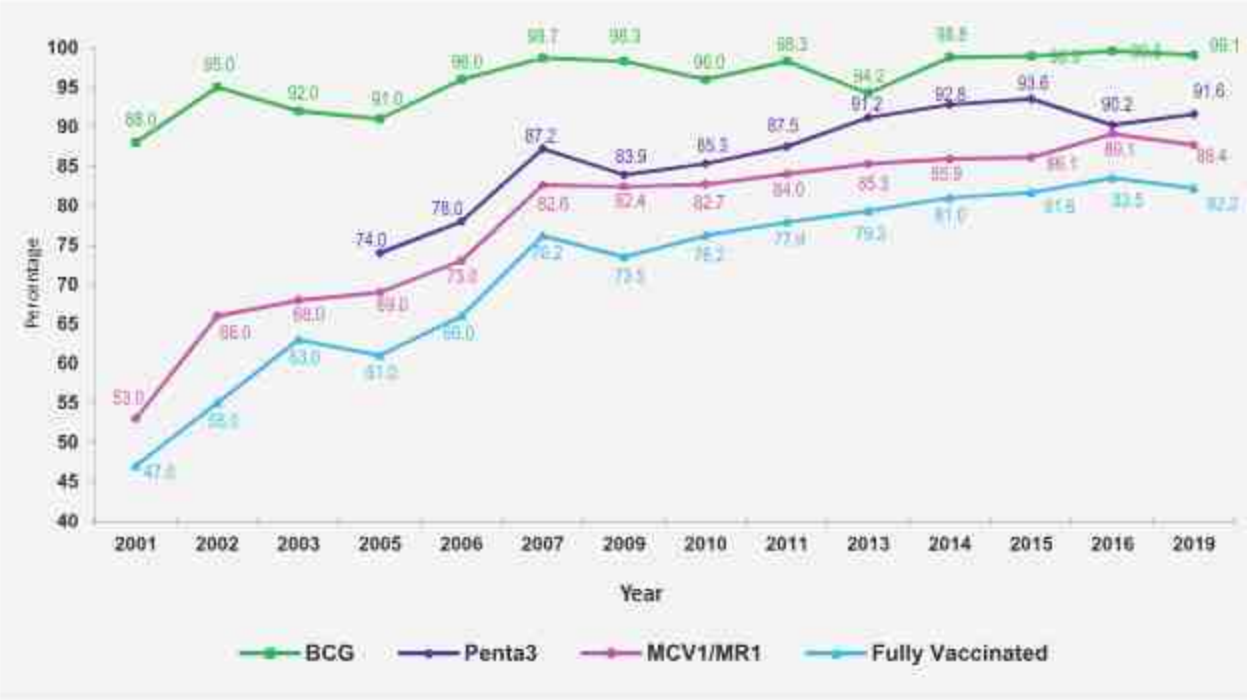


Figure 21: Annual Trend in Valid Full Vaccination Coverage by Age of 12 Months in Chattogram Division from 2001 to 2019



Dhaka Division

Fluctuations in the crude vaccination coverage in Dhaka division were not as wide as in the case of Barishal and Chattogram divisions; but, in common with them, the coverage began to climb after 2003. Dhaka division experienced a steep 19.0 percentage points increase in the rate and reached up to 90.0 percent in 2006 (see Figure 22). From 2006 to 2016, the coverage remained almost constant between 90.0 percent and 93.2 percent. However, the coverage has increased by 1.5 percentage points in 2019 and stands at 94.7 percent.

It is evident from Figure 23 that the valid coverage by the age of 23 months substantially increased during the last decade – from 69.0 percent in 2005 to 88.1 percent in 2016. The coverage decreased down to 86.4 percent in 2019.

In the case of valid vaccination coverage by the age of 12 months, it needs to be mentioned here that the rate has increased about one-quarter since 2001 - from 57.0 percent in 2001 to 81.1 percent in 2015 (see Figure 24). Following the greatest increase between 2002 and 2006, from 52.0 percent to 72.0 percent, the coverage rose steadily with fluctuations and increased up to 77.9 percent in 2016. Compared to CES 2016, it increased by 4.9 percentage points in 2019 and reached at 82.4 percent.

Figure 22: Annual Trend in Crude Full Vaccination Coverage by Age of 23 Months in Dhaka Division from 2001 to 2019

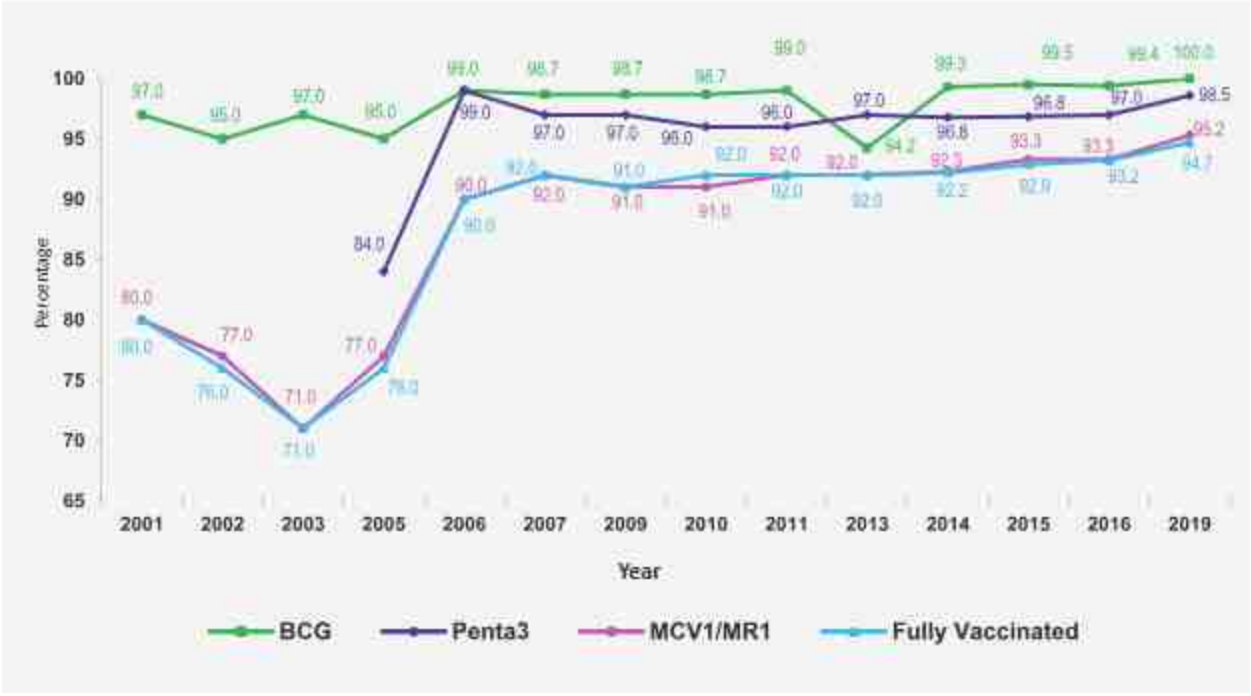


Figure 23: Annual Trend in Valid Full Vaccination Coverage by Age of 23 Months in Dhaka Division from 2005 to 2019

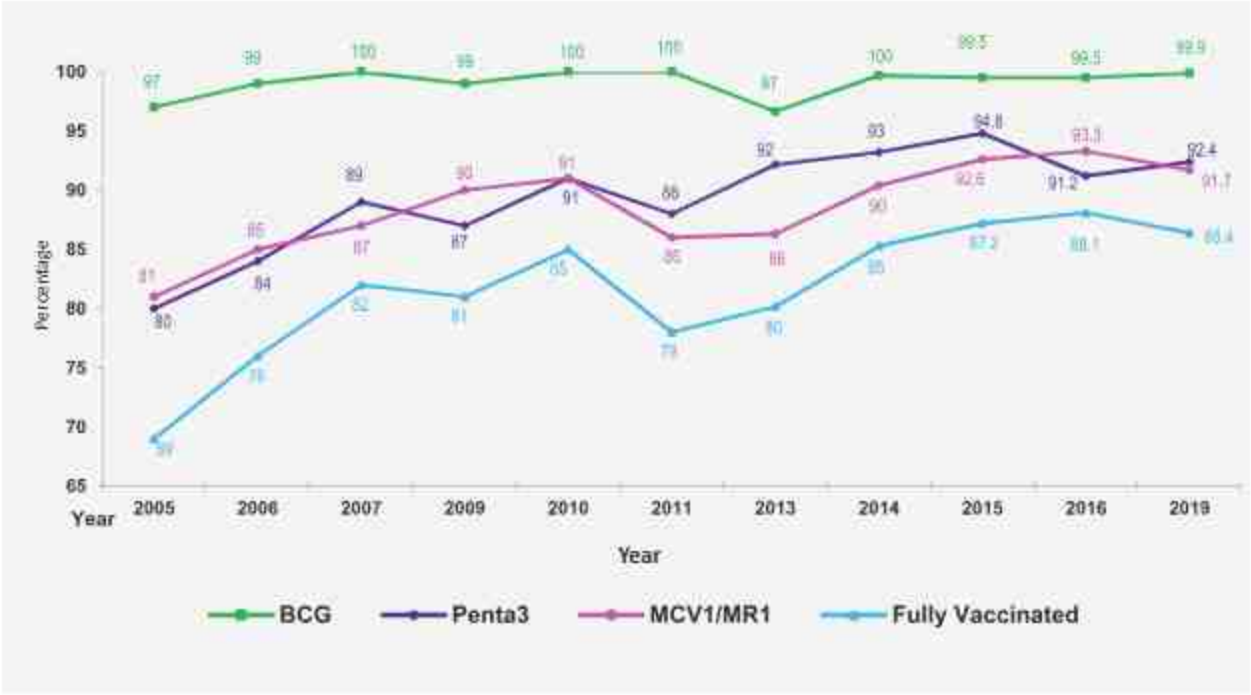


Figure 24: Annual Trend in Valid Full Vaccination Coverage by Age of 12 Months in Dhaka Division from 2001 to 2019

Khulna Division

Among all the five divisions that have records up to 2001, Khulna division has had the flattest rise in coverage figures, having started at the highest percentage for crude vaccination coverage, 86.0 percent in 2001 (see Figure 25). While the division shared with others a drop and then fluctuations in the early years, it also stabilized earlier, in 2001, when the rate was 86.0 percent and then generally rose until 2010, when it reached 94.9 percent. Since then, it has declined slightly in CES 2013 and CES 2014, but increased up to 95.2 percent in 2015, and 95.7 percent in 2016. Again, it was decrease down to 95.6 percent in CES 2019.

Figure 26 presents the valid vaccination coverage by the age of 23 months since 2005. The figure indicates that it increased by 20.0 percentage points - from 69.0 percent in 2005 to 89.0 percent in 2015; however, the coverage was the same in 2014 and 2015. Afterwards, a slight declining trend persisted - 88.5 percent in 2016 and 88.8 percent in 2019.

Figure 27 illustrates the trend in the valid coverage by the age of 12 months. It shows a slow increase in the coverage between 2001 and 2006 - from 65.0 percent to 77.0 percent. After some fluctuations, the coverage rose up to 72.2 percent in 2007; since then there was a continuous improvement in coverage till 2013, when it was 84.8 percent. The coverage again dropped down to 81.9 percent in 2014, further it rose up to 83.6 percent in 2015 and 84.8 percent in 2019.

Figure 25: Annual Trend in Crude Full Vaccination Coverage by Age of 23 Months in Khulna Division from 2001 to 2019

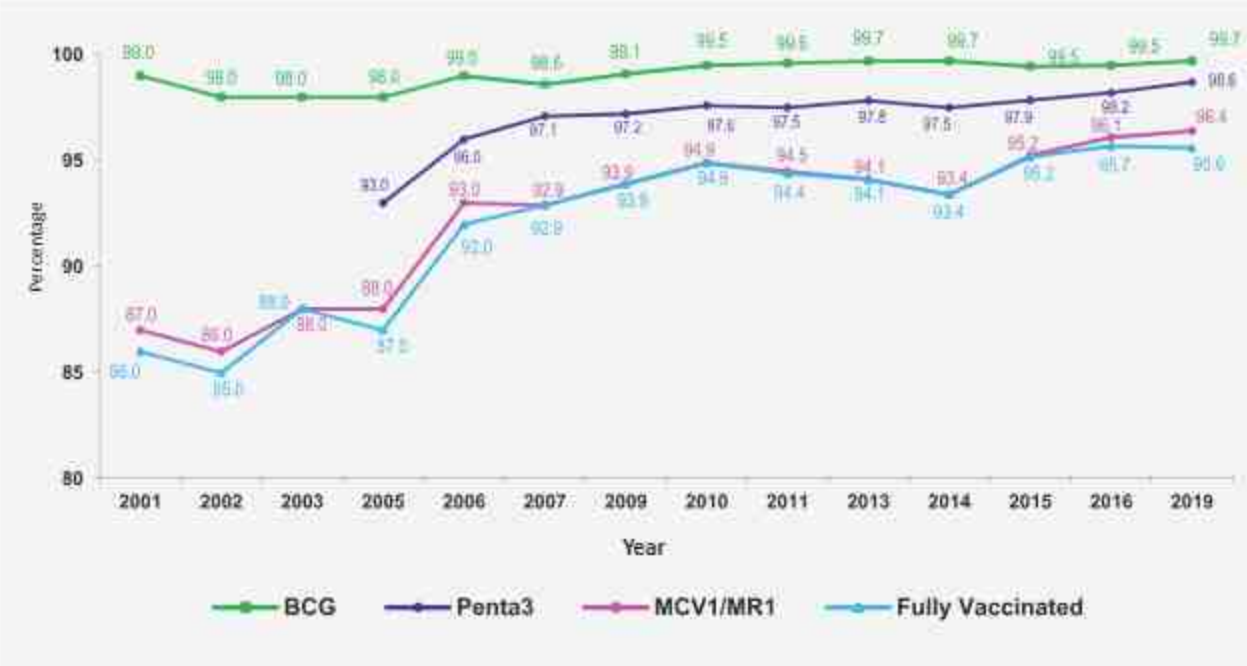


Figure 26: Annual Trend in Valid Full Vaccination Coverage by Age 23 Months in Khulna Division from 2005 to 2019

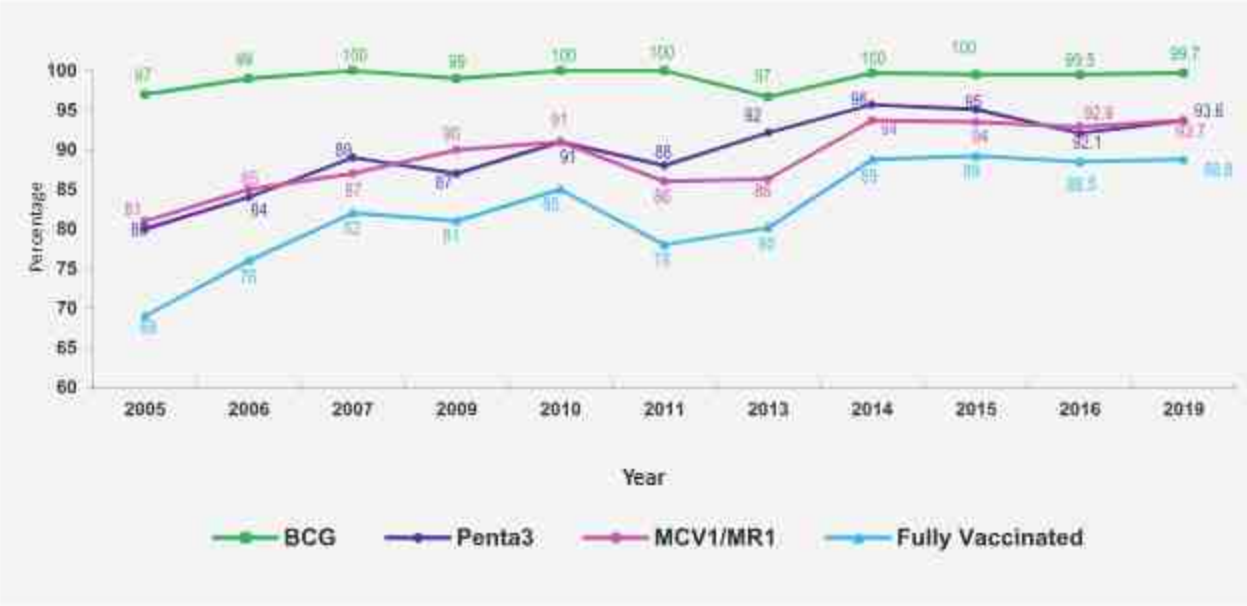
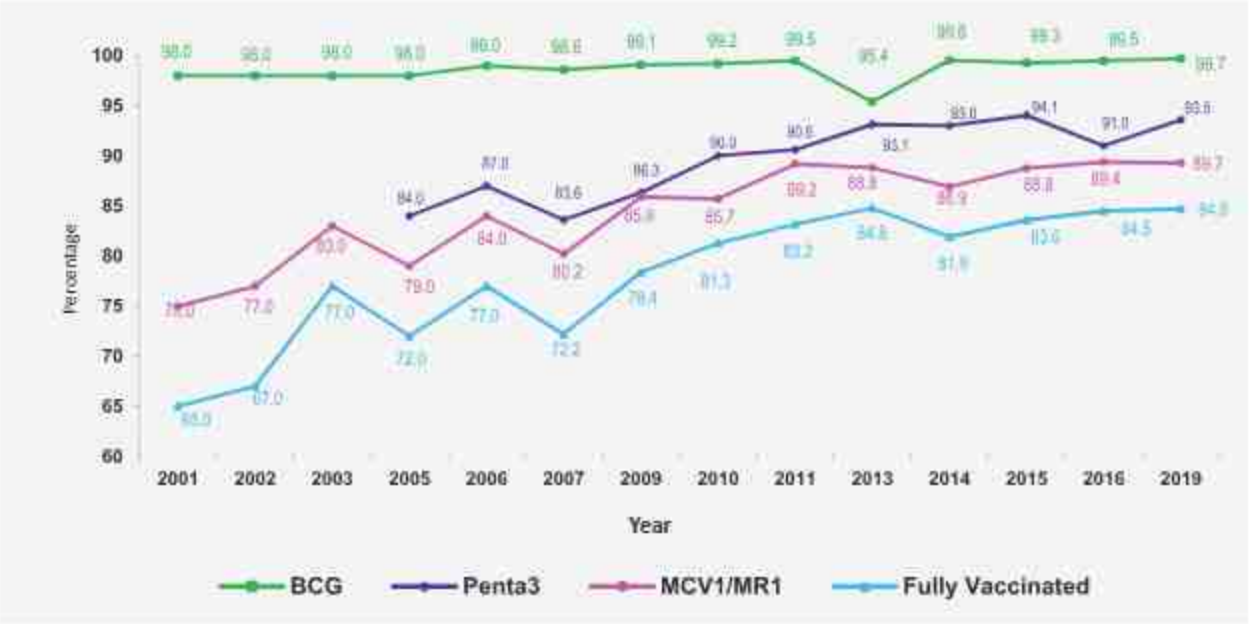


Figure 27: Annual Trend in Valid Full Vaccination Coverage by Age of 12 Months in Khulna Division from 2001 to 2019



Rajshahi Division

The trend in the crude vaccination coverage by the age of 23 months in Rajshahi division since 2001 follows much the same pattern as in the other divisions. The coverage of Rajshahi division decreased between 2001 and 2003 (see Figure 28). The most considerable jump was between 2003 and 2006, when the rate increased by 16 percentage points to 91.0 percent. This rapid jump contributed to Rajshahi's attainment of the status of the highest performing division in Bangladesh. Since 2007, crude coverage remained there almost static, ranging from 94.5 percent to 96.0 percent in 2019.

The trend of valid vaccination coverage by the age of 23 months, as presented in Figure 29, shows a sharp increase in coverage from 69.0 percent in 2005 to 82.0 percent in 2007. Since then, the coverage fluctuated in each CES except 2015 and gradually reached at 89.6 percent in 2019. The coverage increased by 2.4 percentage points in 2019 than that in 2016.

Figure 30 shows that the valid coverage by the age of 12 months quite steadily increased from 54.0 percent in 2001 to 64.0 percent in 2003 in Rajshahi division. Since then, there was an almost continuous improvement as it increased up to 87.0 percent in 2014. With some fluctuations, the coverage was stagnant in the last 3 years and reached up to 86.0 percent in 2019.

Figure 28: Annual Trend in Crude Full Vaccination Coverage by Age of 23 Months in Rajshahi Division from 2001 to 2019

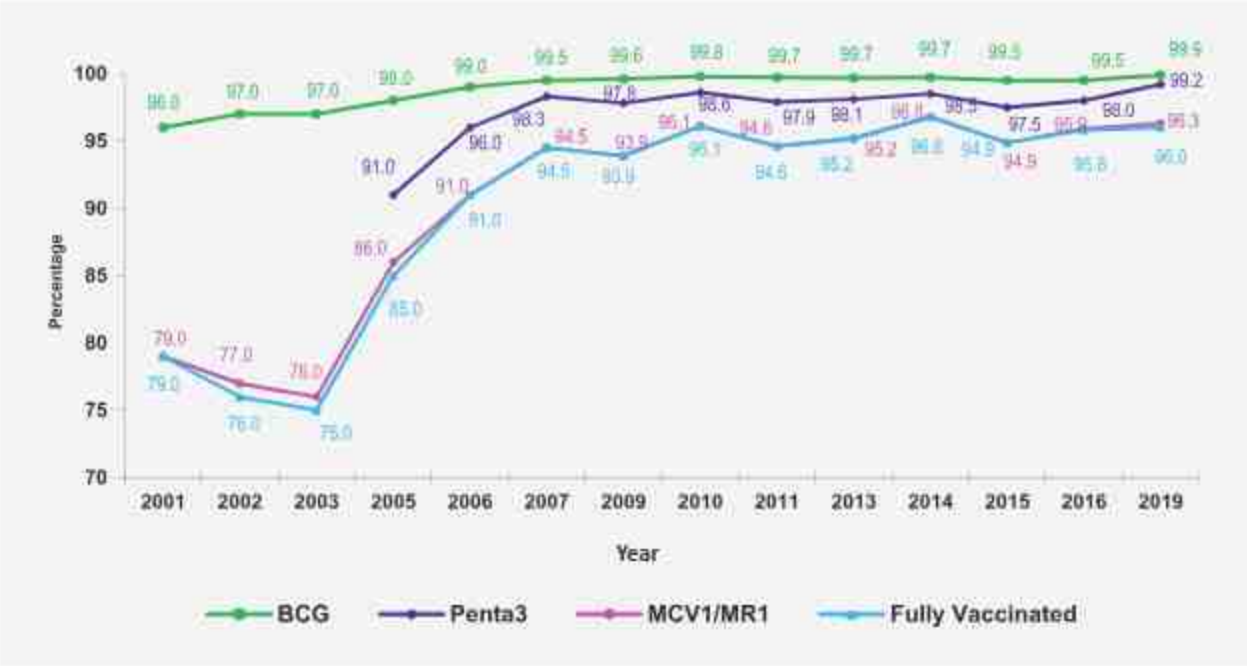


Figure 29: Annual Trend in Valid Full Vaccination Coverage by Age of 23 Months in Rajshahi Division from 2005 to 2019

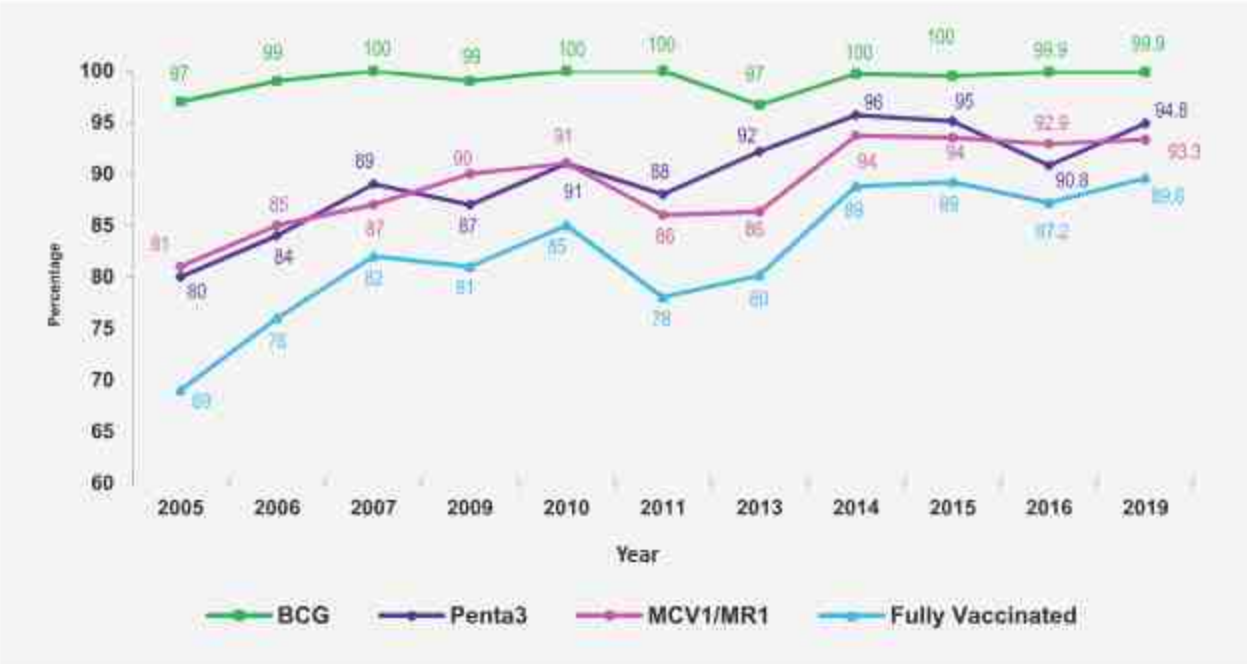
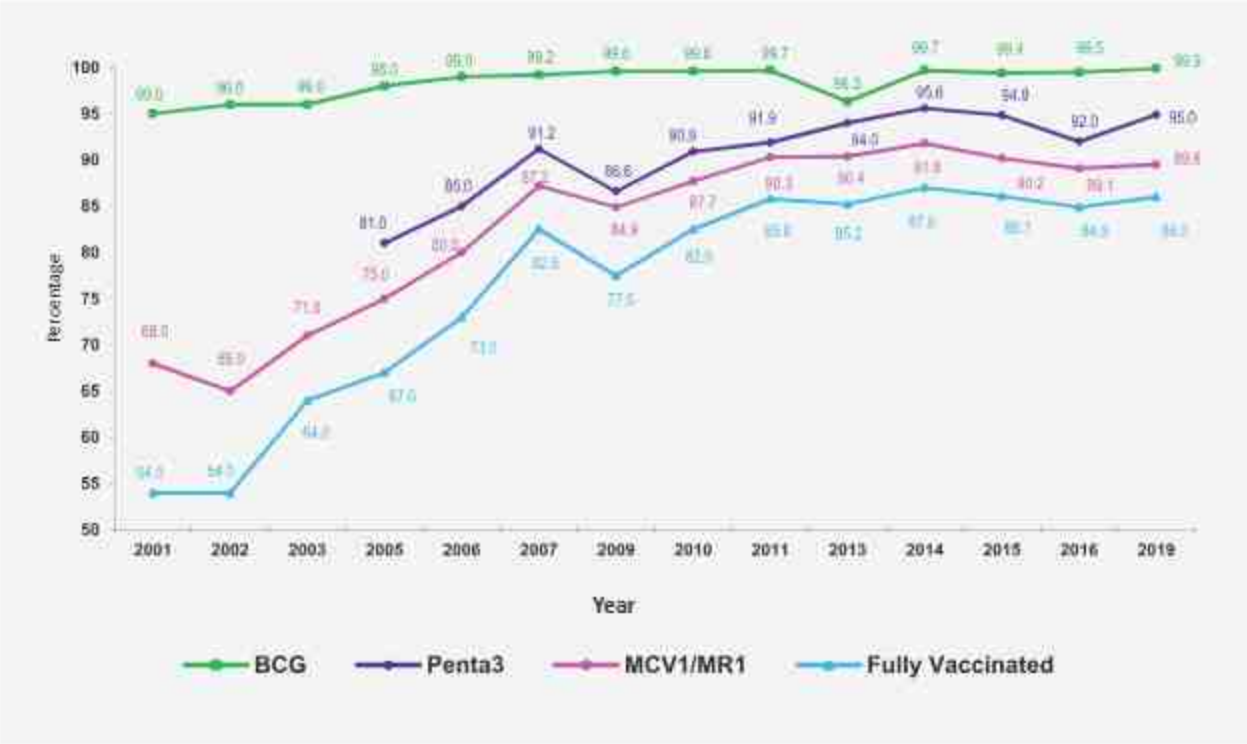


Figure 30: Annual Trend in Valid Full Vaccination Coverage by Age of 12 Months in Rajshahi Division from 2001 to 2019



Rangpur Division

Rangpur emerged as an independent administrative division in 2010. Therefore, the trend in Rangpur division, as shown in Figure 31, describes vaccination coverage only since 2010. There, the crude vaccination coverage was 95.0 percent in 2010; it decreased down to 92.0 percent in 2011, and rose again to 96.5 percent in 2015; later, it experienced 95.2 percent coverage in 2019.

As regards the valid vaccination coverage by the age of 23 months, a sharp continuous rise was observed during 2005-2007. The coverage decreased down to 81.0 percent in 2009, and again rose to 85.0 percent in 2010. The division again experienced a sharp decrease in 2011. Since then, a continuous improvement in coverage was observed. And, it increased from 78.0 percent in 2011 to 88.1 percent in 2019.

The valid coverage by the age of 12 months trend was similar to the trend of valid coverage by the age of 23 months. The coverage was found to be increasing at a slow pace, from 78.0 percent in 2010 to 81.5 percent in 2014; and, it remained unchanged between the 2013 and 2014 CESs (see Figure 33). The valid full vaccination coverage reached at 83.9 percent in 2019 with fluctuations in 2015 and 2016. It increased by 2.4 percentage points from 82.5 percent in 2016 to 83.9 percent in 2019

Figure 31: Annual Trend in Crude Full Vaccination Coverage by Age of 23 Months in Rangpur Division from 2010 to 2019

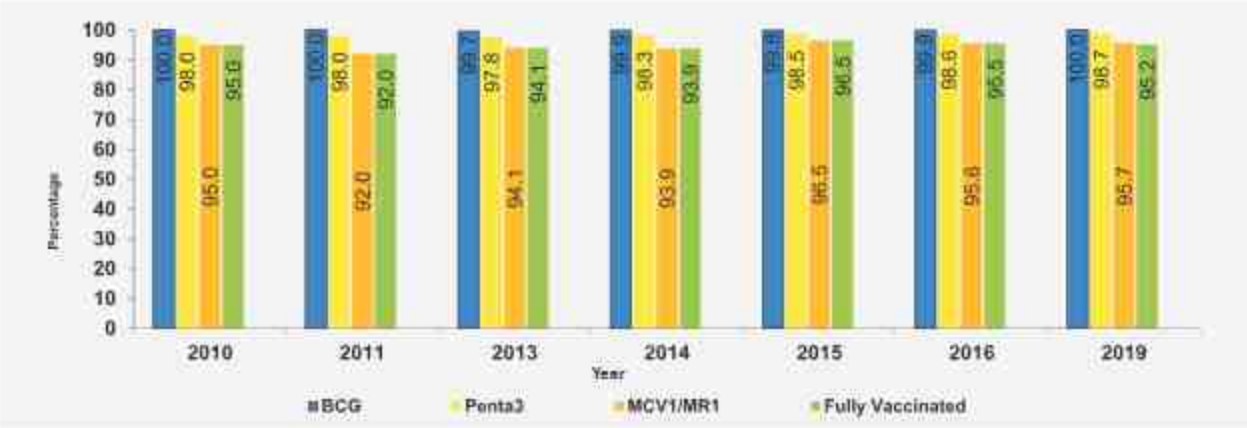
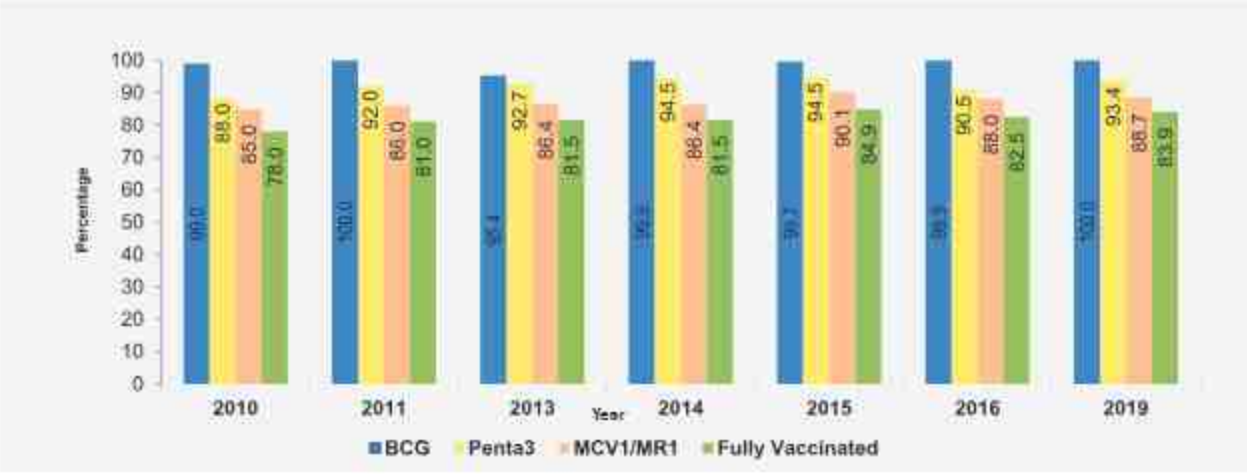


Figure 32: Annual Trend in Valid Full Vaccination Coverage by Age of 23 Months in Rangpur Division from 2005 to 2019

Figure 33: Annual trend in Valid Full Vaccination Coverage by Age of 12 Months in Rangpur Division from 2010 to 2019



Sylhet Division

As a separate division, Sylhet division is quite older than Rangpur division; however, it has been a part of Chattogram division until 1998. Figure 34 illustrates the crude coverage in Sylhet division by the age of 23 months, since 2001, when the crude coverage rate was 42.0 percent. But after that, the coverage increased up to 92.1 percent in 2013 with fluctuations. Between 2013 and 2014, the coverage decreased by 3.5 percentage points from 92.1 percent in 2013 to 88.6 percent in 2014. And, again, it increased up to 92.1 percent in 2015, 93.1 percent in 2016, and 95.8 percent in 2019.

As for the valid vaccination coverage by the age of 23 months, the trend is like that of the crude coverage. A fluctuated but substantial increase in the coverage was noticed during the period 2005 -2013 (see Figure 35). The valid coverage increased by 24 percentage points - from 59.0 percent in 2005 to 83.4 percent in 2013. However, a slight decrease in the coverage was observed in 2014. It again increased from 82.5 percent in 2015 to 89.6 percent in 2019.

Similarly, Figure 36 shows that the valid coverage by the age of 12 months increased, following the same trend of valid coverage by the age of 23 months, between the periods 2001-2003 and 2005-2014. Valid coverage increased from 23.0 percent in 2001 to 42.0 percent in 2003, followed by a continuous improvement during the years 2003-2013. Valid coverage increased by 38.7 percentage points - from 42.0 percent in 2003 to 80.7 percent in 2013. However, in 2014 it decreased by 2 percentage points- from 80.7 percent in 2013 to 78.6 percent in 2014. A similar decreasing trend was observed in 2015. Valid coverage decreased down to 76.9 percent in 2015. After three years of continuous decreasing trend in valid coverage, it rose by 8.9 percentage points from 76.9 percent in 2015 to 79.2 percent in 2016. It increased by 6.8 percentage points between 2016 and 2019 (79.2 percent in 2016, and 85.8 percent in 2019).

Figure 34: Annual Trend in Crude Full Vaccination Coverage by Age of 23 Months in Sylhet Division from 2001 to 2019

Figure 35: Annual Trend in Valid Full Vaccination Coverage by Age of 23 Months in Sylhet Division from 2005 to 2019

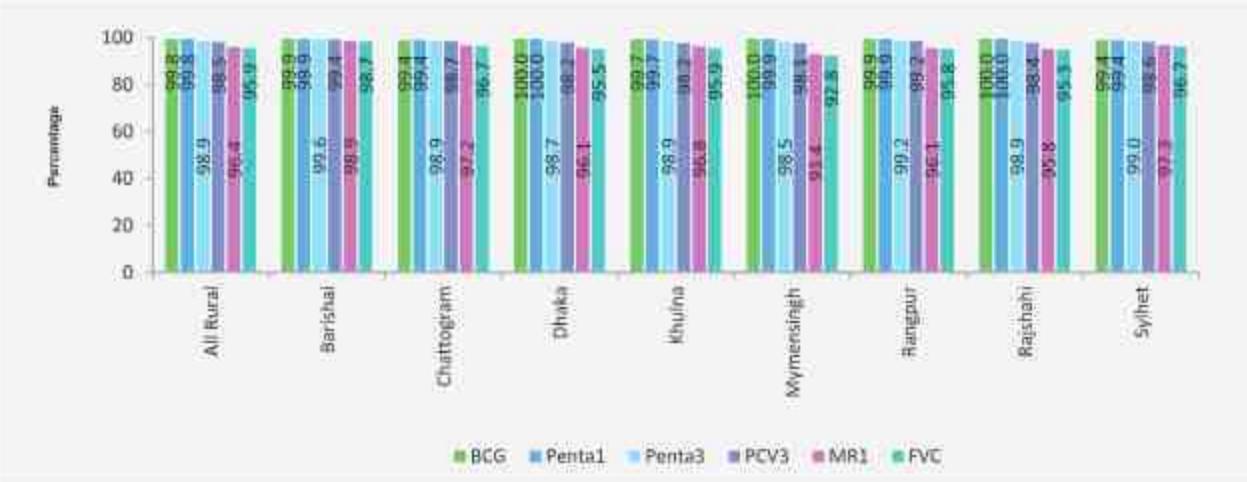
Figure 36: Annual Trend in Valid Full Vaccination Coverage by Age of 12 Months in Sylhet Division from 2001 to 2019

3.3.14 Vaccination Coverage in the Rural Areas by Division

Crude Full Vaccination Coverage by Age of 23 Months

Crude Full Vaccination Coverage by the age of 23 months varied slightly by rural division. Crude vaccination coverage was the highest in Barishal (98.7 percent) and the lowest in Mymensingh (92.8 percent) divisions. Along with Mymensingh, Dhaka, Rajshahi, and Rangpur were below the national average. By vaccine type, all achieved a BCG coverage rate of 99.4 percent or higher. The same general patterns were observed in the case of Penta1 and Penta3. The pattern remained the same for MR1 coverage-Barishal division had the highest MR1 coverage (98.9 percent), while Rangpur was in the middle of the rates (96.1 percent), and Mymensingh had the lowest rate (93.4 percent).

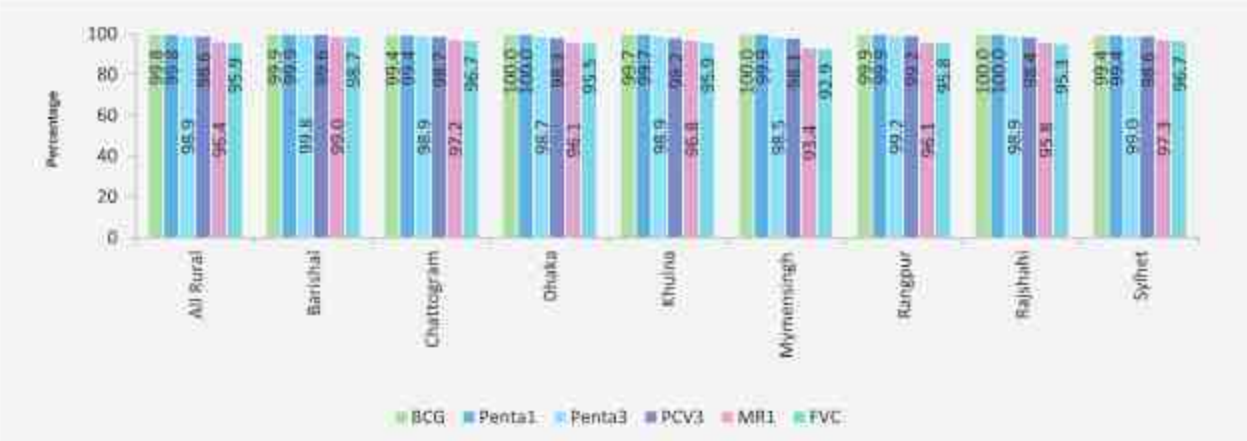
Figure 37: Crude Full Vaccination Coverage by Age of 23 Months in Rural Areas by Division in 2019



Crude Full Vaccination Coverage by Age of 12 Months

Like the crude coverage by the age of 23 months, Barishal division achieved the highest crude vaccination coverage (98.7 percent) by the age of 12 months. It was the lowest in Mymensingh division (92.9 percent). Crude coverage rate was 95.9 percent in Khulna, 96.7 percent in Chattogram, 95.8 percent in Rangpur, 95.5 percent in Dhaka, and 95.3 percent in Rajshahi division (Figure 38).

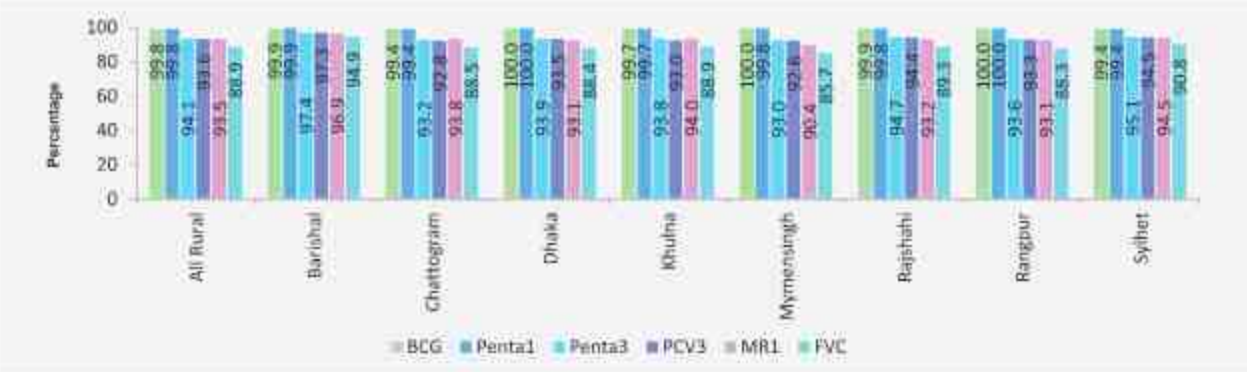
Figure 38: Crude Full Vaccination Coverage by Age of 12 Months in Rural Areas by Division in 2019



Valid Full Vaccination Coverage by Age of 23 Months

Nationwide, 88.9 percent of the rural children received all the vaccines by the age of 23 months as recommended by EPI regarding intervals between the doses and minimum age for receiving vaccine . Among all the eight divisions, children from the rural areas of Barishal division (94.9percent) were more likely to receive all the valid vaccines than those from the other rural divisions.

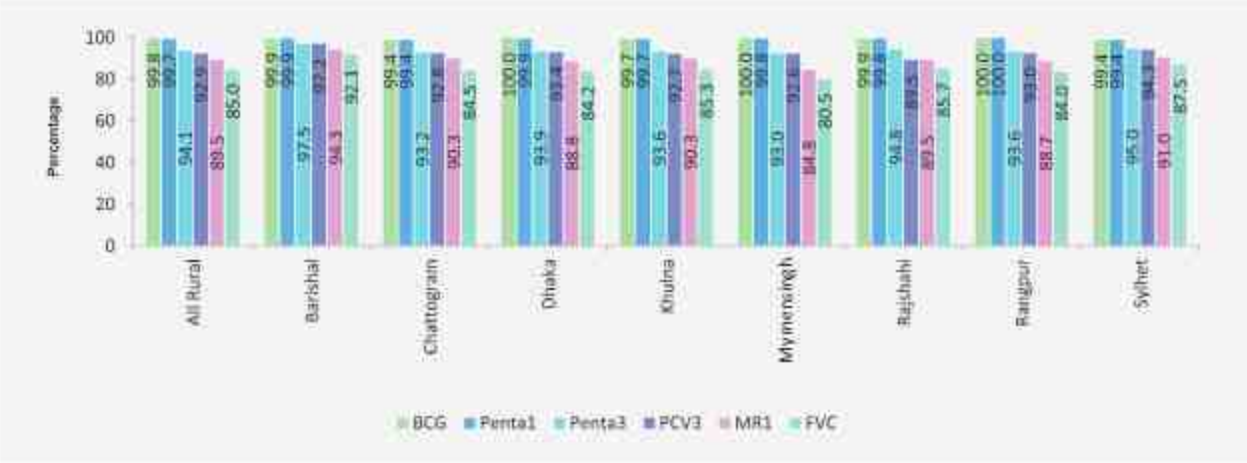
Figure 39: Valid Full Vaccination Coverage by Age of 23 Months in Rural Areas by Division in 2019



Valid Full Vaccination Coverage by age of 12 Months

Figure 40 presents valid full vaccination coverage by the age of 12 months. Nationally, valid coverage in the rural areas was 85.0 percent, with slight variation between divisions from the highest in Barishal (92.1 percent) to the lowest in Mymensingh divisions (80.5 percent).

Figure 40: Valid Full Vaccination Coverage by Age of 12 Months in Rural Areas by Division in 2019

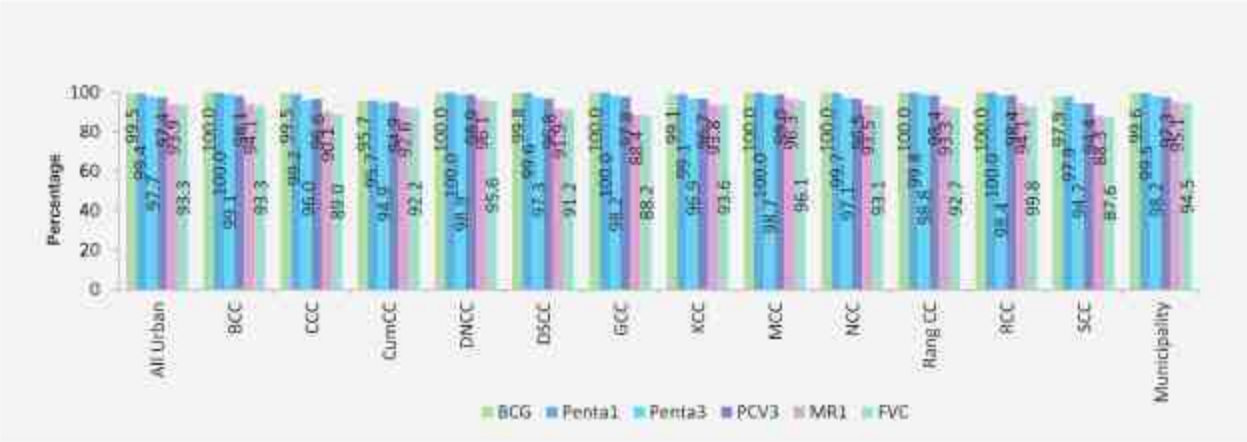


3.3.15 Crude Full Vaccination Coverage in the Urban Areas by City Corporation and Municipality

Figures 41 and 44 depict city corporation-wise vaccination coverage. For CES 2019, each of the 12 city corporations in Bangladesh was surveyed as separate survey strata.

Crude Full Vaccination Coverage by the age of 23 Months: Figure 41 shows urban vaccination coverage by city corporation. Urban coverage was found to be 93.3 percent in CES 2019. Among the city corporations, the highest crude vaccination coverage was in RCC and the lowest in SCC, with 99.8 percent and 87.6 percent, respectively. Crude vaccination coverage in the other city corporations ranged between 88.2 percent and 96.1 percent.

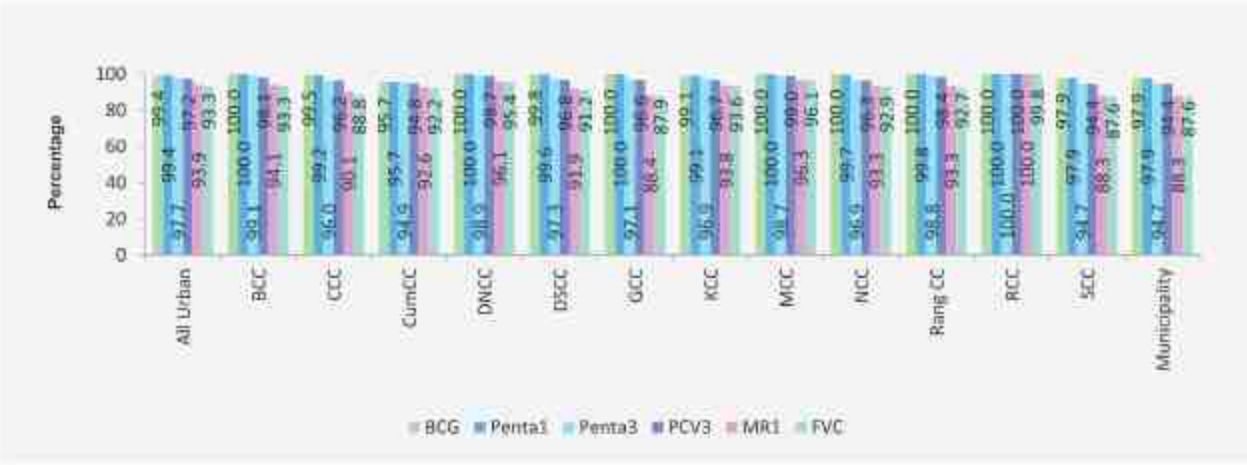
Figure 41: Crude Vaccination Coverage by Age of 23 Months in Urban Areas by City Corporation and Municipality in 2019



Crude Full Vaccination Coverage by the Age of 12 Months

Figure 42 illustrates crude vaccination coverage by the age of 12 months. The figure shows that, RCC achieved the highest coverage (99.8 percent), while SCC had the lowest rate (87.6 percent).

Figure 42: Crude Full Vaccination Coverage by Age of 12 Months in Urban Areas by City Corporation and Municipality in 2019

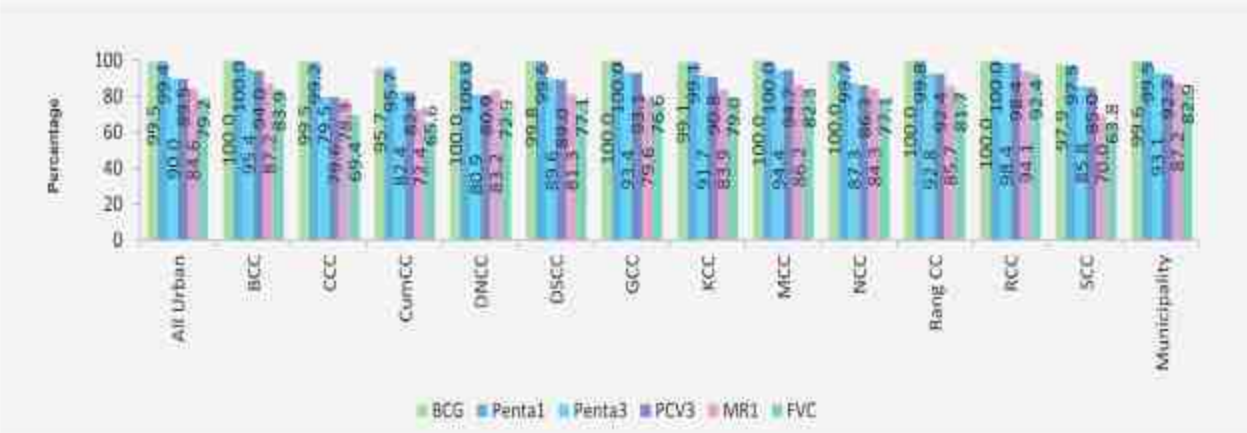


Valid Full Vaccination Coverage by the Age of 23 Months: Figure 43 highlights valid vaccination coverage by the age of 23 months by city corporation. The figure shows that valid coverage was the highest in RCC (96.7 percent). The next highest (87.2 percent) coverage was found in BCC, the rest of the rates ranged between 89.6 percent and 73.1 percent.

Figure 43: Valid Full Vaccination Coverage by Age of 23 Months in Urban Areas by City Corporation and Municipality in 2019

Valid Full Vaccination Coverage by the Age of 12 Months: Valid full vaccination coverage by the age of 12 months is shown in Figure 44. Among all the city corporations, RCC achieved the highest position with 92.4 percent coverage. The lowest coverage was revealed in SCC (63.8 percent). Valid coverage in the other city corporations was between 65.6 percent and 83.9 percent.

Figure 44: Valid Full Vaccination Coverage by Age of 12 Months in Urban Areas by City Corporation and Municipality in 2019



3.3.16 Sex Differentials in Vaccination Coverage

Crude Full Vaccination Coverage by Age of 23 Months by Sex

Figures 45a-45c presents crude full vaccination coverage by the age of 23 months. Nationally, 0.1 percentage point difference was noticed in the crude coverage between the males and the females. Crude full vaccination coverage was 95.4 percent among the males as against 95.3 percent among the females. Similarly, a slight difference was observed between the males and the females in both the urban and the rural areas.

Figure 45a: National Crude Full Vaccination Coverage by Age of 23 Months by Sex in 2019

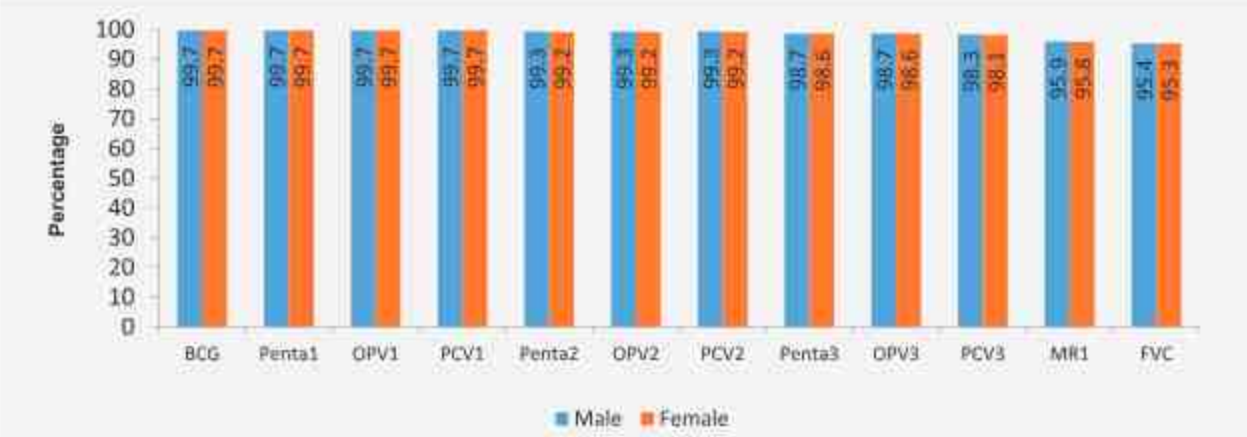


Figure 45b: Crude Full Vaccination Coverage by Age of 23 Months in Urban Areas by Sex in 2019

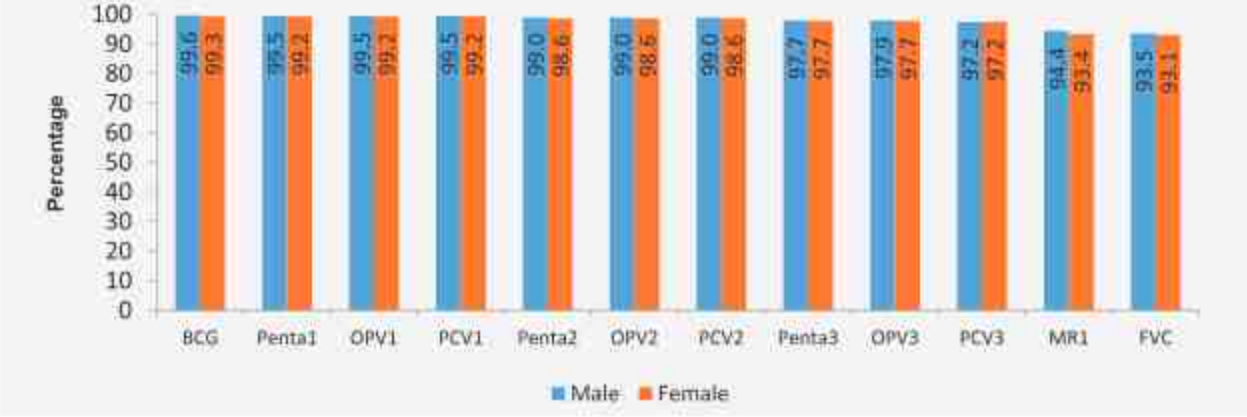
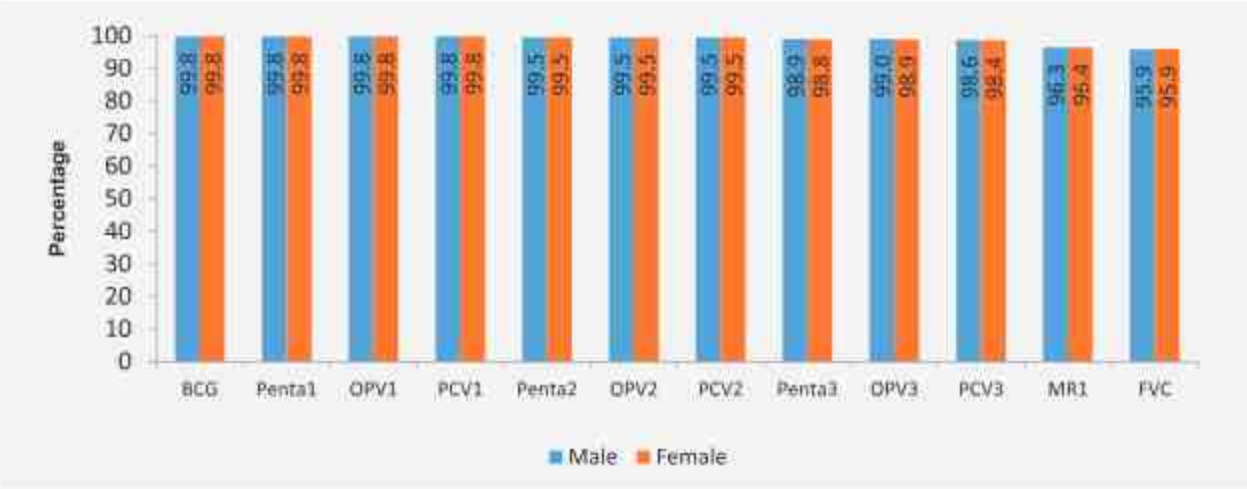


Figure 45c: Crude Full Vaccination Coverage by Age of 23 Months in Rural Areas by Sex in 2019



Crude Full Vaccination Coverage by Age of 12 Months by Sex

Figures 46a-46c presents crude full vaccination coverage by the age of 12 months. Nationally, 0.1 percentage point of difference was noticed in the crude coverage between the males and the females (95.4 percent vs.95.3 percent). Similarly, a slight difference was observed between the males and the females in the urban areas. However, no difference was observed in the rural areas.

Figure 46a: National Crude Full Vaccination Coverage by Age of 12 Months by Sex in 2019

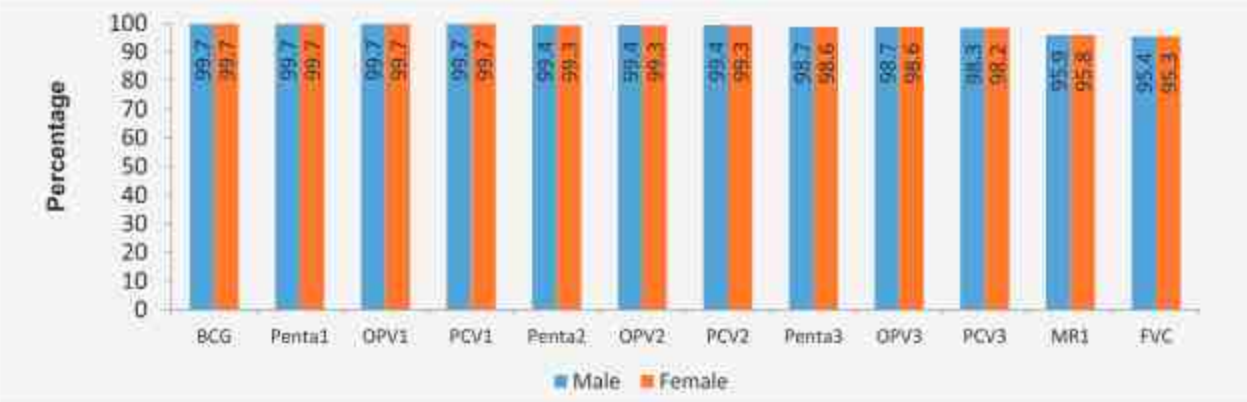


Figure 46b: National Crude Full Vaccination Coverage by Age of 12 Months in Urban Areas by Sex in 2019

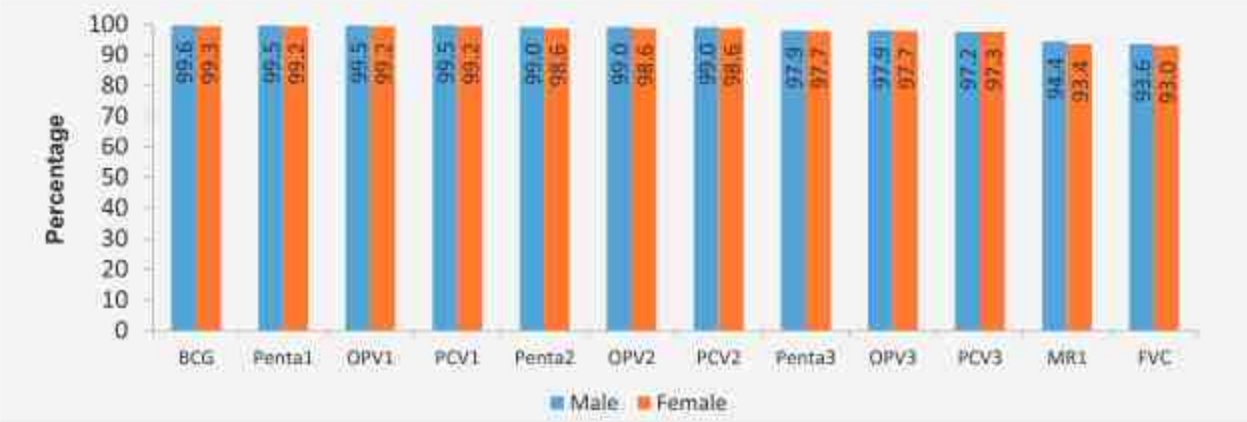
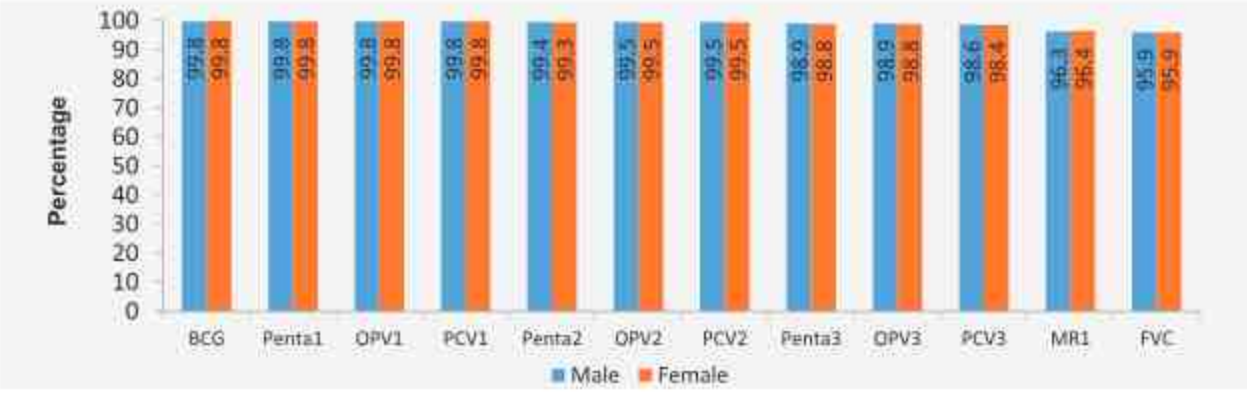


Figure 46c: Crude Full Vaccination Coverage by Age of 12 Months in Rural Areas by Sex in 2019



Valid Full Vaccination Coverage by Age of 23 Months by Sex

Figures 47a-47c depicts the valid full vaccination coverage by the age of 23 months. It shows that the valid coverage was 88.0 percent in the case of males and 88.1 percent in the case of the females. As regards the residence, it was found to be similar among the males and the females in the rural areas. In contrast, a slight difference was noticed in the urban areas.

Figure 47a: National Valid Full Vaccination Coverage by Age of 23 Months by Sex in 2019

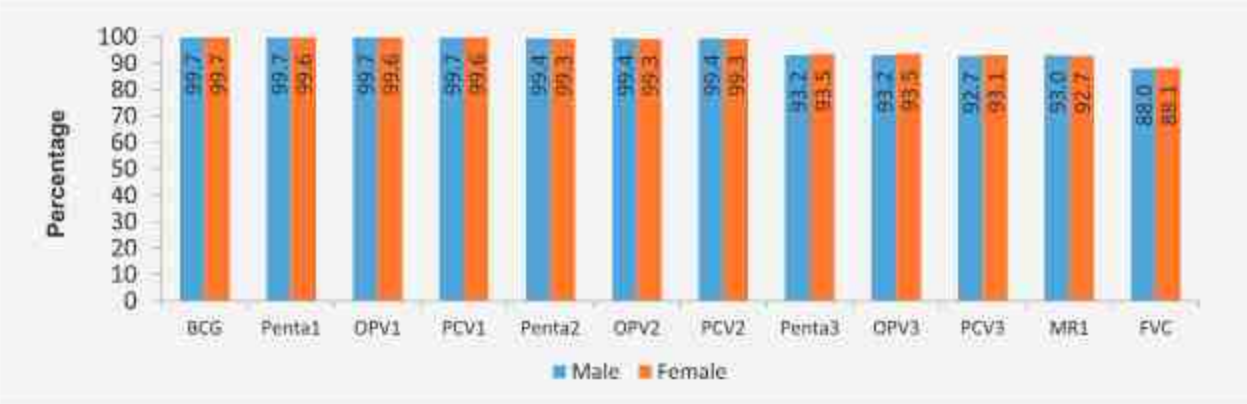


Figure 47b: National Valid Full Vaccination Coverage by Age of 23 Months in Urban Areas by Sex in 2019

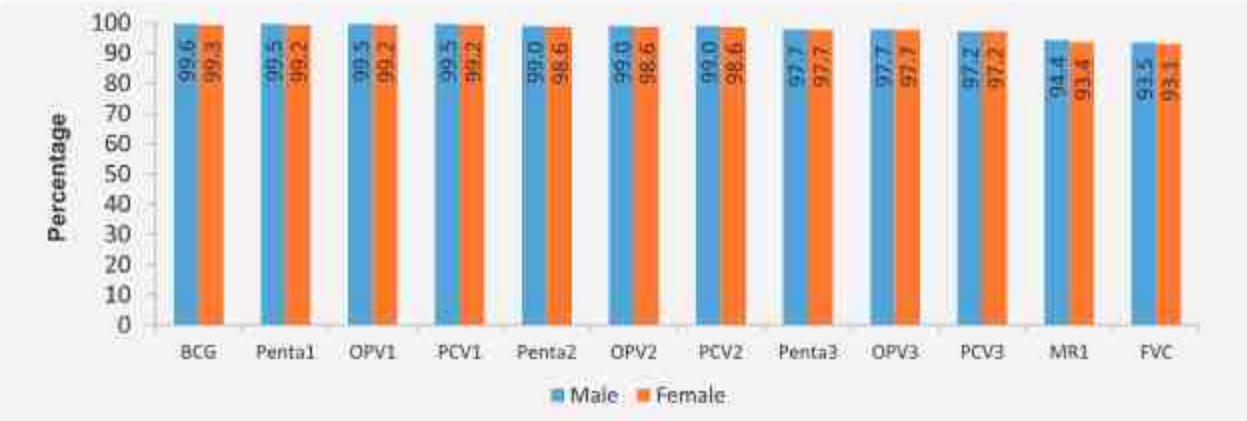
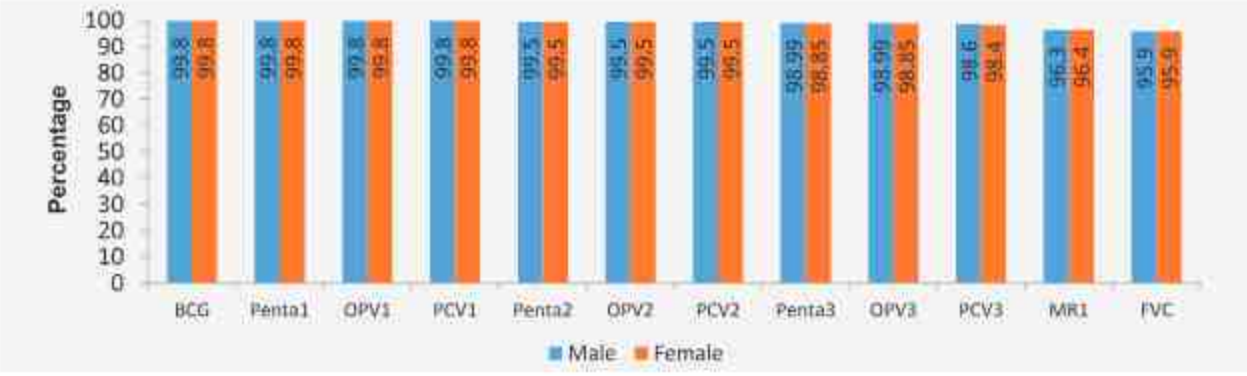


Figure 47c: National Valid Full Vaccination Coverage by Age of 23 Months in Rural Areas by Sex in 2019



Valid Full Vaccination Coverage by Age of 12 Months by Sex

Sex differential in the valid full vaccination coverage by the age of 12 months is presented in Figures 48a-48c. Valid coverage was found to be 83.8 percent in the case of males and 84.0 percent in the case of females. By residence, valid coverage was found to be 1.6 percentage points higher among the females residing in the urban areas.

Figure 48a: National Valid Full Vaccination Coverage by Age of 12 Months by Sex in 2019

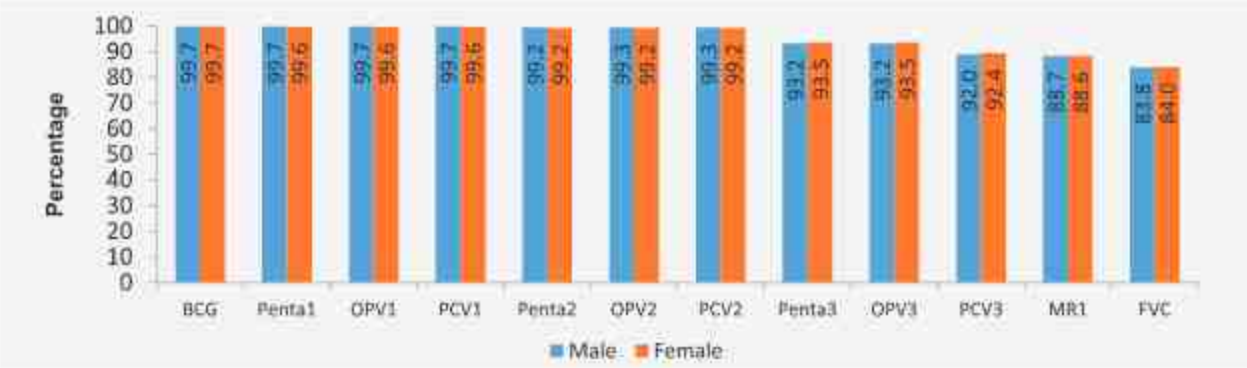


Figure 48b: National Valid Full Vaccination Coverage by Age of 12 Months in Urban Areas by Sex in 2019

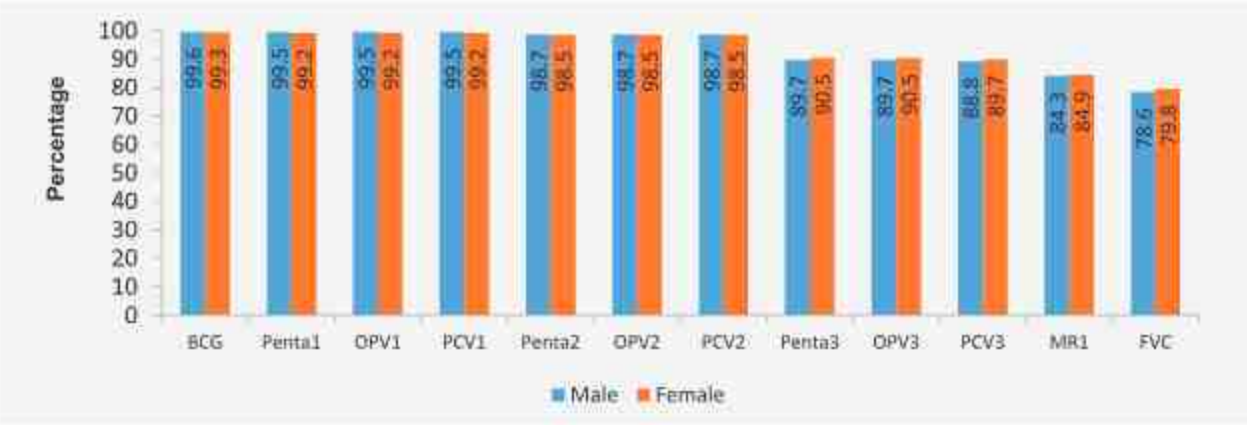
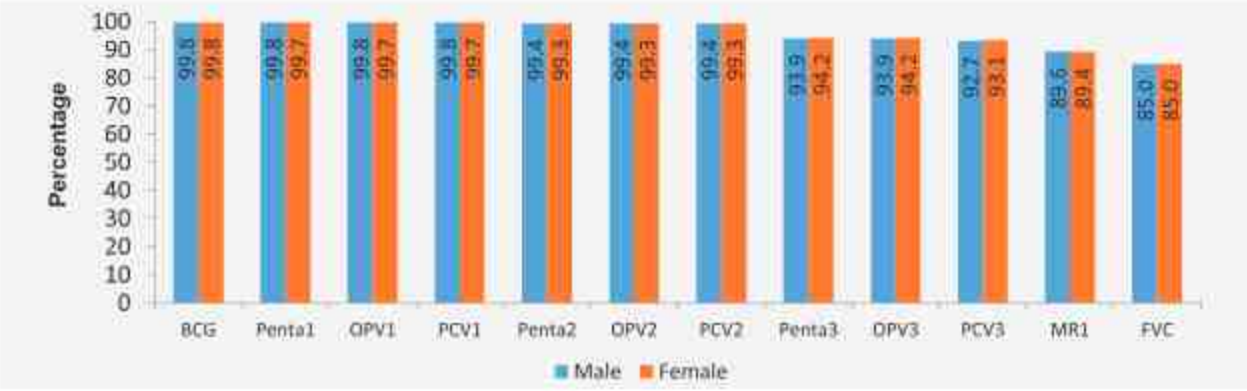


Figure 48c: National Valid Full Vaccination Coverage by Age of 12 Months in Rural Areas by Sex in 2019



Map 1: Crude Full Vaccination Coverage by Age of 23 Months by District

Map 2: Valid Full Vaccination Coverage by Age of 23 Months by District

Map 3: Valid Full Vaccination Coverage by Age of 12 Months by District

Map 4: Valid Penta 3 Vaccination Coverage by Age of 23 Months by District

Map 5: Valid Penta 3 Vaccination Coverage by Age of 12 Months by District

Map 6: Valid MR1 Vaccination Coverage by Age of 23 Months by District

Map 7: Valid MR1 Vaccination Coverage by Age of 12 Months by District

3.4 PROGRAMME QUALITY

3.4.1 Card Retention Rate

Vaccination cards were issued to the children at the time of their first vaccination. The card contains the dates of the vaccine(s) given to the children for the first time as well as the dates when they will receive the subsequent doses. The availability of the card was an important tool for the Coverage Evaluation Survey, as vaccination dates were obtained from the card to estimate the crude coverage and the valid coverage. Card retention rate was defined as the proportion of cards available during the survey from the number of cards issued at the time of first vaccination. It is found nationwide that 97.7 percent of the children received vaccination cards and 87.1 percent of the mothers/caregivers retained those (see Figure 49). The card retention rate was considerably higher in the rural areas (89.4 percent) than that in the urban ones (77.8 percent).

Figure 49: Vaccination Card Status by National, Rural and Urban Areas in 2019

Among the rural areas by division, card retention rate was the highest in Barishal division (96.5 percent) and the lowest in Chattogram (80.8 percent) division (see Figure 50) .

Figure 50: Vaccination Card Status in Rural Areas by Division in 2019

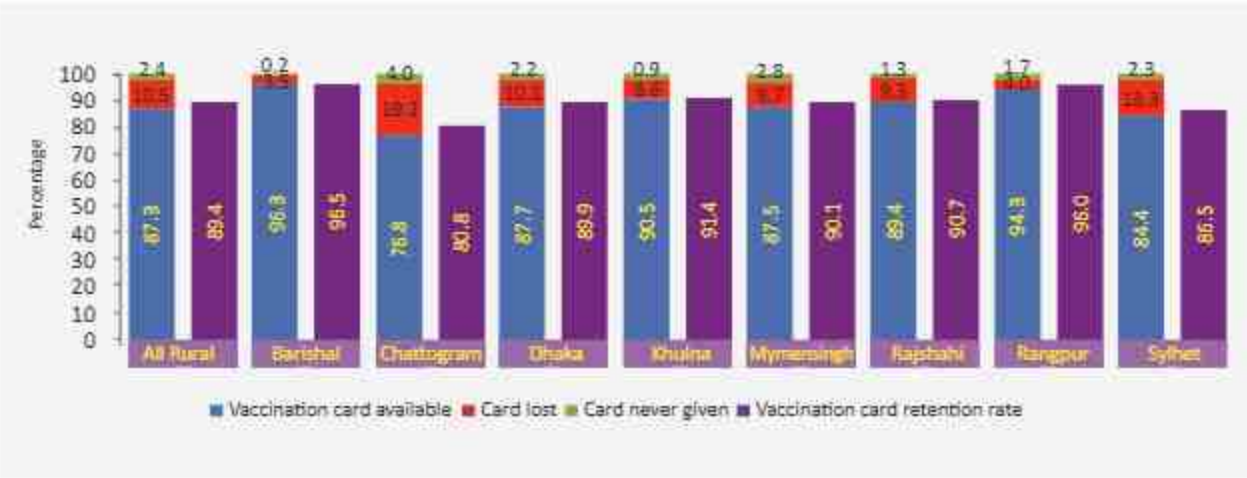


Figure 51 depicts the card retention rate in the urban areas by City Corporation. It shows that card retention rate was the highest in Rang CC (93.5 percent) and the lowest in CCC (54.3 percent), with some variations between those two numbers among the other city corporations.

Figure 51: Vaccination Card Status in Urban Areas by City Corporation and Municipality in 2019

Map 8: Card Retention Rate of Chilhood Vaccination by District

3.4.2 Incidence of Invalid Doses

CES 2019 estimated invalid doses of Penta1, Penta2, Penta3, and MR1 vaccines, which are presented in Figure 52. As it has been discussed earlier, a dose was invalid when the vaccine was administered without following the EPI-recommended childhood vaccination schedule, as outlined in Table 3. When any dose of any antigen is administered before the recommended age and/or interval, it was treated as an "invalid" dose. The highest number of invalid doses were of MR1 (7.8 percent) and the lowest numbers were of Penta2 and Penta3 (1.0 percent each) while regarding Penta1 it was 3.5 percent. There was a slight variation in the case of invalid doses between urban and rural areas. It was found to be higher in the urban areas as against their rural counter parts.

Figure 52: Incidence of Invalid Penta1, Penta2, Penta3, and MR by National, Rural and Urban Areas in 2019 (Card + Register Only)

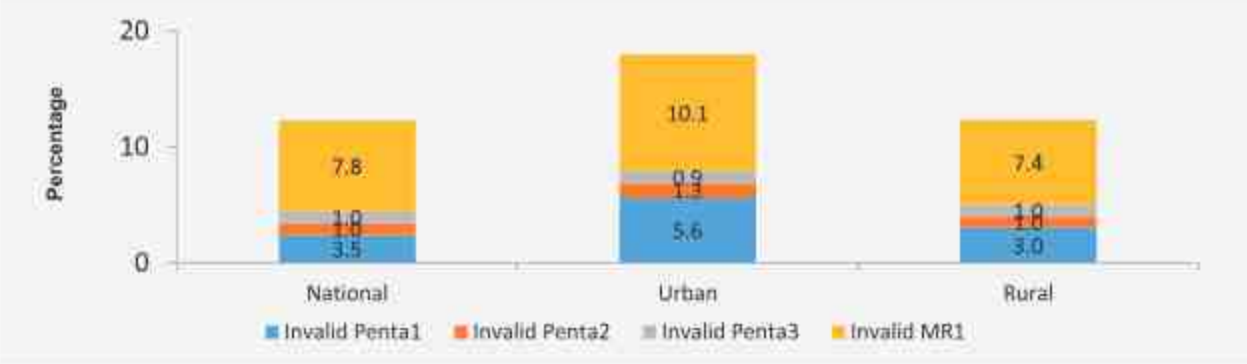
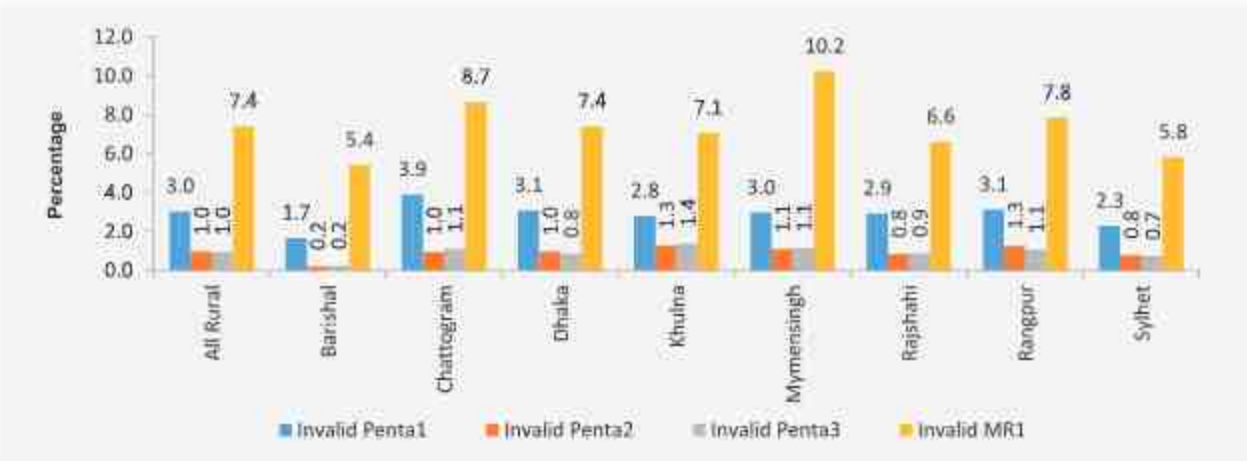


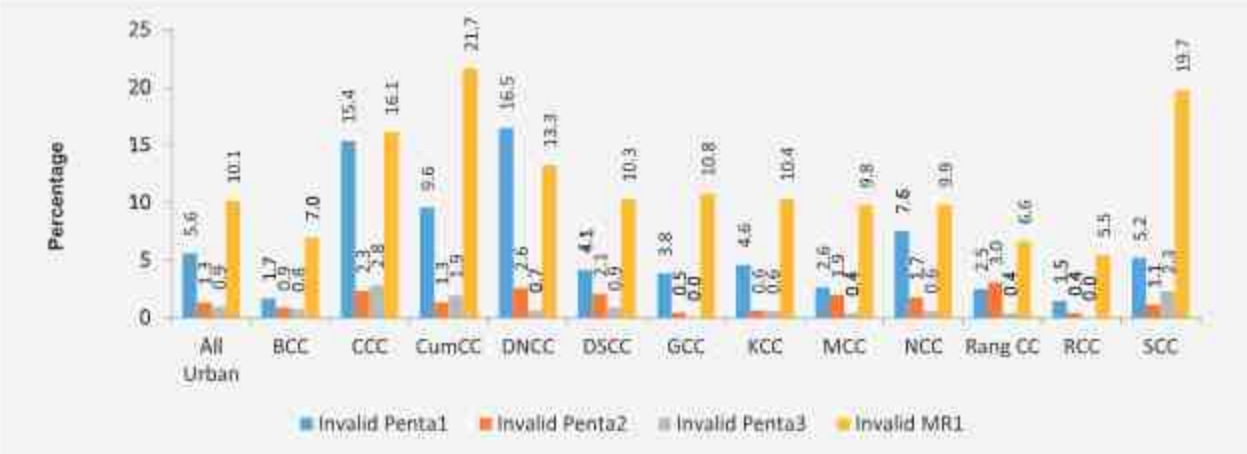
Figure 53 presents invalid doses of different antigens by rural division. It shows that the highest proportion of invalid MR1 dose was administered in Mymensingh division (10.2 percent) and the lowest in Barishal division (5.4 percent). Invalid Penta1 doses were the highest in Chattogram division (3.9 percent), and the lowest in Sylhet division (2.3 percent). Regarding invalid Penta2 and Penta3, it needs to be noted here that Khulna division administered the highest invalid doses (1.3 and 1.4 percent respectively) while Barishal division was found to be the lowest (0.2 percent each) in this regard.

Figure 53: Incidence of Invalid Penta1, Penta2, Penta3 and MR in Rural Areas by Division in 2019



By antigen, as shown in Figure 54, the highest percentage of invalid MR1 dose was in CumCC, with 9.6 percent invalid Penta1, 1.9 percent Penta3, and 1.3 percent for Penta2, the lowest rate for MR1 was in RCC (5.5 percent) dropping down to 0.4 percent for Penta2. Across the city corporations, the lowest invalid Penta1 dose was administered in RCC (1.5 percent), and the highest invalid Penta1 was in DNCC (16.5 percent). As expected, invalid Penta2 and Penta3 doses were again the lowest in RCC (0.4 and 0.0 percent respectively). As a whole, the highest invalid Penta2 and Penta3 doses were found in CCC (2.3 percent and 2.8 percent respectively) (see Figure 54).

Figure 54: Incidence of Invalid Penta1, Penta2, Penta3 and MR in Urban Areas by City Corporation and Municipality in 2019

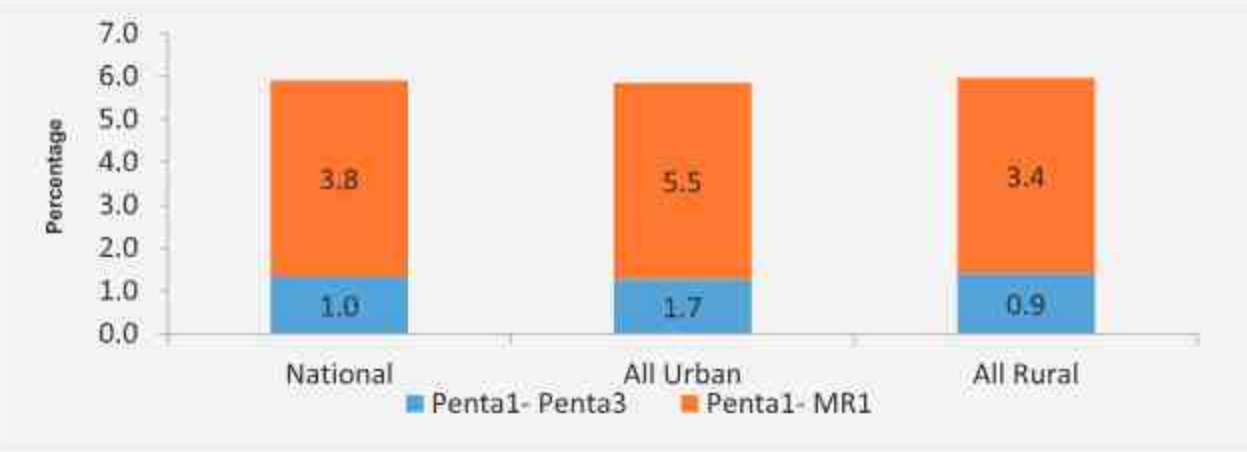


3.4.3 Vaccination Drop-out Rates

A low vaccination drop-out rate is crucial to the process of achieving the desired coverage target. To be Fully vaccinated, children should receive all the antigens as per the EPI-recommended vaccination schedule before their first birthday. When a child fails to receive the subsequent dose(s) of any one of the same or different recommended vaccines (one dose of BCG, three doses each of Penta and OPV, PCV and one dose of MR1 vaccines), it is interpreted as a drop-out case. In CES 2019, the drop-out rate from Penta1-Penta3 was defined as the proportion of children who received Penta1 but failed to receive Penta3. Similarly, the drop-out rate from Penta1-MR1 was defined as the proportion of children who received Penta1 but failed to receive MR1.

Figure 55 presents the drop-out rates from Penta1-Penta3 and Penta1-MR1. Nationwide, Penta1-Penta3 drop-out rate was 1.0 percent, with the rate being slightly lower in the rural areas (0.9 percent) than that of the urban areas (1.7 percent). In comparison, the Penta1-MR1 drop-out rate was 3.8 percent, with 2.1 percentage points difference between the urban and the rural areas (urban 5.5 and rural 3.4) (see Figure 55).

Figure 55: Vaccination Drop-out Rates from Penta1-Penta3 and Penta1-MR1 by National Rural and Urban Areas in 2019



By sex, the drop-out rate from Penta1-Penta3 was slightly higher among the males than among the females (2.3 percent vs. 2.6 percent in the urban areas while 1.2 percent vs. 1.0 percent in the rural areas). Across the country, a little variation in Penta1-MR1 drop-out was observed between the males and the females (see Figures 55a and 55b).

Figure 55a: Vaccination Drop-out Rate from Penta1-Penta3 by Sex at National Level in 2019

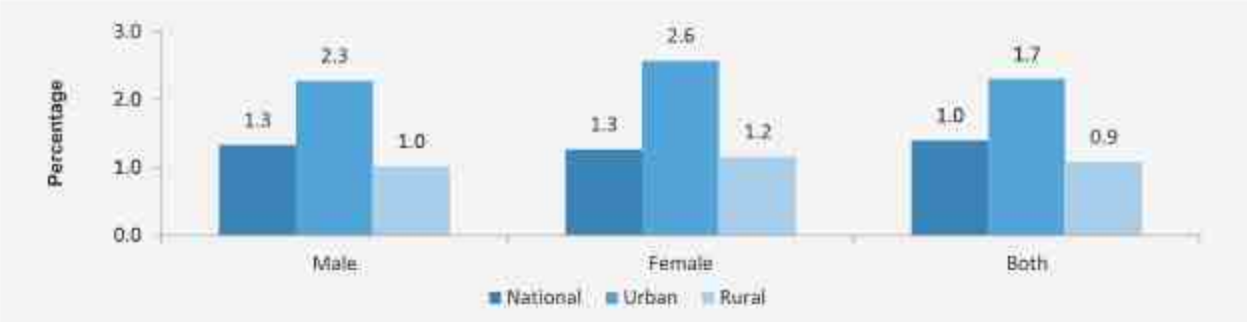


Figure 55b: Vaccination Drop-out Rate from Penta1-MR1 by Sex at National Level in 2019

Figure 56 presents the drop-out in the rural areas by division. Among the eight divisions, the Penta1-Penta3 drop-out rate was found to be the highest in Mymensingh division at 1.5 percent with the next highest but considerably lower, at 1.3 percent in Rangpur, and the lowest being 0.3 percent in Barishal division. Similarly, Penta1-MR1 drop¬out rate was the highest in Mymensingh division at 6.3 percent and the lowest in Barishal division (1.2 percent). Penta1-MR1 drop-out rate ranged between 4.7 percent and 2.8 percent in other divisions.

Figure 56: Vaccination Drop-out Rates from Penta1-Penta3 and Penta1-MR1 in Rural Areas by Division in 2019

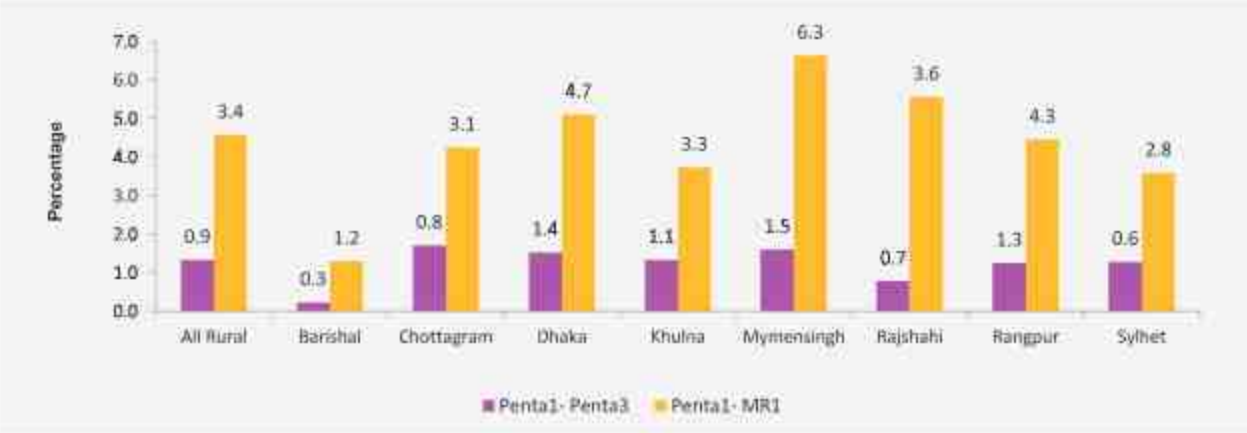


Figure 57 illustrates the drop-out rate in the urban context by city corporation. Among the city corporations, the highest Penta1-Penta3 drop-out rate ranged from 3.2 percent in CCC to 0.2 percent in RCC. Conversely, the Penta1-MR1 drop-out rate was the highest in GCC (11.6 percent) and the lowest in RCC (0.2 percent). In other city corporations, Penta1-MR1 drop¬out rate was between 9.6 percent and 3.1 percent.

Figure 57: Vaccination Drop-out Rates from Penta1-Penta3 and Penta1-MR1 in Urban Areas by City Corporation and Municipality in 2019

3.4.3.1 Trend in National Drop-out Rates

In the analysis of the trend in national drop-out rates, considerable improvement can be seen over a decade ago. The drop-out rate regarding Penta1 - Penta3 vaccinations fluctuated from 2001 to 2003, when it rose from 11.0 percent to 21.0 percent (see Figure 58). After the rise in 2003, it dropped again to 8.0 percent in 2005, and decreased down to 2.0 percent in 2009. Since then, it has ranged around 2.0 percent till 2016 and dropped down to 1.0 percent in 2019.

The declining trend was also observed in the case of Penta1-MR1 drop-out rates. Penta1-MR1 drop-out rate decreased by 4 percentage points - from 19.0 percent in 2001 to 15.0 percent in 2005, when it, too, began a sharp decline by 10.4 percentage points down to 3.8 percent in 2019. While not as stable as the Penta1-Penta3 rate, it ranged between 7.0 percent and 3.8 percent since 2009.

Figure 58: Annual Trend in National Vaccination Drop-out Rates for Penta1-Penta3 and Penta1-MR1 from 2001-2019

3.4.3.2 Trend in the Divisional Drop-out Rates

Figures 59-64 show the trend in the division-wise drop-out rate from Penta1-Penta3 and Penta1-MR1 (Rangpur divisions' figures are included in the Rajshahi divisions' figures before 2010, the year when Rangpur became a new division). The figures suggest that the trends of both Penta1-Penta3 and Penta1-MR1 drop-out rates were on a declining line since 2005; but fluctuations remained in some divisions. Barishal division reached 0.3 percent in 2019, which was the lowest among all the divisions. The second lowest drop-out rate was observed in Sylhet division - at 0.6percent.

During the period between 2001 and 2019, Penta1-MR1 drop-out rate decreased at an even more rapid pace than Penta1-Penta3 in all divisions. After high in the 2001 that ranged from 11.1 percent in Khulna to 45.7 percent in Sylhet, most of the divisions experienced a very steep decline throughout the next decade. By 2010, Sylhet's rate was 37 percentage points lower, at 9.0 percent, and Barishal declined 16 percentage points to 5.0 percent- a trend that the other divisions shared. By 2010, the divisions had reached rates of 3.0 percent in Rajshahi to 9.0 percent in Sylhet. Since then, most of the divisions experienced an increase in 2011, but have again either stabilized or declined except for 2014 when Khulna division increased drop-out rates from 4.0 percent in 2010 to 6.1 percent in 2014. Since 2015 Barishal division's Penta1-MR1 drop-out rate became stagnant. A slow steeped down drop-out rate was observed in Dhaka and Sylhet divisions. Penta1-MR1 drop-out rate in Chattogram and Khulna divisions slightly decreased from 2015 with fluctuations (5.4 percent to 3.1 percent in Chattogram and 4.2 percent to 3.3

percent in Khulna divisions). The drop-out rate in Rajshahi was 5.6 percent in 2009 and decreased to 3.6 percent in that year.

The trend analysis suggests that compared to 2015, both Penta1-Penta3 and Penta1- MR1 drop-out rates decreased in all divisions in 2019 except in Chattogram and Rajshahi division.

Figure 59: Annual Trend in Vaccination Drop-out Rates for Penta1-Penta3 and Penta1-MR1 in Barishal Division from 2001 to 2019

Figure 60: Annual Trend in Vaccination Drop-out Rates for Penta1-Penta3 and Penta1-MR1 in Chattogram Division from 2001 to 2019

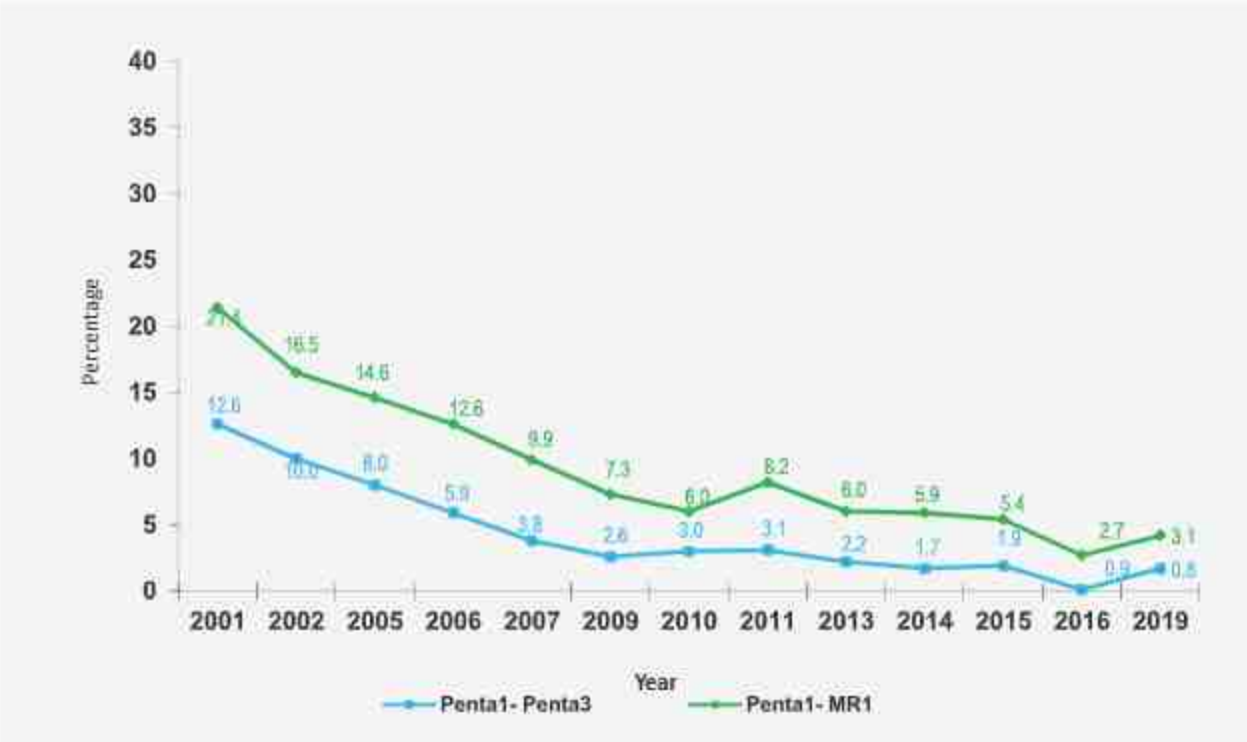


Figure 61: Annual Trend in Vaccination Drop-out Rates for Penta1-Penta 3 and Penta1-MR1 in Dhaka Division from 2001 to 2019

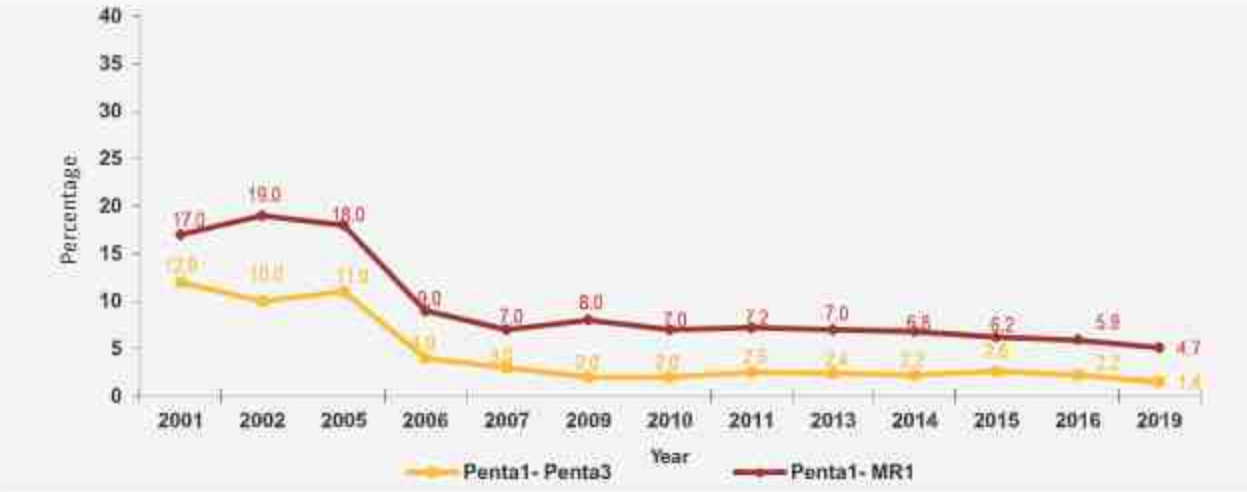


Figure 62: Annual Trend in Vaccination Drop-out Rates for Penta1-Penta3 and Penta1- MR1 in Khulna Division from 2001 to 2019

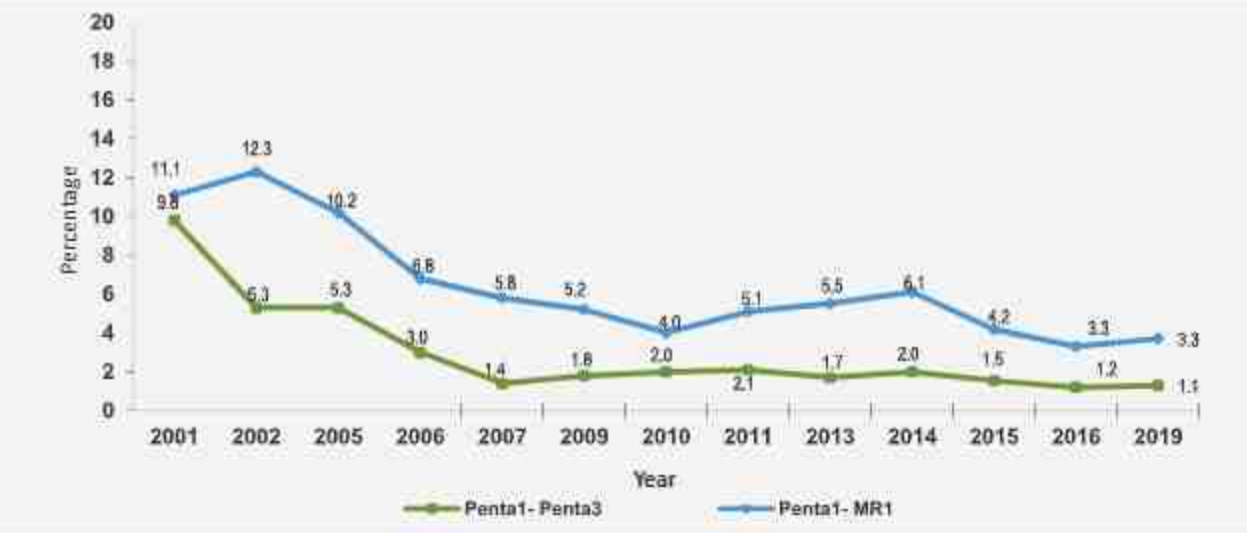


Figure 63: Annual Trend in Vaccination Drop-out Rates for Penata1-Penta3 and Penta1-MR1 in Rajshahi Division from 2001 to 2019

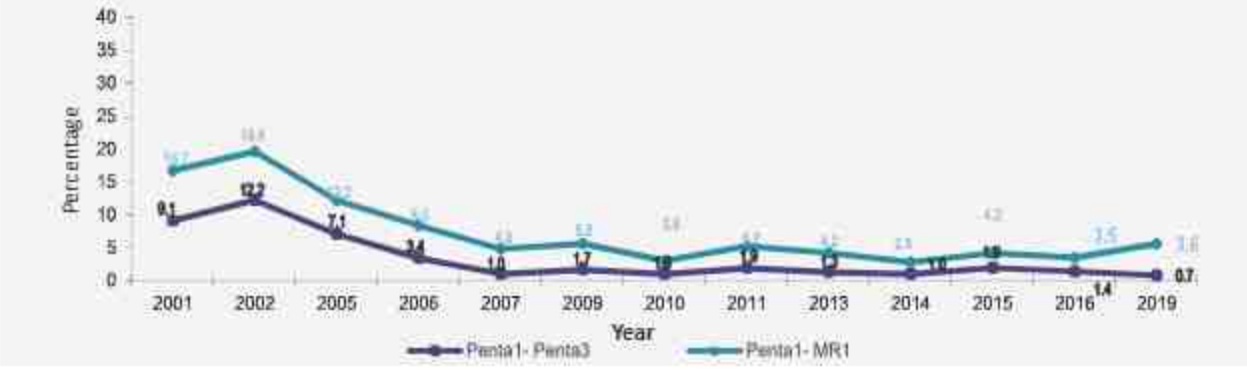
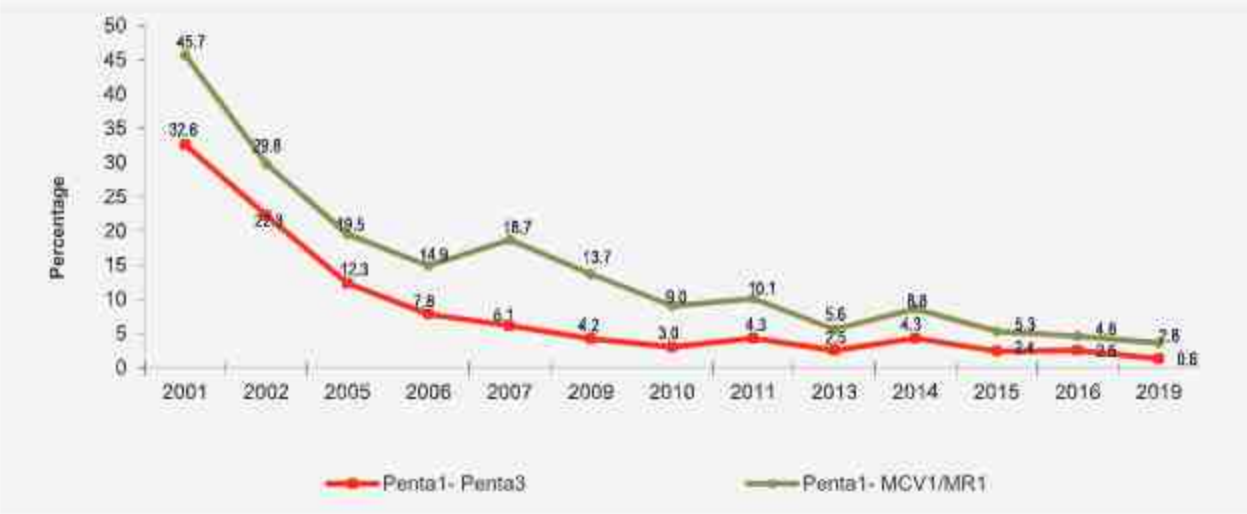


Figure 64: Annual Trend in Vaccination Drop-out Rates for Penta1-Penta3 and Penta1-MR1 in Sylhet Division from 2001 to 2019



3.4.4 Knowledge about the Common Side-Effects of Vaccination

CES 2019 assessed the knowledge of mothers/caregivers regarding the minor side-effects caused by vaccination. Overall, fever was the most reported known side-effect. Nationwide, by 89.3 percent of the mothers/caregivers - 87.3 percent in the urban and 89.8 percent in the rural areas reported it (see Figure 65). Among the rural divisions, more than 90.0 percent of the mothers/caregivers from Rangpur, Khulna, Mymensingh, and Barishal divisions reported fever as a side-effect (see Figure 66). Similarly, except in NCC, BCC, CCC, and CumCC more than 85.0 percent of the mothers/caregivers reported fever (see Figure 67) in this regard.

Figure 65: Knowledge on Adverse Events Following Immunization by National, Rural and Urban Areas in 2019

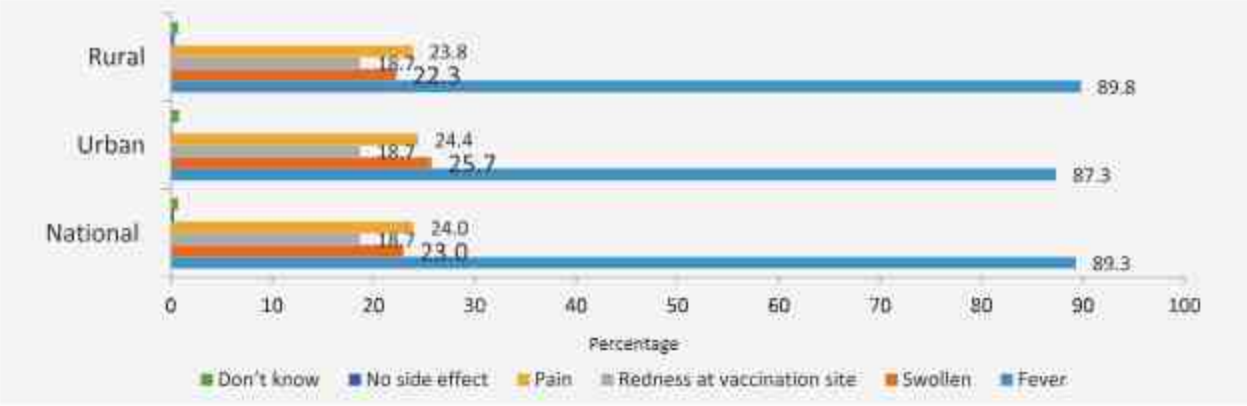


Figure 66: Knowledge on Adverse Events Following Immunization in Rural Areas by Division in 2019

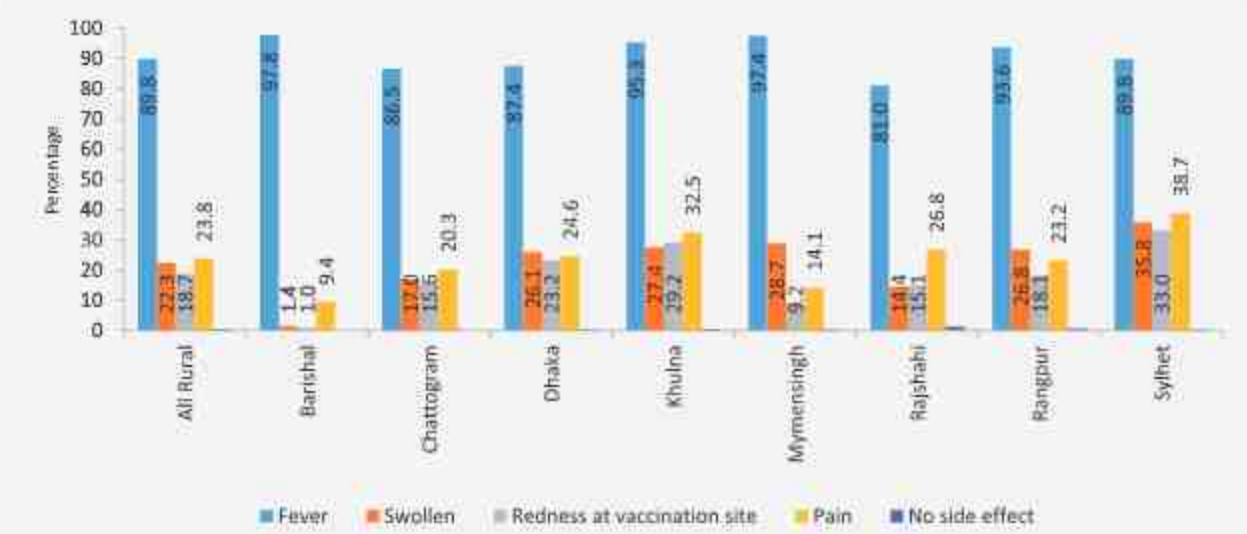
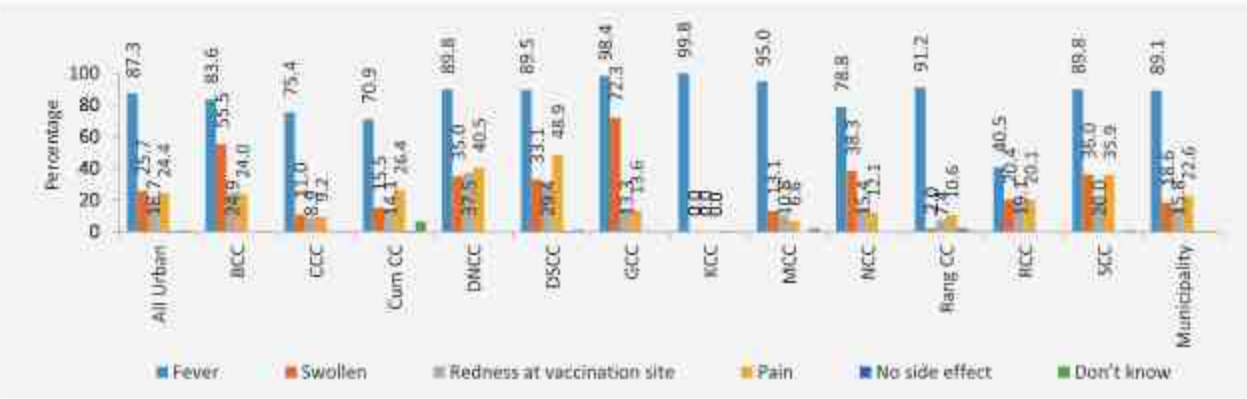


Figure 67: Knowledge on Adverse Events Following Immunization in Urban Areas by City Corporation and Municipality in 2019



3.5 REASONS FOR NEVER HAVING VACCINATION OR PARTIAL VACCINATION

Left-outs, those who never received vaccination and drop-outs from subsequent doses result in low crude and valid vaccination coverage. CES 2019 addressed reasons for not receiving any vaccine. The findings are presented below.

3.5.1 Reasons for Never Having Vaccination

Among the surveyed children, less than 1 percent did not receive any vaccine. Table 5 presents reasons for never vaccinating the children, the reasons mentioned by the mothers/caregivers. The figure shows that about one-third of the mothers reported that they did not know that their children should be vaccinated followed by other major causes: not believing in vaccination (16.3 percent), and also the child being sick, could not be taken to the vaccination centre (19.6 percent), and mothers/ caregivers were unaware about vaccination sites (10 percent).Reasons for never having vaccination by the rural division and city corporation are presented in Table 6 and Table 7 respectively.

Table 5: Reasons for Never Having Vaccination by National, Rural and Urban Areas in 2019

Reasons	National	Urban	Rural
Didn't know that my child should be given vaccine	33.0	24.0	38.5
Didn't know where to go for vaccine	10.5	18.7	5.6
Fearing side effects	1.2	0.8	1.5
Rumor	3.0	0.7	4.4
Don't believe in vaccination	16.3	8.5	21.1
Was busy and so couldn't give vaccine	7.0	6.0	7.7
Vaccine centre was too far	3.4	0.0	5.5
Vaccinator was not friendly	2.4	4.4	1.1
Child was sick	19.6	33.6	11.0
The session time was inconvenient	3.4	3.4	3.4

Table 6: Reasons for Never Having Vaccination in Rural Areas by Division in 2019

Reasons	All Rural	Barishal	Chattogram	Dhaka	Khulna	Mymensingh	Rajshahi	Rangpur	Sylhet
Didn't know that my child should be given vaccine	38.5	0.0	63.3	0.0	17.4	0.0	0.0	0.0	0.0
Didn't know when to go for the second/third dose	0.2	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
Didn't know where to go for vaccine	5.5	0.0	0.0	0.0	20.3	0.0	0.0	0.0	13.7
Fearing side effects	1.5	0.0	0.0	0.0	10.1	0.0	0.0	0.0	0.0
Rumor	4.4	0.0	2.0	0.0	10.1	0.0	0.0	0.0	9.9
Don't believe in vaccination	21.1	69.4	22.3	0.0	13.4	0.0	21.5	0.0	16.9
Mothers/Caregivers were busy	7.7	0.0	3.6	0.0	3.5	0.0	52.3	0.0	6.1
Vaccine centre was too far	5.5	30.6	2.6	0.0	0.0	0.0	0.0	0.0	18.1
Faced problem after vaccination	4.7	0.0	0.0	0.0	19.3	0.0	0.0	0.0	9.9
Vaccinator was not friendly	7.5	0.0	0.0	0.0	6.0	0.0	26.2	0.0	25.4
The session time was inconvenient	3.4	0.0	5.9	0.0	0.0	0.0	0.0	0.0	0.0

Table 7: Reasons for Never Having Vaccination by City Corporation and Municipality in 2019

Reasons	All Urban	BCC	CCC	Cum CC	DNCC	DSCC	GCC	KCC	MCC	Rang CC	RCC	SCC	Municipality
Didn't know child should be given vaccine	24.0	0.0	0.0	30.0	0.0	50.0	0.0	60.6	0.0	0.0	0.0	13.2	15.0
Didn't know where to go for vaccination	18.7	0.0	56.2	26.9	0.0	0.0	0.0	18.1	0.0	0.0	0.0	30.7	0.0
Fearing of side effects	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5	0.0
Rumor	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5	0.0
Don't belive in vaccination	8.5	0.0	43.8	8.6	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Was busy	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.7	14.9
Vaccinator was not friendly	38.0	0.0	0.0	29.6	0.0	0.0	0.0	21.3	0.0	0.0	0.0	13.2	70.1
Session time was inconvinient	3.4	0.0	0.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.2	0.0

3.5.2 Reasons for Partial Vaccination

Across the country, 4 percent of the surveyed children received partial vaccination. While asked for reasons, 16.5 percent (15.3 percent in urban and 16.9 percent in rural) of the mothers reported that they were busy with household chores.

Among the other causes, illness of child (13.0 percent) was prominent, followed by mothers/caregivers forgetting to vaccinate their children (12.8 percent), scared of side effects (9.7) percent) by mothers/caregivers, mothers/caregivers being unaware of the fact that the child should be given vaccine (9.1 percent), not knowing when to go for vaccine of Measles (5.2 percent), the vaccinator not being able to give vaccine to the child as the child was sick (4.4 percent), vaccinating the child in future (3.9 percent), session time being inconvenient for mothers/caregivers (3.7 percent), mothers/caregivers being unaware of the schedule of 2nd dose (3.7 percent), thinking that the vaccinator would come at home (1.6 percent). Another 1.6 percent of the mothers/caregivers reported that they were not at home. Further, 1.5 percent of them reported that they became sick. A detailed description of the reasons for partial vaccination by rural division and city corporations are presented in Table 9 and Table 10.

Table 8: Reasons for Partial Vaccination by National, Rural and Urban Areas in 2019

Reasons	National	Urban	Rural
Was busy and so couldn't give vaccine	16.5	15.3	17.9
The child was sick, so was not taken to the vaccination centre	13.7	16.0	12.7
Don't remember	12.8	12.2	13.0
Fearing side effects	9.7	6.8	10.9
Didn't know that my child should be given vaccine	9.1	4.8	10.8
Didn't know when to go for vaccine of MR	5.2	7.7	4.2
The child was sick, so the vaccinator didn't give vaccine	4.4	3.4	4.8
Will give vaccine in future	3.9	5.5	3.2
The session time was inconvenient	3.7	5.0	3.2
Didn't know when to go for the second/third dose	3.7	3.5	3.7
There was no vaccine in the center	1.6	1.3	1.7
Was not at home	1.6	0.9	1.9
I thought the vaccinator would come home	1.6	1.7	1.5
Vaccinator was not friendly	1.6	0.3	2.1
Due to migration	1.6	5.6	0.0
Didn't know where to go for vaccine	1.5	3.9	0.6
Mother was sick	1.5	1.1	1.6
Don't know	1.3	1.2	1.3
Vaccination centre was too far	1.3	0.0	1.8
There was no vaccinator in the center	0.8	0.1	1.1
Injection was too painful for the child	0.7	0.7	0.8
Faced problem after vaccination	0.7	0.6	0.7
They charge money to take vaccine	0.6	1.4	0.3
Others	0.2	0.0	0.3
There was a long queue in the vaccination	0.2	0.0	0.3
Don't believe in vaccination	0.1	0.0	0.2
Health worker did not give	0.1	0.4	0.0
Rumor	0.1	0.3	0.0
Did not have vaccination card	0.1	0.0	0.1
Didn't know where to go for vaccine	1.5	3.9	0.6

Table 9: Reasons for Partial Vaccination in Rural Areas by Division in 2019

Reasons	All Rural	Barishal	Chattogram	Dhaka	Khulna	Mymensingh	Rajshahi	Rangpur	Sylhet
Didn't know that my child should be given vaccine	10.8	11.7	2.4	11.3	9.7	4.9	0.1	20.8	12.9
Didn't know when to go for the second/ third dose	3.8	5.8	2.4	4.0	1.1	4.0	14.1	3.7	4.6
Didn't know when to go for vaccine of Measles	4.2	4.0	2.6	3.4	2.7	5.5	6.0	4.8	1.0
Didn't know where to go for vaccine	0.6	0.0	0.0	0.4	1.5	1.3	7.7	0.5	0.0
Fearing side effects	10.9	1.9	8.9	13.9	1.8	19.2	0.5	6.7	4.8
Don't believe in vaccination	0.2	0.0	0.4	0.2	0.0	0.3	14.4	0.0	0.0
Was busy and so couldn't give vaccine	16.9	16.9	17.0	14.1	22.2	13.5	0.0	24.9	17.7
Will give vaccine in future	3.2	5.9	2.6	2.9	2.8	3.4	12.0	3.7	1.1
There was a long queue in the vaccination	0.3	0.0	0.0	0.9	0.3	0.0	4.7	0.0	0.0
Don't remember	13.1	11.5	11.4	14.1	10.9	20.1	0.0	12.5	5.3
There was no vaccine in the center	1.8	11.3	0.9	1.3	5.3	0.4	10.5	0.0	6.7
There was no vaccinator in the center	1.1	0.0	1.1	2.8	0.0	0.7	0.5	0.0	0.0
Vaccine centre was too far	1.8	5.1	4.7	0.6	4.4	0.0	1.4	0.7	2.0
Injection was too painful for the child	0.8	0.0	0.0	2.6	0.0	0.0	1.4	1.0	0.0
Faced problem after vaccination	0.7	0.0	0.0	1.9	0.0	0.0	0.0	0.0	1.9
Vaccinator was not friendly	2.1	1.6	6.6	1.3	5.3	0.4	1.3	0.7	1.1
The child was sick, so was not taken to the vaccination centre	12.7	13.4	14.6	11.1	13.9	16.3	0.0	11.2	4.4
The child was sick, so the vaccinator didn't give vaccine	4.8	4.2	9.1	2.1	5.4	3.2	13.5	6.1	6.7
Mother was sick	1.6	2.2	1.5	1.8	1.5	1.3	4.6	1.4	2.0
I thought the vaccinator would come home	1.5	0.0	0.3	1.6	0.5	3.7	2.0	1.0	3.0
They charge money to take vaccine	0.3	0.0	0.0	1.5	0.0	0.0	1.5	0.0	0.0
The session time was inconvenient	3.2	1.1	8.7	3.9	5.5	0.0	0.0	0.0	4.4
Was not at home	1.9	1.5	3.7	1.9	2.0	1.2	1.3	0.3	5.3
Due to migration	0.1	0.0	0.0	0.4	0.0	0.0	1.4	0.0	0.0
Did not have vaccination card	0.3	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0
Others	1.3	1.9	1.0	0.0	3.1	0.0	1.3	0.0	15.2

Table 10: Reasons for Partial Vaccination by City Corporation and Municipality in 2019

Reasons	All Urban	BCC	CCC	CumCC	DNCC	DSCC	GCC	KCC	MCC	NCC	Rang CC	RCC	SCC	Municipality
Didn't know that my child should be given vaccine	4.8	0.0	3.3	8.7	0.0	0.0	1.5	11.7	5.9	9.1	13.3	0.0	5.5	7.7
Didn't know when to go for the second/ third dose	3.4	5.7	1.9	0.0	0.0	2.4	0.0	5.9	18.2	2.6	5.6	0.0	5.8	6.3
Didn't know when to go for vaccine of Measles	7.7	21.6	7.6	3.8	0.0	4.5	0.0	10.1	4.3	2.6	14.7	0.0	21.8	12.8
Didn't know where to go for vaccine	4.0	8.4	3.3	0.0	0.0	1.9	6.6	3.4	7.9	4.4	5.5	0.0	6.4	4.6
Fearing side effects	6.8	22.3	11.8	3.8	0.0	2.6	2.2	9.5	0.0	0.0	20.4	0.0	14.1	8.4
Rumor	0.3	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Don't believe in vaccination	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0
Was busy and so couldn't give vaccine	15.3	6.4	17.4	18.0	25.9	13.2	16.9	3.4	5.1	16.7	4.9	100.0	1.0	14.2
Will give vaccine in future	5.5	2.7	5.3	10.9	0.0	3.8	13.9	0.0	0.0	7.9	0.0	0.0	2.8	4.6
Don't remember	12.2	2.7	8.1	16.4	17.3	13.0	11.7	12.6	37.2	11.0	4.0	0.0	11.2	12.4
There was no vaccine in the center	1.3	2.7	0.0	4.4	4.0	0.0	0.0	2.8	0.0	0.0	0.0	0.0	0.0	1.8
There was no vaccinator in the center	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Injection was too painful for the child	0.7	0.0	0.0	0.0	4.0	0.0	1.3	0.0	0.0	0.0	0.9	0.0	0.0	0.0
Faced problem after vaccination	0.6	0.0	1.5	0.0	0.0	2.6	0.0	0.0	0.0	3.4	0.8	0.0	0.0	0.3
Vaccinator was not friendly	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
The child was sick, so was not taken to the vaccination centre	16.0	13.5	14.2	18.6	18.9	35.9	12.7	11.2	4.0	17.7	23.6	0.0	16.9	11.8
The child was sick, so the vaccinator didn't give vaccine	3.4	2.7	0.0	0.0	11.6	3.0	0.0	3.4	12.3	5.3	2.7	0.0	2.2	4.1
Mother was sick	1.1	0.0	0.0	0.0	0.0	1.9	0.0	0.0	5.1	0.0	1.7	0.0	0.0	2.4
I thought the vaccinator would come home	1.7	0.0	8.0	0.0	0.0	1.9	1.5	9.5	0.0	0.0	1.1	0.0	1.4	0.0
They charge money to take vaccine	1.4	0.0	3.8	0.0	3.5	0.0	2.0	4.5	0.0	0.0	0.0	0.0	0.0	0.3
The session time was inconvenient	5.0	2.7	3.7	4.4	4.0	1.9	19.6	3.4	0.0	2.6	0.0	0.0	1.3	1.4
Health worker did not give	0.4	2.7	0.0	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Was not at home	0.9	0.0	2.3	0.0	0.0	1.9	0.0	0.0	0.0	3.0	0.0	0.0	0.0	1.0
Due to migration	5.6	5.7	5.6	5.1	10.7	6.7	4.0	5.9	0.0	10.4	0.0	0.0	7.5	4.6
Don't Know	1.2	0.0	2.3	6.0	0.0	3.0	1.7	2.8	0.0	3.0	0.0	0.0	2.2	0.0

3.6 KNOWLEDGE ABOUT THE NUMBER OF VISITS REQUIRED FOR COMPLETE VACCINATION

As a mother/caregiver should make five visits to a vaccination centre to complete all the scheduled vaccines of her/ his children, CES 2019 appraised the knowledge of mothers/caregivers about the minimum number of visits required. Figure 68 shows that a little over half of the mothers/caregivers (52.0 percent) reported 5 visits. Urban-rural differentiation was 4 percentage points (47.8 percent in the urban and 53 percent in the rural areas). Among the rural divisions, knowledge about the five visits was found to be the highest in Sylhet division (68.4 percent) and the lowest in Rangpur division (42.4 percent) (see Figure 69). Across the city corporations, knowledge of the five required visits varied widely – from 73.6 percent to 26.3 percent (see Figure 70).

Figure 68: Knowledge of Number of Visits Required to Have Child Fully Vaccinated by National, Rural and Urban Areas in 2019

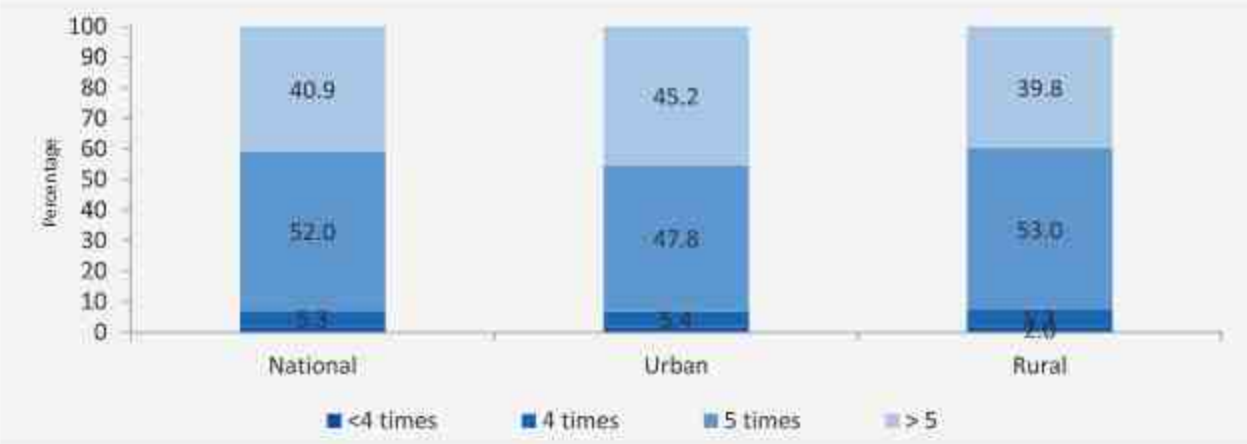


Figure 69: Knowledge on Number of Visits Required to Have a Child Fully Vaccinated in Rural Areas by Division in 2019

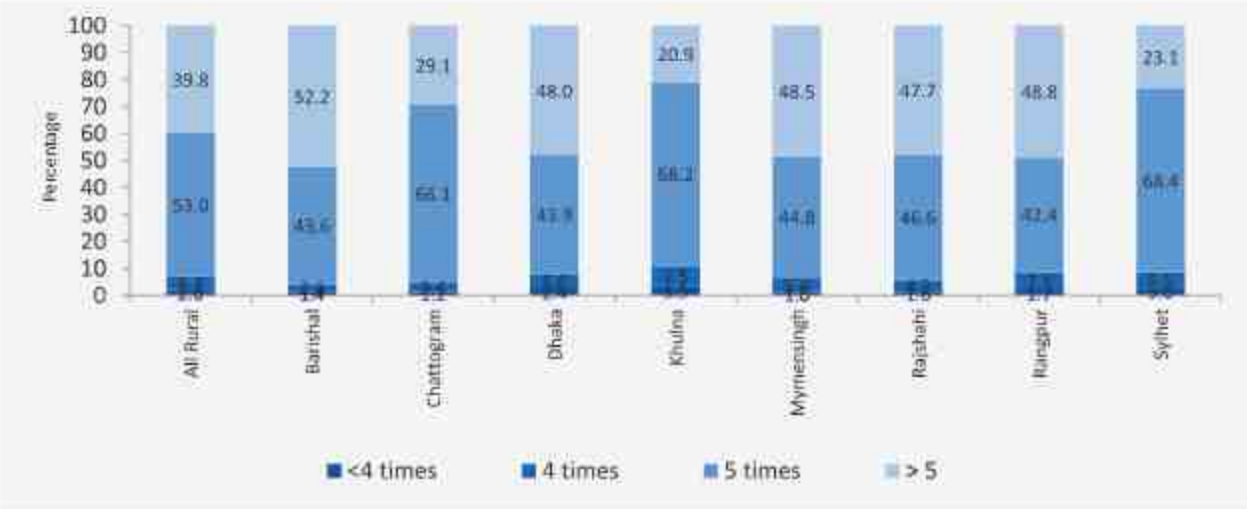
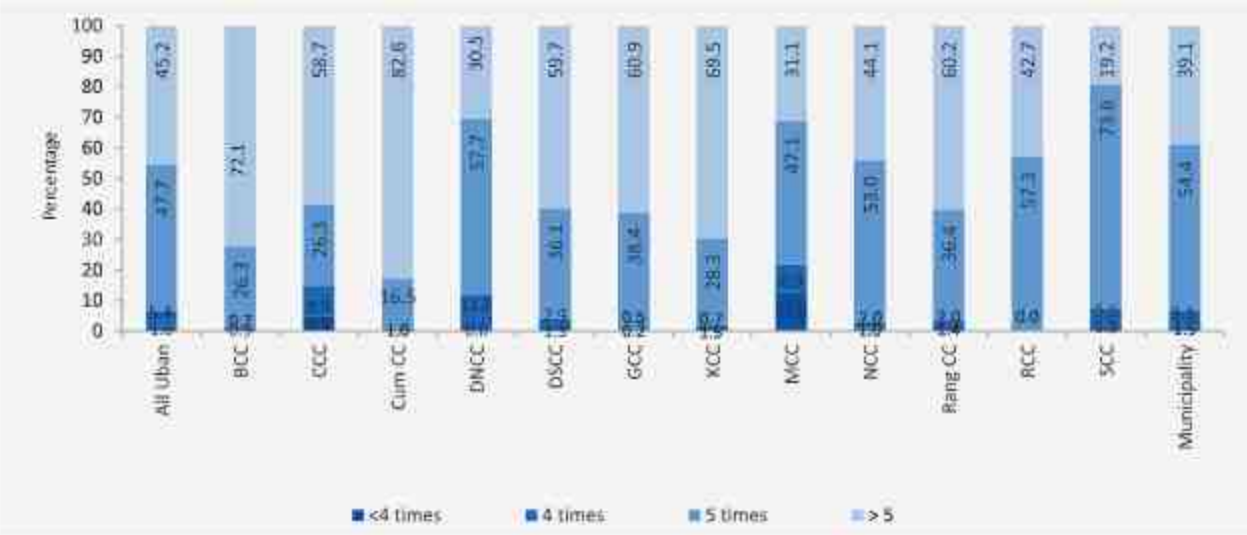


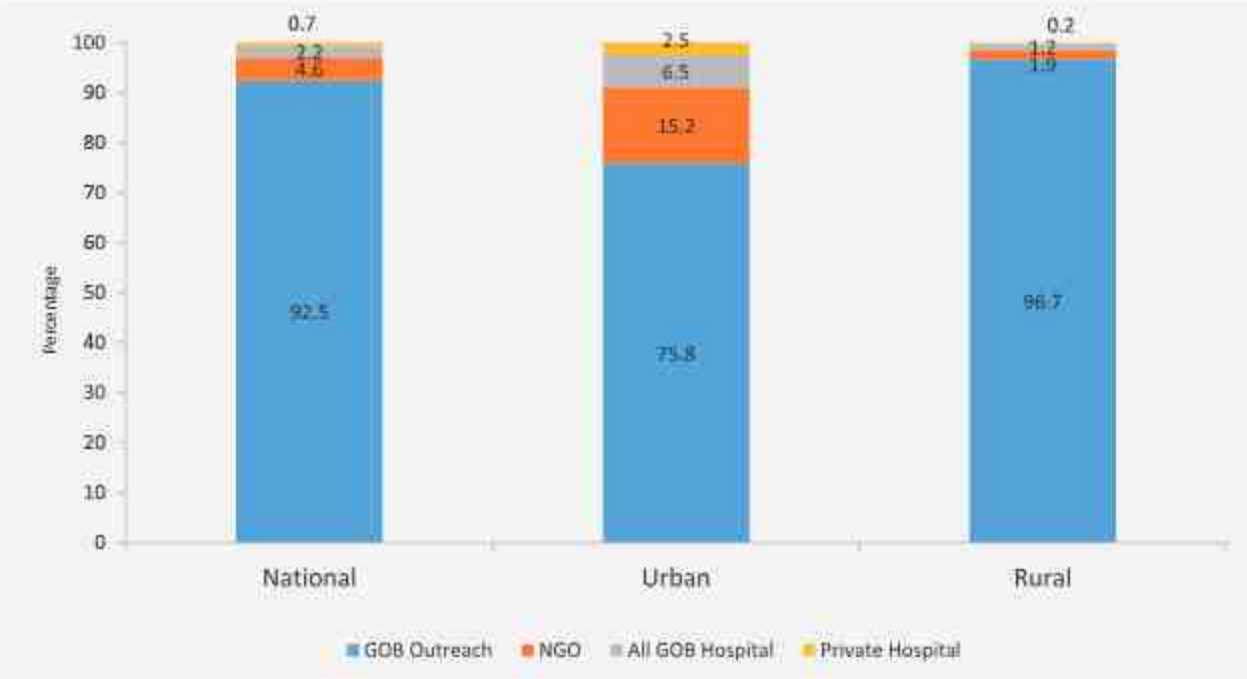
Figure 70: Knowledge on Number of Visits Required to Have a Child Fully Vaccinated in Urban Areas by City Corporation and Municipality in 2019



3.7 SOURCES OF CHILDHOOD VACCINATION

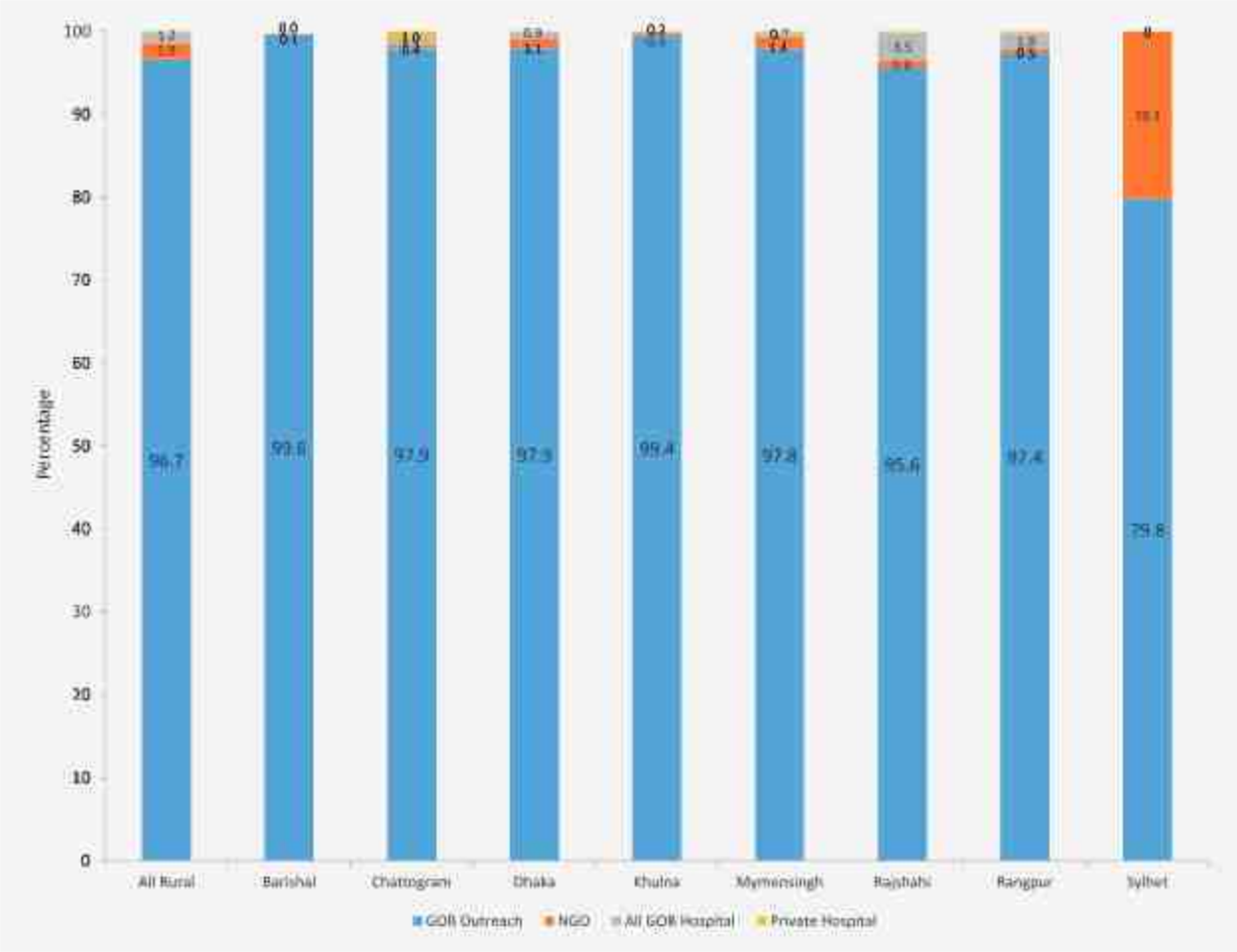
Children can receive vaccination from a number of sources: GoB outreach centres or hospitals, NGO hospitals /clinics or outreach centers, private hospitals, and/or clinics. These options for sources of Penta1 vaccine are presented in Figures 71-73. Overall, 92.5 percent of the children received Penta1 vaccine from the GoB outreach centers, 96.7 percent cases in the rural areas and 75.8 percent cases in the urban areas. Nationwide, the other sources include GoB hospitals (4.6 percent) and NGOs and/or private hospitals (2.2 percent) (see Figure 71).

Figure 71: Source of Penta1 Vaccination by National, Rural and Urban Areas in 2019



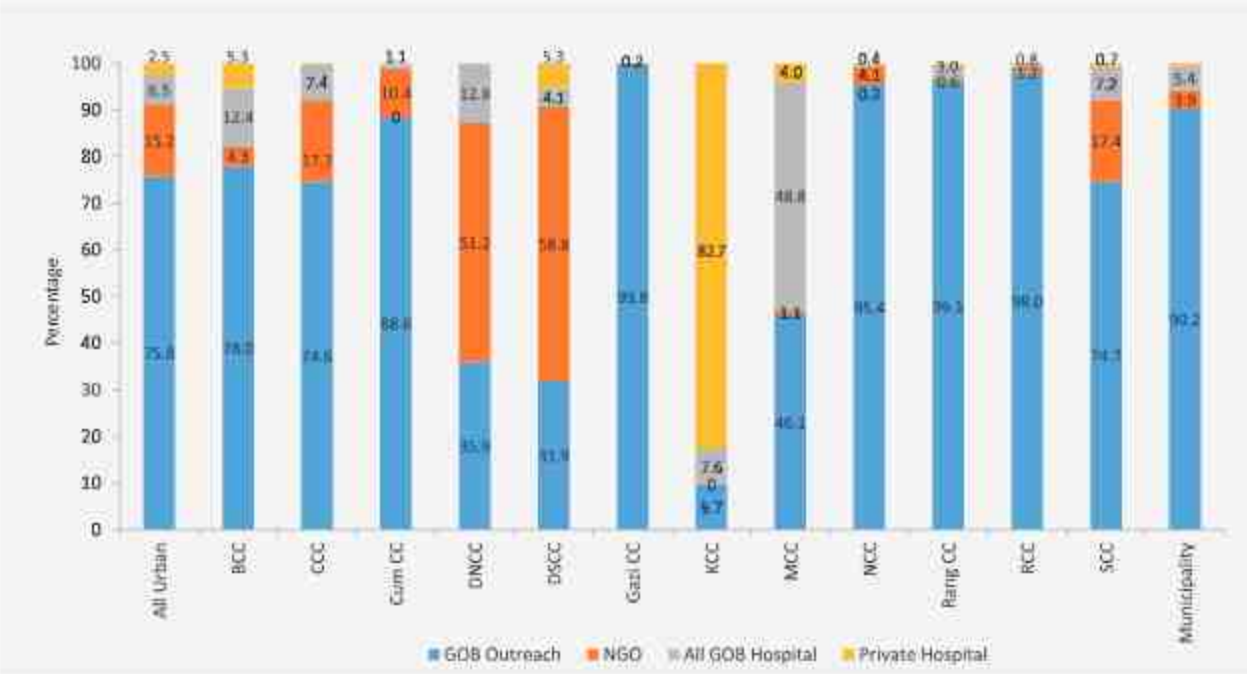
By rural division, the highest proportion of vaccine recipients who received Penta1 from GoB outreach centers ranged from 99.6 percent in Barishal division to 79.8 percent in Sylhet division. In the rural divisions, private and NGO hospitals and clinics were the sources of Penta1 vaccine in less than 1.5 percent of cases (see Figure 72).

Figure 72: Source of Penta1 Vaccination in Rural Areas by Division in 2019



In city corporations, government facilities were again the prime source of Penta1 vaccination, except in DNCC, DSCC and KCC. More than 50 percent of the mothers/caregivers reported about vaccination either in the NGOs, or private clinics. In other city corporations, this proportion varied between 25 percent and less than 1 percent (see Figure 73).

Figure 73: Source of Penta1 Vaccination in Urban Areas by City Corporation and Municipality in 2019



3.8 RELATION BETWEEN SOURCE AND BCG VACCINATION GAP

Table 11 shows the gap between the date of childbirth and the date of receiving BCG by the source of BCG vaccination. It shows that overall 3.0% of the children received BCG within 7 days of their birth, thirty-nine percent between 8 and 42 days and around 58 percent received BCG after 42 days of birth. Findings on both the urban and the rural areas were similar to the nationwide findings.

Table 11: Source of BCG by the Gap of BCG Vaccination after the Child Born

BCG Receiving Duration	National	Urban	Rural
Upto 7 days	3.0	4.5	2.7
8-42 days	39.4	39.8	39.4
More than 42 days	57.5	55.7	57.9

3.9 AVAILABILITY OF BIRTH CERTIFICATE AMONG SURVEYED CHILDREN (12-23 MONTHS OLD CHILDREN)

Nationwide, 33.9 percent of the children had their birth certificates available; urban children are more likely to have the certificates compared to their rural counterparts (37.9 percent vs. 32.8 percent) (see Figure 74). Among the rural divisions, availability of birth certificates was the highest in Sylhet (46.8 percent) and the lowest in Dhaka (24.3 percent) divisions (see Figure75). Among the city corporations, availability of birth certificates was the highest in RCC (91.9 percent) and the lowest in DSCC (13.3 percent). Moreover, 37.9 percent of the children residing in the municipality areas had their birth certificates (see Figure 76).

Figure 74: Percentage Distribution of Children by Availability of Birth Certificate by National, Rural and Urban Areas in 2019

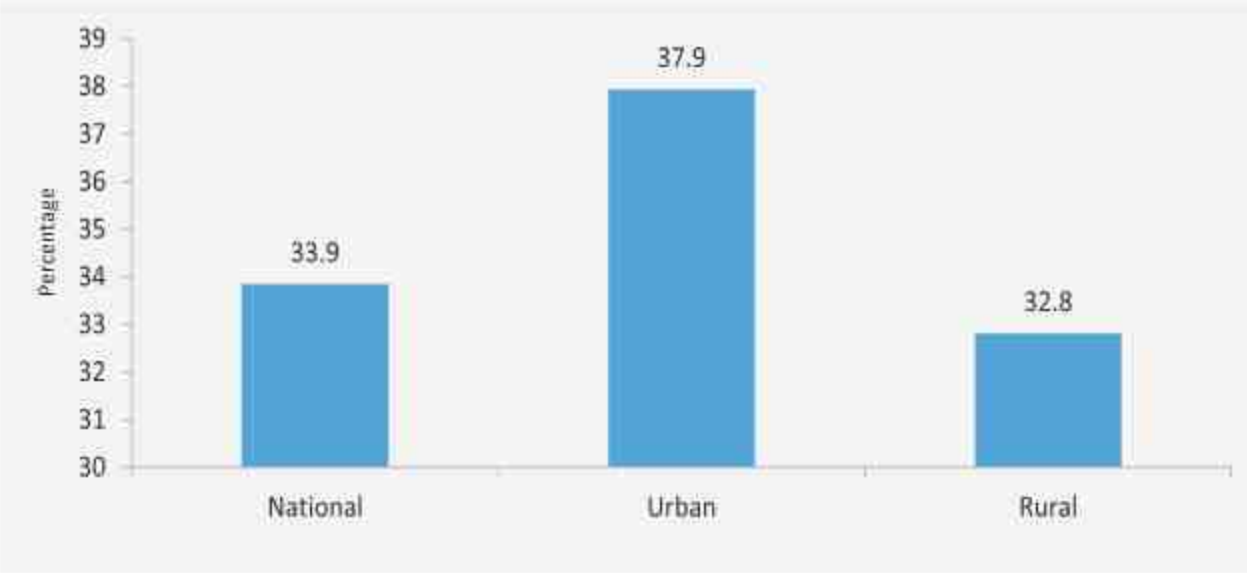


Figure 75: Percentage Distribution of Children by Availability of Birth Certificate in Rural Areas by Division in 2019

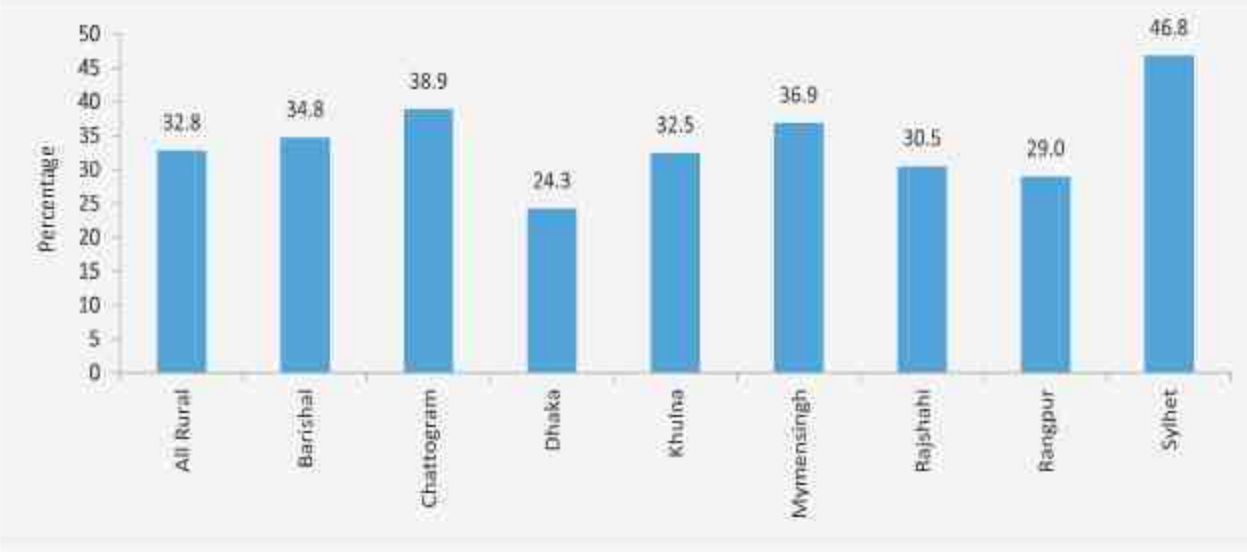


Figure 76: Percentage Distribution of Children by Availability of Birth Certificate in Urban Areas by City Corporation and Municipality by in 2019

CHAPTER 4

CHILDHOOD VACCINATION COVERAGE INCLUDING MEASLES-RUBELLA SECOND DOSE (MR2) BY THE AGE OF 23 MONTHS AMONG 24-35 MONTHS OLD CHILDREN

CHILDHOOD VACCINATION COVERAGE INCLUDING MEASLES-RUBELLA SECOND DOSE (MR2) AMONG 24-35 MONTHS OLD CHILDREN

This section details the facts and findings of Measles-Rubella Second Dose (MR2) vaccination coverage of children aged between 24 and 35 months. The Measles & Rubella Initiative is a global partnership aimed at ensuring no child dies of measles or is born with congenital rubella syndrome. The global partnership committed to the elimination of measles, rubella and congenital rubella syndrome applauds today's global pledge to meet measles and rubella elimination goals. One hundred and ninety-four countries resolved their commitment to achieving these goals in the context of a new Global Vaccines Action Plan (GVAP) endorsed by the World Health Assembly. Its goals include reducing measles-related deaths by 95% by 2015 and eliminating measles and rubella in at least five of six World Health Organization (WHO) Regions by 2020. In Bangladesh second dose of Measles was included in the EPI schedule in 2012. And, after taking into consideration the Measles control and elimination goal, Measles Second Dose (MSD) has been replaced by Measles- Rubella (MR) vaccine and is termed as MR2. It needs to be mentioned here once again that the first dose of MR (MR1) is scheduled for the children after the completion of 270 days of birth while the second dose of MR (MR2) scheduled to administer at the age of between 15 and 23 months.

CES 2019 estimated childhood vaccination coverage in 2 different age cohorts: - children who were born between May 1, 2016 and April 30, 2017 and children who were born between May 1, 2017 and April 30, 2018. Chapter 4 highlights MR2 coverage among children aged 24-35 months. In addition, this chapter also describes Full Vaccination Coverage (FVC) including MR2. One dose of BCG, 3 doses of Pentavalent, OPV, and PCV, and 2 doses of MR (MR1 and MR2) were included to calculate the FVC.

However, Full Vaccination Coverage described in Chapter 3 was assessed among children aged 12-23 months who were born between May 1, 2017 and April 30, 2018. One dose of BCG, 3 doses of Pentavalent, OPV, and PCV, and the first dose of MR was included to calculate the FVC in this age group. It may be mentioned here that all the children were not eligible for MR2 in this age cohort, hence, information regarding MR2 was not included in the survey.

4.1 OBJECTIVES

- Childhood vaccination coverage under routine EPI among the 24-35 months old children
- Measles-Rubella Second Dose (MR2) vaccination coverage among the 24-35 months old children under routine EPI
- Drop-out rates and quality (percentage of invalid doses, vaccination card availability, reasons for left-out and drop-out cases)
- Trends in the vaccination coverage and drop-out rates at the national and divisional levels
- Provide information as a basis for making concrete recommendations and planning for improving routine immunization activities.

4.1.1 Survey Subject

MR2 should be received between 15 and 23 months after one's birth. Therefore, children who were aged between 24 and 35 months and were born between 1st May 2016 and 30th April 2017 were eligible for Childhood Vaccination Coverage Survey by the Age of 23 Months Old Children in CES 2019.

4.2 SAMPLE SELECTION

The MR2 survey was carried out among 24-35-month old children drawn from the same cluster of CES 2019 as applied in the other survey components. The interviewers listed all the eligible children (aged

between 24-35 months) in every household of each cluster during the time of household visits with an aim to make the sampling frame of eligible households. Afterwards, households with eligible children were selected randomly from the sampling frame to administer the questionnaire.

4.2.1 Childhood Vaccination Coverage

A child who has received all the doses of all antigens, as recommended in the EPI programme under the childhood vaccination schedule, is Full vaccinated. The EPI has a WHO-recommended vaccination schedule to administer and complete the required doses of all antigens. According to the EPI childhood vaccination schedule, a child should receive all the eligible vaccines within one year of age, thus complying with the recommended minimal age for starting the vaccines and the intervals between the consecutive doses. Two types of coverage – crude and valid – were determined and analyzed as per the WHO guideline and were presented in CES 2019.

Valid coverage informs us that the first dose of a vaccine was given at the recommended age and the recommended minimum interval between the doses was maintained. Therefore, any dose of a scheduled vaccine received by a recipient that was administered at the appropriate age and at the minimum time interval between the doses was a valid dose. If any child received all the valid doses within the age of 12 months, CES termed it as the valid coverage by the age of 12 months. And, if s/he received all the valid doses within the age of 23 months, CES termed it as valid coverage by the age of 23 months. Conversely, the coverage was defined as crude when a child received all the scheduled vaccines, whether or not the recommended starting age or intervals between the doses were complied with as recommended by EPI Bangladesh.

4.3 COVERAGE RATES FROM CARD AND HISTORY

The total coverage is an aggregated result which was obtained from the vaccination cards, register, and history. Information about CES 2019 was gathered from these three sources: card, register, and history. Regarding children who didn't have any vaccination card, their vaccination information was recorded by taking their history from their mothers/caregivers. The findings are presented below.

4.4 LEVELS OF CRUDE FULL VACCINATION COVERAGE BY AGE OF 23 MONTHS AMONG 24-35 MONTHS OLD CHILDREN

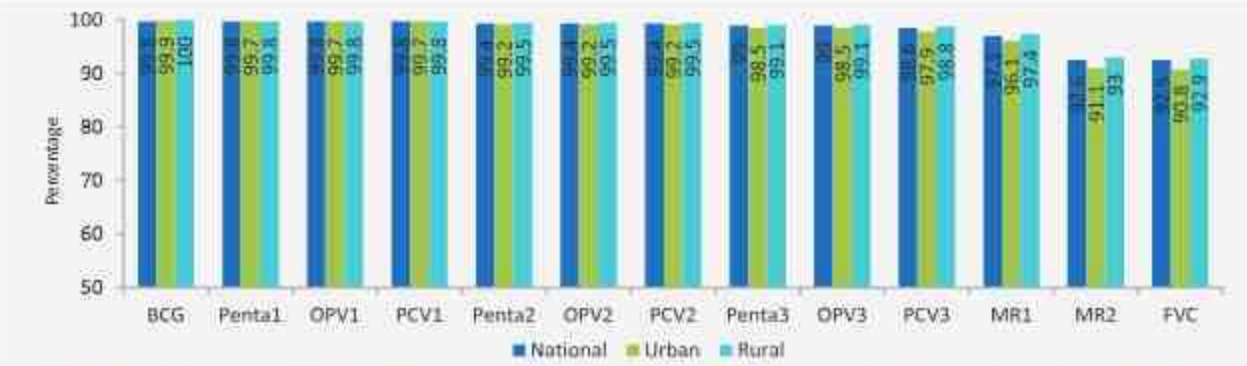
Crude vaccination coverage was defined as the vaccines given to the children when the exact age for starting the vaccination and/or the interval between the doses as recommended in the EPI schedule were or were not met. Figure77 presents crude vaccination coverage separately obtained from three sources: card, register, and history.

Across the country, 92.5 percent of the children received all the eligible vaccines, irrespective of the appropriate time for starting the antigen and/or the minimum interval between the two doses. Following the order by which the EPI schedule recommended doses, as shown in Figure 77, BCG had the highest coverage (99.8percent), which was followed by Penta1, Penta2, Penta3, and MR. The difference between BCG and MR1 was the most prominent (2.7 percentage points), while the difference was the least prominent between BCG and Penta2 (0.4 percentage point). Moreover, the gap between MR1 and MR2 coverage was noticed 4.5 percentage points (97.1 percent vs.92.6 percent). The gap in the coverage between the two antigens/doses might be caused by the drop-out from subsequent doses.

By residence, a little variation was observed in the crude full vaccination coverage between rural and urban areas (92.9 percent vs. 90.8 percent) (see Figure 78).

Figure 77: Crude Full Vaccination Coverage among 24-35 Months Old Children by Vaccination Sources

Figure 78: Crude Full Vaccination Covergae by National, Rural and Urban Areas among 24-35 Years Old Children



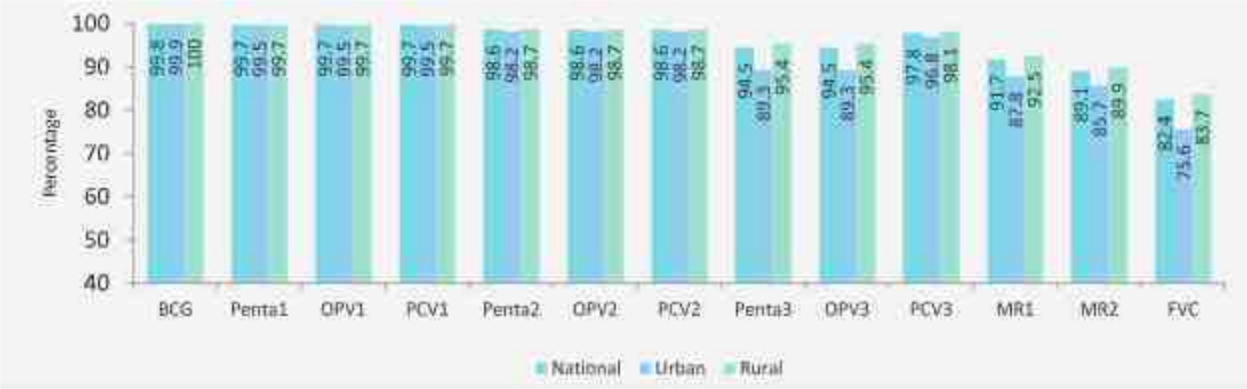
4.5 LEVELS OF VALID FULL VACCINATION COVERAGE AMONG 24-35 MONTHS OLD CHILDREN

Figure 79 presents Valid Full Vaccination Coverage among 24-35 Months Old Children. Valid coverage was defined as vaccines received by following the EPI-recommended age and dose interval for each antigen. In the country, 82.4 percent of the children received all the scheduled doses of all antigens with BCG coverage being at 99.8 percent. Penta1 coverage was 99.7 percent, Penta2 98.6 percent, and Penta3 94.5 percent, MR1 91.7 percent, and MR2 89.1 percent. MR1 coverage was revealed to be 8.1 percentage points lower than BCG (99.8 percent).

Figure 79: Valid Full Vaccination Coverage among 24-35 Months Old Children by Vaccination Sources

By residence, Valid Full Vaccination Coverage was 8.1 percentage points higher in the rural areas (83.7 percent), compared to those who resided in the urban areas (75.6 percent) (see Figure 80).

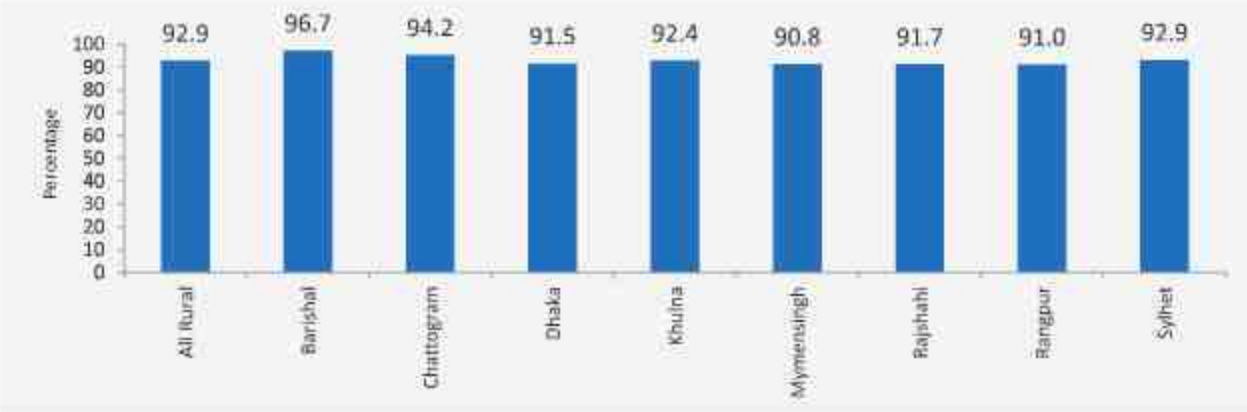
Figure 80: Valid Full Vaccination Coverage by National, Rural and Urban Areas among 24-35 Years Old Children



4.6 CRUDE FULL VACCINATION COVERAGE AMONG 24-35 MONTHS OLD CHILDREN IN RURAL AREAS BY DIVISION

Among the rural areas by division, as shown in Figure 81, crude full vaccination coverage was 90.8 percent or above in all the divisions. The coverage was 90.8 percent in Mymensingh which is the lowest among the divisions. The highest crude full vaccination coverage was in Barishal division with 96.7 percent. Coverages in other divisions were between 91.0 percent and 94.2 percent.

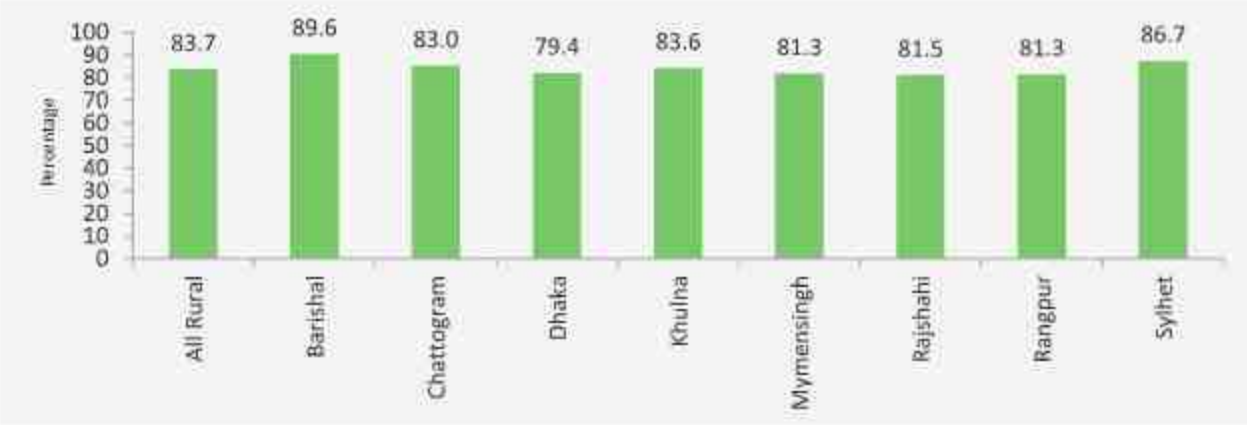
Figure 81 : Crude Full Vaccination Coverage among 24-35 Months Old Children in Rural Areas by Division in 2019



4.7 VALID FULL VACCINATION COVERAGE AMONG 24-35 MONTHS OLD CHILDREN IN RURAL AREAS BY DIVISION

Figure 82 presents the Valid Full Vaccination Coverage among 24-35 Months Old Children by division. It shows that the Valid Full Vaccination Coverage was the highest in Barishal (89.6 percent) and the lowest in Dhaka divisions (79.4 percent). Valid coverage in the other divisions was at an intermediary level that ranged between 86.7 percent in Sylhet and 81.3 percent in Mymensingh and Rangpur divisions.

Figure 82 : Valid Full Vaccination Coverage among 24-35 Months Old Children in Rural Areas by Division in 2019



4.8 CRUDE FULL VACCINATION COVERAGE IN URBAN AREAS BY CITY CORPORATION AND MUNICIPALITY

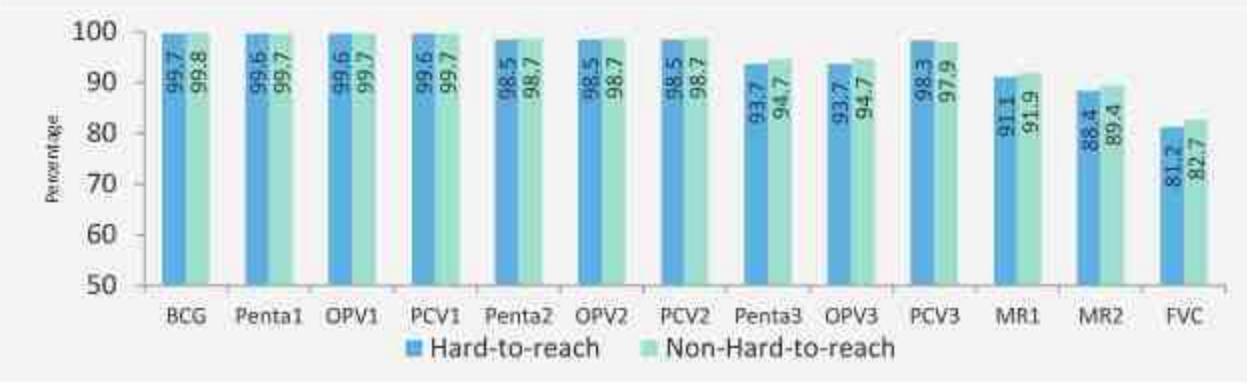
Across the city corporations, the crude full vaccination coverage was ranged 99.6 percent at RCC to 83.5 percent at CCC. However, the crude full vaccination coverage in other city corporations was between 85.1 percent in SCC and 93.0 percent in DNCC (see Figure 83).

Figure 83: Crude Full Vaccination Coverage among 24-35 Months Old Children by City Corporation in 2019

4.9 VALID FULL VACCINATION COVERAGE BY HARD-TO REACH AREAS AMONG 24-35 MONTHS OLD CHILDREN

A hard-to-reach area was defined as an area where two or more hours are required to reach from the pazila headquarters. Figure 84 indicates that the vaccination coverage was 1.5 percentage points higher in non-hard-to-reach areas than those in hard-to-reach areas.

Figure 84: Valid Vaccination Coverage by Age of 12 Months by Hard-to-Reach Area in 2019



4.10 DIFFERENTIAL IN VALID VACCINATION COVERAGE AMONG 24-35 MONTHS OLD CHILDREN BY BACKGROUND CHARACTERISTICS

Table 12 presents the valid vaccination coverage by the age of 23 months, by background characteristics, such as gender and areas, which showed little variation; here the education of mothers and the income of families had greater influences upon the coverage. There was slight gender disparity, with valid vaccination coverage at 82.1 percent for males and 82.7 percent for females. As for the residence, 8.1 percentage points difference was noticed between the rural (83.7 percent) and the urban areas (75.6 percent).

However, regarding the educational attainment of mothers, valid vaccination coverage was higher among those children whose mothers had higher education compared to those mothers/caregivers who had no education. Coverage was considerably higher among the children whose mothers had more than ten years of education (85.8 percent), compared to those with five years' education (81.3 percent) and those with no education (78.3 percent). Valid vaccination coverage of children with mothers having Masters level of education noticed a decrease compared to those whose mothers' education was between 12 and 14 years (86.8 percent for Graduate and 83.1 percent for Masters).

In terms of income, no remarkable variation in the valid full vaccination coverage was observed between the highest and the lowest income groups. Valid full vaccination coverage was the highest in the middle-income group (83.2 percent). And, the second highest coverage (83.1 percent) was revealed among the people belonging to the highest income group. And, the coverage was 81.4 and 81.3 percent respectively among those belonging to the fourth- and fifth-income group. The above findings suggest that people from the lower income group are almost parallel to people from the highest income group as regards to vaccination of their children. It also points towards the efforts of EPI programme in Bangladesh to ensure equity here.

The valid vaccination coverage was also assessed by wealth quintile, which was calculated by using a principal component analysis. Similar to the analysis by income, the vaccination coverage was higher in the poorer wealth quintiles. The coverage was 82.2 percent in the richest wealth quintile, which was

actually about 1.0 percentage point lower than middle, 0.3 percentage point from second quintile. The analysis revealed that vaccination service was being provided through EPI Programme irrespective socio-economic status which again indicates the Programme's commitment to ensure equity in vaccination service.

Table12: Percentage Distribution of Children who received all Valid Vaccine by Age of 23 Months among 24-35 Months by Background Characteristics

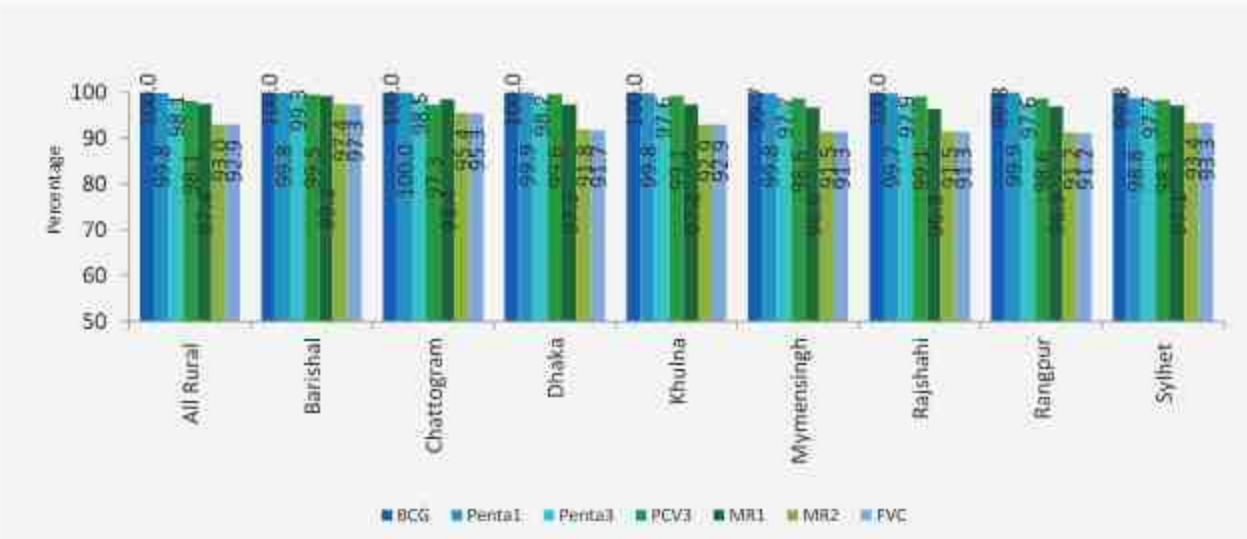
	BCG	Penta1	OPV1	PCV1	Penta2	OPV2	PCV2	Penta3	OPV3	PCV3	MR1	MR2	FVC
Sex													
Male	99.8	99.7	99.7	99.7	98.8	98.8	98.8	94.2	94.2	97.7	91.6	89.7	82.1
Female	99.8	99.7	99.7	99.7	98.7	98.7	98.7	94.7	94.7	97.9	91.9	90.1	82.7
Residence													
Urban	99.9	99.5	99.5	99.5	98.2	98.2	98.2	89.3	89.3	96.8	87.8	85.7	75.6
Rural	100	99.7	99.7	99.7	98.7	98.7	98.7	95.4	95.4	98.1	92.5	89.9	83.7
Education Level of Mothers													
Illiterate	99.6	99.4	99.4	99.4	98.2	98.2	98.2	93.2	93.2	96.6	89.1	85.6	78.3
Primary	99.8	99.7	99.7	99.7	98.5	98.5	98.5	93.9	93.9	97.5	91.1	88.3	81.3
Secondary	99.8	99.7	99.7	99.7	98.6	98.6	98.6	94.7	94.7	98.1	92.1	89.8	82.9
SSC/Dhakil/O level	99.8	99.8	99.8	99.8	99.1	99.1	99.1	94.6	94.6	98.0	92.5	90.0	83.1
HSC/Alim/A level	99.8	99.8	99.8	99.8	98.8	98.8	98.8	95.7	95.7	98.3	93.5	90.6	85.8
Degree/Fazil	99.8	99.8	99.8	99.8	98.6	98.6	98.6	96.8	96.8	98.9	93.4	91.6	86.8
Masters/Kamil	99.8	99.8	99.8	99.8	99.2	99.2	99.2	94.6	94.6	97.7	90.0	91.4	83.1
Monthly Household Income													
Upto 5000	99.9	99.9	99.9	99.9	98.7	98.7	98.7	95.1	95.1	97.2	91.0	88.5	81.9
5001-10000	99.8	99.7	99.7	99.7	98.6	98.6	98.6	94.6	94.6	97.8	91.7	88.6	82.1
10001-15000	99.8	99.7	99.7	99.7	98.6	98.6	98.6	95.1	95.1	97.7	91.5	89.9	83.2
15001-20000	99.9	99.7	99.7	99.7	98.7	98.7	98.7	93.3	93.3	97.8	91.7	88.5	81.4
20001-25000	99.9	99.7	99.7	99.7	98.5	98.5	98.5	92.4	92.4	98.2	92.6	89.7	81.3
Above 25000	99.7	99.7	99.7	99.7	98.8	98.8	98.8	94.8	94.8	98.0	92.2	89.9	83.1
Wealth Quintiles													
Lowest	99.8	99.7	99.7	99.7	98.5	98.5	98.5	94.9	94.9	97.5	91.7	88.1	82.0
Second	99.8	99.7	99.7	99.7	98.6	98.6	98.6	95.2	95.2	97.9	91.6	89.2	82.5
Middle	99.9	99.7	99.7	99.7	98.6	98.6	98.6	95.1	95.1	98.1	92.0	89.9	83.2
Fourth	99.8	99.7	99.7	99.7	98.7	98.7	98.7	94.0	94.0	97.7	91.6	88.9	81.8
Highest	99.7	99.7	99.7	99.7	98.9	98.9	98.9	92.6	92.6	97.8	91.5	89.8	82.2
Hard-to-reach/Non-Hard-to-reach													
Hard-to-reach	99.7	99.6	99.6	99.6	98.5	98.5	98.5	93.7	93.7	98.3	91.1	88.4	81.2
Non-Hard-to-reach	99.8	99.7	99.7	99.7	98.7	98.7	98.7	94.7	94.7	97.9	91.9	89.4	82.7

4.11 Vaccination Coverage in the Rural Areas by Division

Crude Full Vaccination Coverage by Age of 23 Months

Crude full vaccination coverage by the age of 23 months varied slightly by rural division. Crude vaccination coverage was the highest in Barishal (97.3 percent) and the lowest in Rangpur (91.2 percent) divisions. Along with Rangpur, Dhaka, Mymensingh and Rajshahi were also below the national average. By vaccine type, all the divisions achieved the BCG coverage rate of 99.7 percent or higher. Regarding the Penta1 coverage, Chattogram divisions had the universal coverage while the lowest coverage was observed in Rajshahi division with 99.7 percent. However, the Penta3 coverage was the highest in Barishal division with 99.3 percent and the lowest in Rangpur division with 97.6 percent.

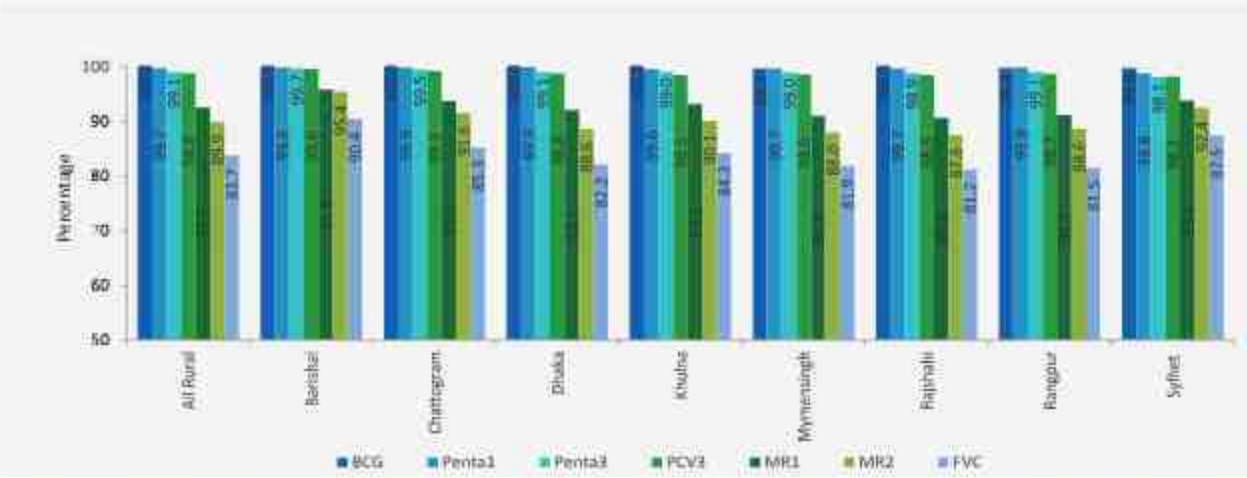
Figure 84a: Crude Full Vaccination Coverage in Rural Areas by Division among 24-35 Months Old Children



Valid Full Coverage by Age of 23 Months

Nationwide, 83.7 percent of the rural children received all the vaccines by the age of 23 months as recommended by EPI regarding intervals between the doses and minimum age of receiving vaccine. Among all the eight divisions, children from the rural areas of Barishal division (90.4 percent) were more likely to receive all the valid vaccines than those from the other rural divisions.

Figure 84b: Valid Full Vaccination Coverage in Rural Areas by Division among 24-35 Months Old Children

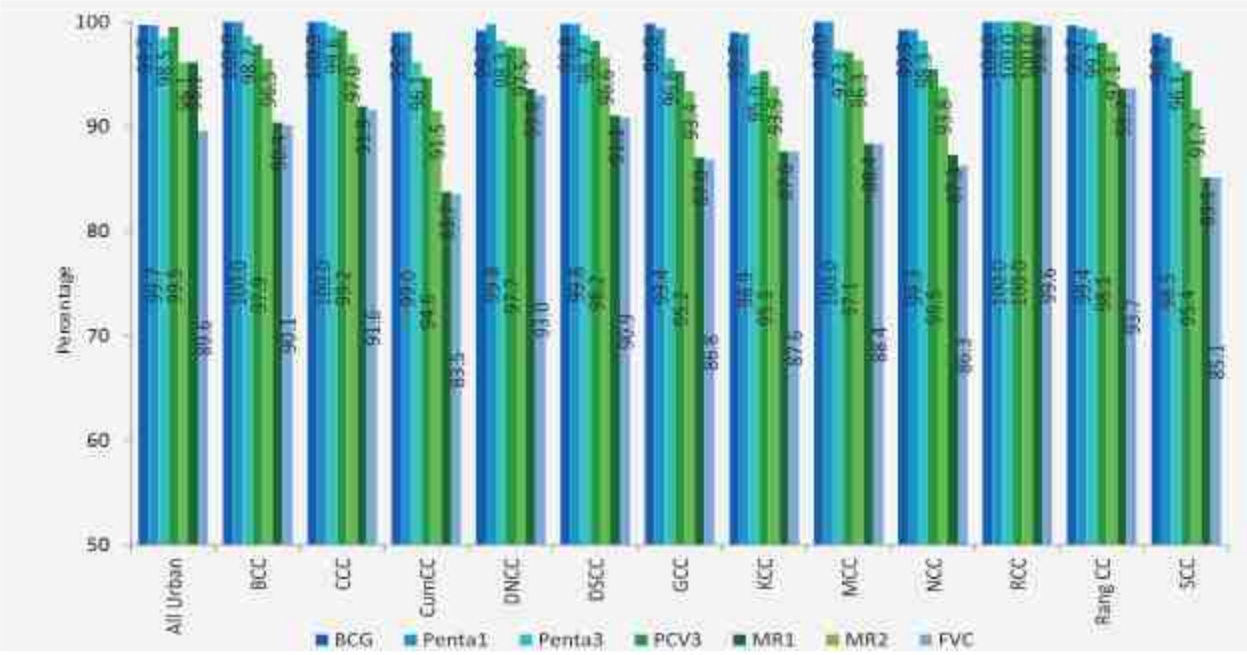


4.12 VACCINATION COVERAGE IN THE URBAN AREAS BY CITY CORPORATION AND MUNICIPALITY

Figures 84c and 84d depict city corporation-wise vaccination coverage. For CES 2019, each of the 12 city corporations in Bangladesh was surveyed as separate survey strata.

Crude Full Vaccination Coverage by the age of 23 Months: Figure 84c shows urban vaccination coverage by city corporation. As a whole, urban coverage was found to be 89.6 percent in CES 2019. Among the city corporations, the highest crude vaccination coverage was in RCC (99.6 percent) and the lowest in CumCC (83.5 percent). Crude full vaccination coverage in the other city corporations ranged between 85.1 percent and 93.7 percent.

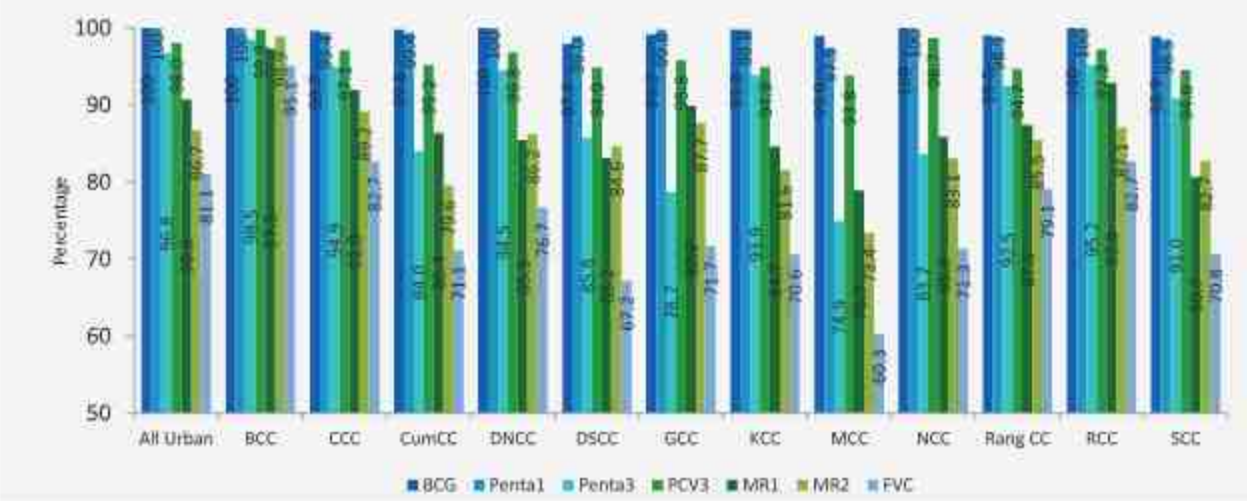
Figure 84c: Crude Full Vaccination Coverage in Urban Areas by City Corporation among 24-35 Months Old Children



Valid Full Vaccination Coverage by the Age of 23 Months:

Figure 84d highlights valid vaccination coverage among 24-35 months old children by city corporation. The figure shows that valid coverage was the highest in BCC (95.1 percent). The next highest (82.7 percent) was found in CCC and RCC, the rest of the rates ranged between 76.7 percent and 60.3 percent.

Figure 84d: Valid Full Vaccination Coverage in Urban Areas by City Corporation among 24-35 Months Old Children



4.13 SEX DIFFERENTIALS IN VACCINATION COVERAGE

Crude Full Vaccination Coverage by the Age of 23 Months by Sex

Figures 85-85b present crude full vaccination coverage by the age of 23 months.In the country, 0.1 percentage point difference was noticed in the crude coverage between the males and the females. Crude full vaccination coverage was 92.4 percent among the males as against 92.5 percent among the females. Similarly, a slight difference was observed between males and females in the rural areas. However, in the urban areas crude coverage was 6.4 percentage points higher among the males than that in the females.

Figure 85: National Crude Full Vaccination Covergae by Age of 23 Months by Sex in 2019

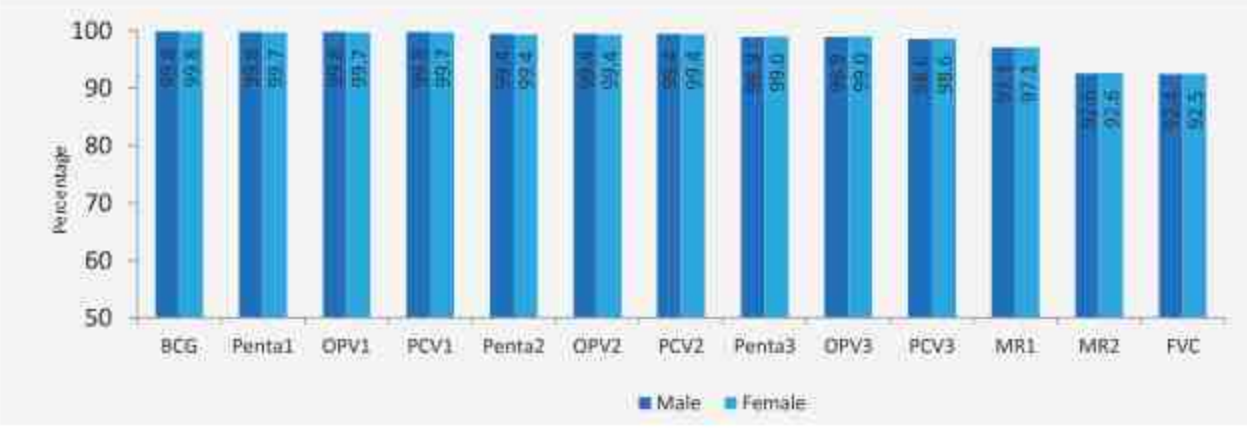


Figure 85a: Crude Full Vaccination Covergae by Age of 23 Months in Urban Areas by Sex in 2019

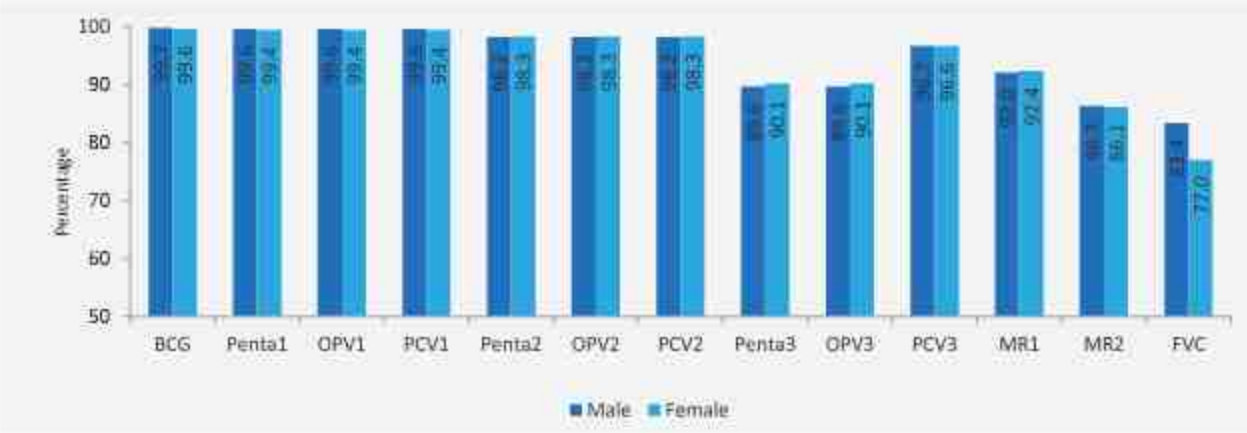
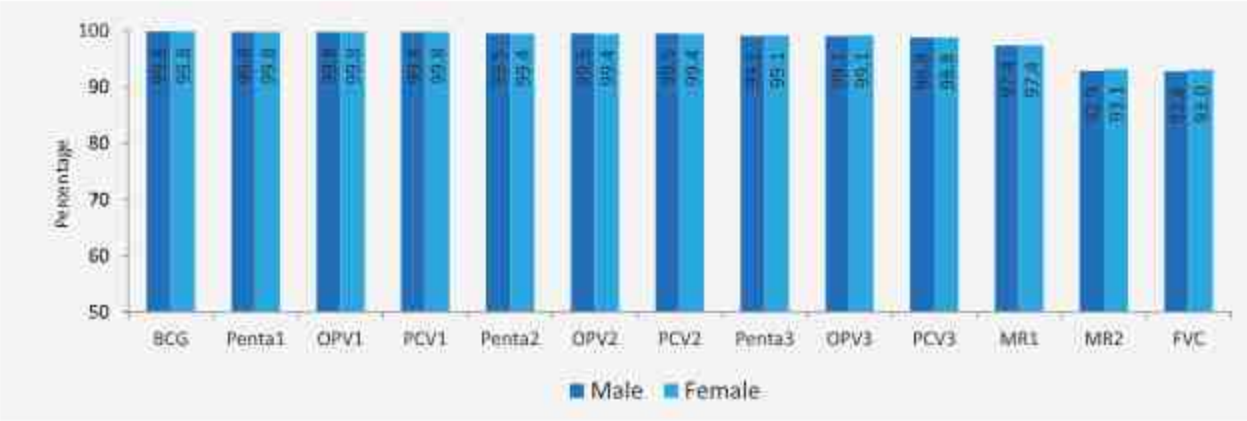


Figure 85b: Crude Full Vaccination Covergae by Age of 23 Months in Rural Areas by Sex in 2019



Valid Full Vaccination Coverage by Age of 23 Months by Sex

Figures 86-86b depict the valid full vaccination coverage by the age of 23 months. It shows that the valid coverage was 82.1 percent in the case of males and 82.7 percent in the case of females. As regards the residence, it was found to be similar among the males and the females in the rural areas. In contrast, a slight difference was noticed in the urban areas.

Figure 86: Valid Full Vaccination Coverage by Age of 23 Months at National level by Sex in 2019

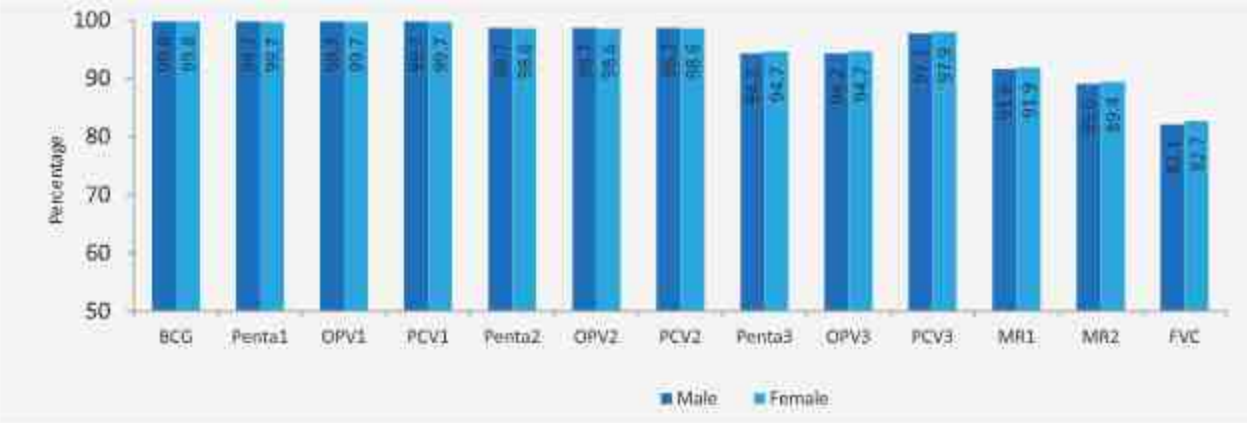


Figure 86a: Valid Full Vaccination Covergae by Age of 23 Months in Urban Areas by Sex in 2019

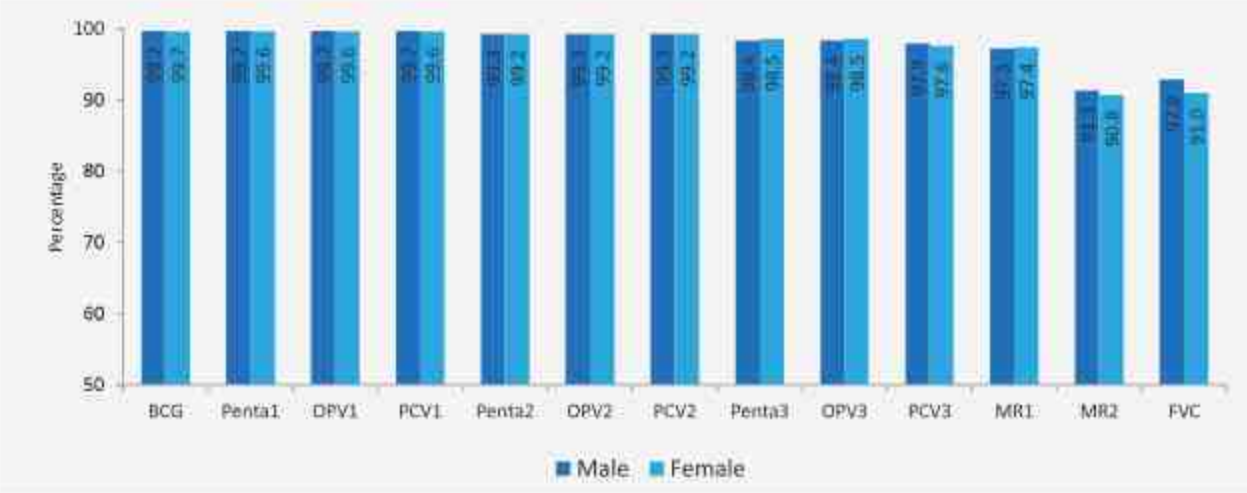
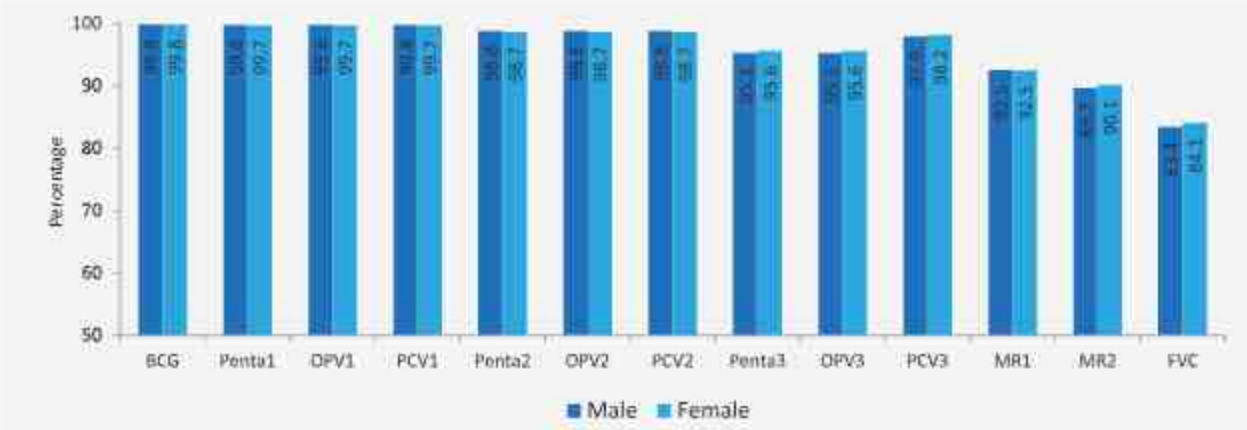


Figure 86b: Valid Full Vaccination Covergae by Age of 23 Months in Rural Areas by Sex in 2019



Map 9: Crude Full Vaccination Coverage with MR2 by the Age of 23 Months among 24-35 Months Old Children by District

Map 10: Crude MR2 Vaccination Coverage by the Age of 23 Months among 24-35 Months Old Children by District

Map 11: Valid Full Vaccination Coverage with MR2 by the Age of 23 Months among 24-35 Months Old Children by District

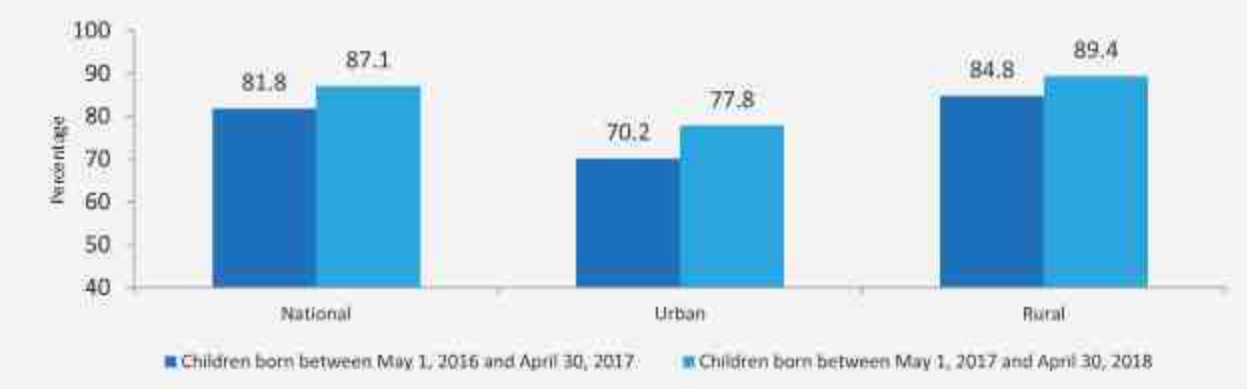
Map 12: Valid MR2 Vaccination Coverage by the Age of 23 Months among 24-35 Months Old Children by District

4.14 PROGRAMME QUALITY

4.14.1 Card Retention Rate

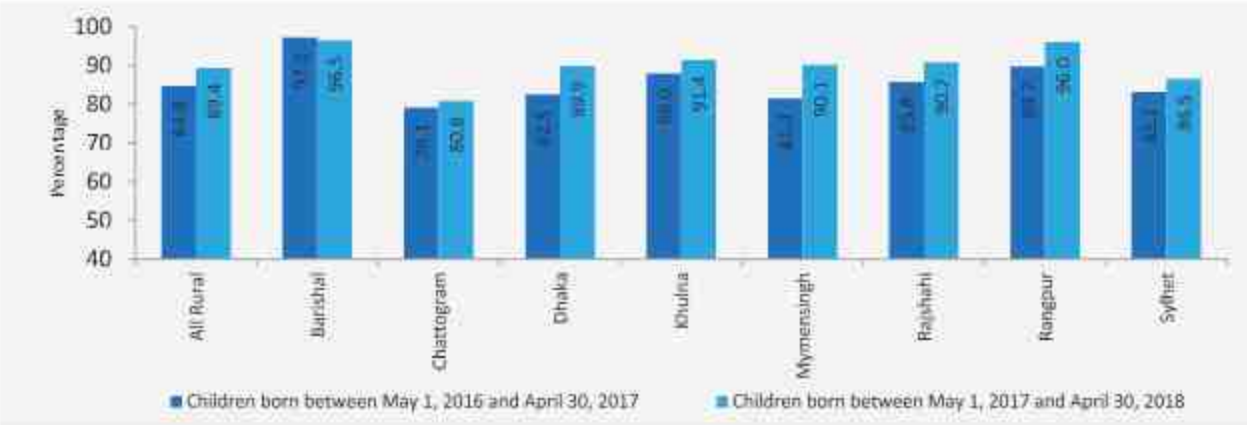
The availability of the card was an important tool for the Coverage Evaluation Survey, as vaccination dates were obtained from the card to estimate the crude coverage and the valid coverage. CES 2019 estimated card retention rate through a separate analysis and presented it in the Figure below. The figure shows that card retention rate was 5.3 percentage points higher among the children who were born between May 1, 2017 and April 30, 2018 (87.1 percent vs.81.8 percent). This was true for both the urban and rural areas. Card retention rates were 7.6 percentage points higher in the urban (77.8 vs. 70.2 percent) and 4.6 percentage points in the rural (89.4 vs. 84.8 percent) areas among the children of younger cohort as against the children who were born between May 1, 2016 and April 30, 2017.

Figure 87: Card Retention Rate by National, Rural and Urban Areas between Two Cohorts



After analyzing data by rural areas of eight divisions, the result shows higher retention rates among children aged 24-35 months in all the divisions except Barishal. The highest difference was observed in Mymensingh division with 8.7 percentage points between children who were born between May 1, 2017 and April 30, 2018 and children who were born between May 1, 2016 and April 30, 2017.

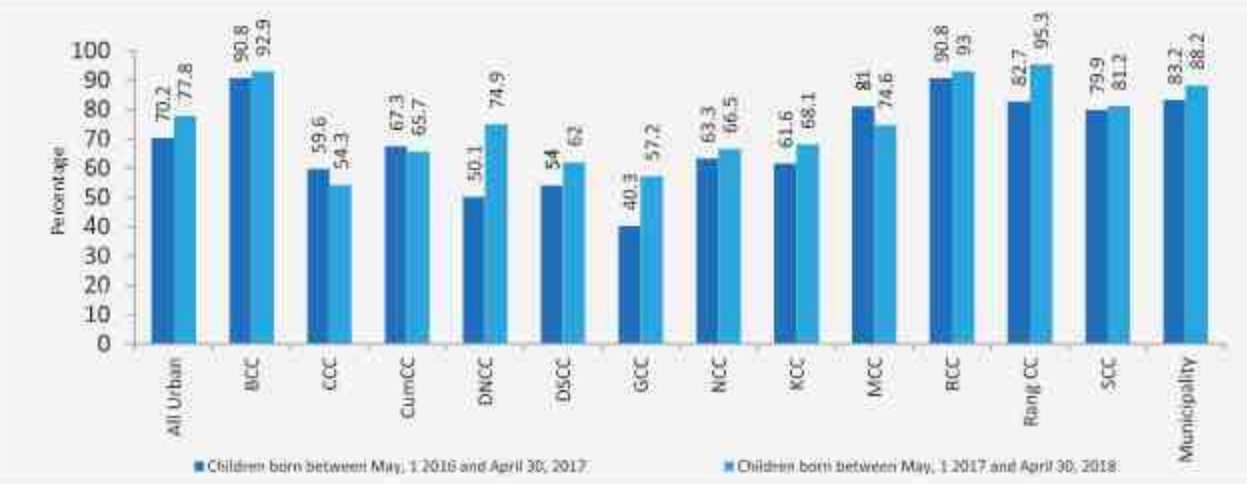
Figure 88: Card Retention Rate in Rural Areas by Division between Two Cohorts



Similar to the rural areas, card retention rates were higher in all the city corporations among the children who were born between May 1, 2017 and April 30, 2018. And, the highest difference was observed in DNCC where 74.9 percent of the children who were born between May 1, 2017 and April 30, 2018 retained

their vaccination card as against 50.0 percent of their older counter parts (children who were born between May 1, 2016 and April 30, 2017). However, the lowest difference was observed in Barishal City Corporation. Ninety three percent of the children who were born between May 1, 2017 and April 30, 2018 retained vaccination cards compared to 90.8 percent who were born between May 1, 2016 and April 30, 2017.

Figure 89: Card Retention Rate Between Two Cohorts in urban areas by city corporation



4.14.2 Drop-out Rate From MR1 To MR2

Drop-outs from the subsequent dose(s) of the same antigen or different antigen are the most notable obstacle in the progress of achieving the desired coverage target. A child was considered to be a drop-out from MR2, if s/he failed to receive MR2 after receiving MR1. Nationally, the MR1-MR2 drop-out rate was 4.5 percent, with almost the same rate in rural (4.4 percent) and urban areas (5.0 percent) (see Figure 90). By sex, there was no difference in the MR1-MR2 drop-out rates between the males and the females across the country.

Figure 90: MR1-MR2 Vaccination Drop-out Rate by Sex at National Level

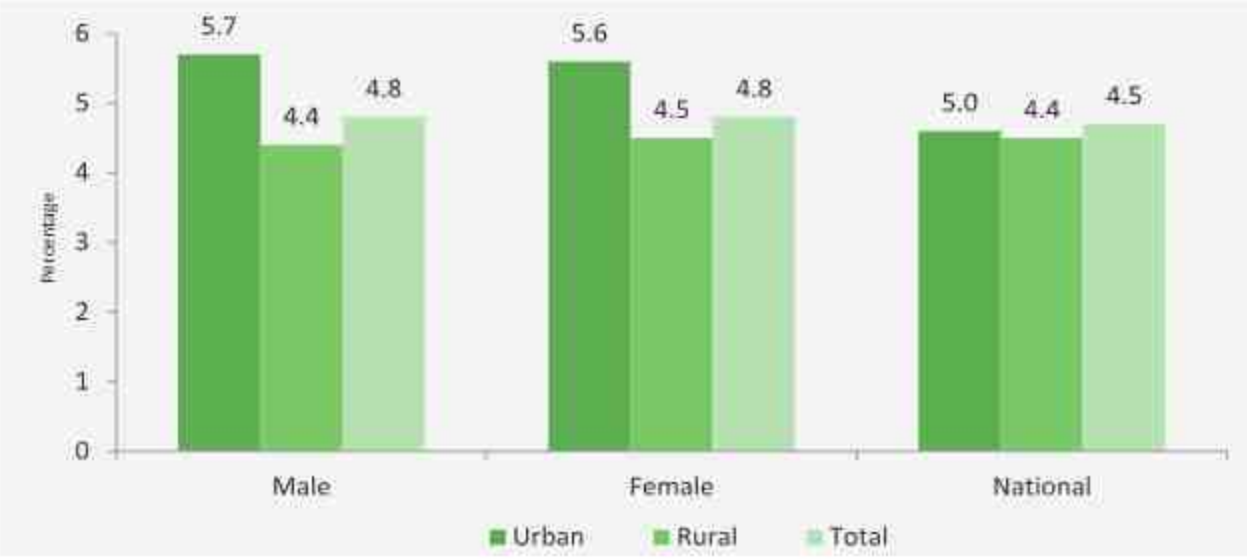


Figure 91 depicts the drop-out rate by rural division. Among the eight divisions, MR1-MR2 drop-out rate was the highest in Mymensingh (8.3 percent) and the lowest in Rajshahi (0.4 percent) divisions. The rates for the other divisions were in between 7.1 percent and 3.6 percent.

Figure 91: MR1-MR2 Drop-out Rate in Rural Areas by Division in 2019

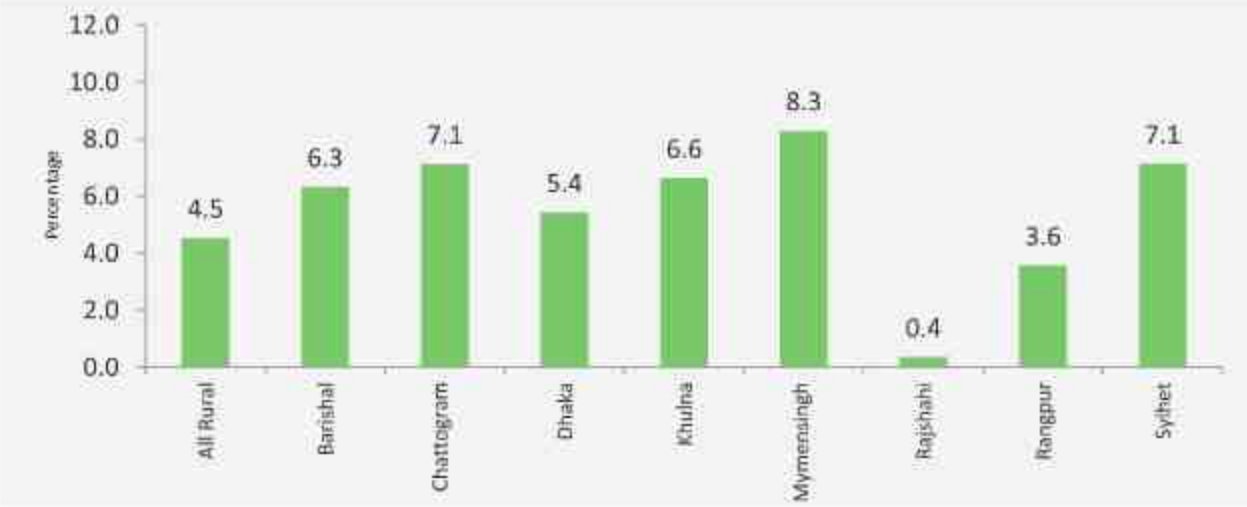
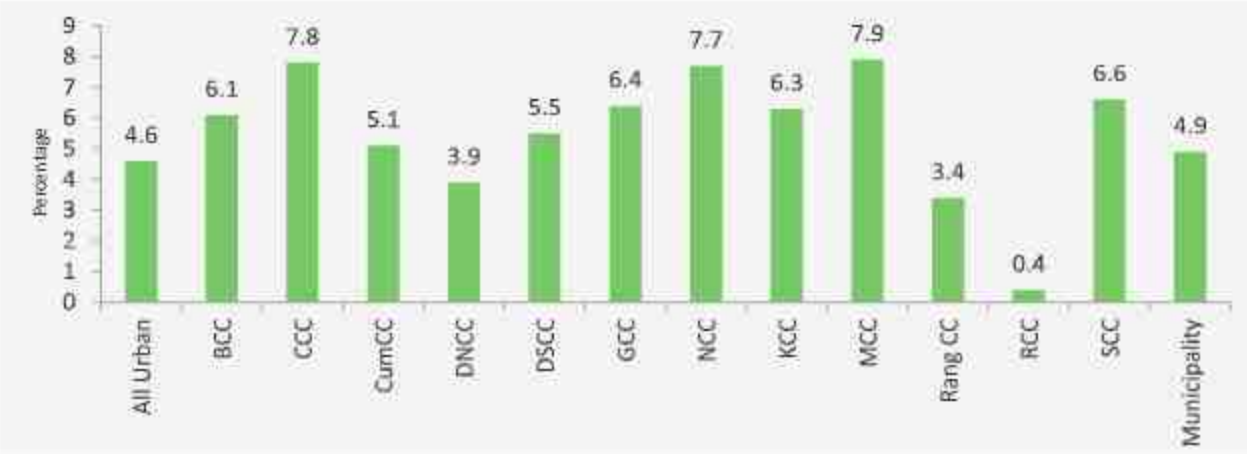


Figure 92 shows the drop-out rate by city corporation, which had a wider variation than those in the rural divisions. Among the city corporations, the highest drop-out rate was observed in MCC (7.9 percent) and the lowest in RCC (0.4 percent). In other city corporations, it ranged between 7.8 percent and 3.9 percent.

Figure 92: MR1-MR2 Vaccination Drop-out Rate in Urban Areas by City Corporation and Municipality in 2019



REASONS FOR NEVER Having VACCINATION OR PARTIAL VACCINATION

Left-outs, those who never received vaccination, and drop-outs from subsequent doses result in low crude and valid vaccination coverage. CES 2019 addressed reasons for not receiving vaccine. The findings are presented below.

4. 14.3 Reasons for Never Having Vaccination

Among the surveyed children, less than 1 percent did not receive any vaccine. Table 13 presents comparative analysis of reasons for never vaccinating the children between two cohorts of children.

The table shows that lack of awareness about vaccination service was a more pronounced response among the mothers/caregivers with children who were born between May 1, 2017 and April 30, 2018. The second highest reason was that the child was sick so s/he was not taken to the vaccination center (19.6 percent) followed by other major reasons: mothers/caregivers did not believe in vaccination (16.3 percent), they did not know where to go for vaccination (10.5 percent), and mothers/caregivers were busy with household chores (7.0 percent).

In contrast, a little over one-quarter of the mothers/caregivers (26.8 percent) of children who were born between May 1, 2016 and April 30, 2017, reported that they were unaware of vaccination service. Lack of faith in vaccination revealed around 26.8 percent among mothers/caregivers of children born between May 1, 2016 and April 30, 2017 as against 16.3 percent of the mothers/caregivers of children who were born between May 1, 2017 and April 30, 2018). Similarly, fear of side effects was lower among mothers/caregivers of children who were born between May 1, 2017 and April 30, 2018 (younger age) (21.2. percent vs. 1.2 percent). The table shows that the cause, lack of motivational issues were more reported by the mothers/caregivers of children who were born between May 1, 2016 and April 30, 2017 compared to the mothers/caregivers of 12-23 months old children (children who were born between May 1, 2017 and April 30, 2018), e.g. Rumor (7.8 percent vs.3.0 percent), and don't believe in vaccination (26.8 percent vs. 16.3 percent).

Table 13: Reasons for Never Having Vaccination by National, Rural and Urban Areas between Two Cohorts in 2019

Reasons[3]	National	Urban	Rural
Didn't know that my child should be given vaccine	33.0	24.0	38.5
Didn't know where to go for vaccine	10.5	18.7	5.6
Fearing side effects	1.2	0.8	1.5
Rumor	3.0	0.7	4.4
Don't believe in vaccination	16.3	8.5	21.1
Was busy and so couldn't give vaccine	7.0	6.0	7.7
Vaccine centre was too far	3.4	0.0	5.5
Vaccinator was not friendly	2.4	4.4	1.1
Child was sick	19.6	33.6	11.0
The session time was inconvenient	3.4	3.4	3.4

Reasons[4]	National	Urban	Rural
Didn't know that my child should be given vaccine	7.6	0	10.4
Didn't know where to go for vaccine	2.4	8.9	0.0
Fearing side effects	21.2	55.9	8.1
Rumor	7.8	0	10.8
Don't belive in vaccination	26.8	8.6	33.7
Was busy and so couldn't give vaccine	6.1	2.4	7.5
Will give vaccine in future	2.6	0	3.5
Forgot to vaccinate	5.1	6.3	4.6
Shortage of vaccine	1.7	0	2.3
Faced problem after vaccination	8.9	0	12.2
The child was sick	3.3	4.0	3.0
The child was sick so vaccinator didn't give	1.5	5.4	0.0
Mother was sick	1.9	7.0	0.0
Charge money	2.8	0	3.9
Session time inconvenient	0.4	1.4	0.0

[3] Children who born between May 2017 and April 30, 2018
[4] Children who born between May 2016 and April 30, 2017

4.14.4 Reasons for Partial Vaccination

Table 14 presents compared analysis of partial vaccination between the two age cohorts (children born between May 1, 2016 and April 30, 2017, and children born between May 1, 2017 and April 30, 2018).

The table shows that demand side problem, e.g. mothers/caregivers were busy with household chores, was reported by majority of mothers and caregivers (16.5 percent) of children who were born between May 1, 2017 and April 30, 2018 across the country. Nearly one-quarter (24.1 percent) of the mothers/caregivers of children who were born between May 1, 2016 and April 30, 2017 reported their involvement with household chores as a reason for partial vaccination.

In contrast, the second highest proportion of mothers/caregivers of children who were born between May 1, 2017 and April 30, 2018 reported that their children were sick (13.7 percent), therefore, they could not vaccinate their children. About the same percentage (12.8 percent) of the mothers/caregivers of children who were born between May 1, 2016 and April 30, 2017 reported it. The fact that they forgot to vaccinate their children was the second highest cause of partial vaccination for the cohorts who were born between May 1, 2016 and April 30, 2017 (13.6 percent mothers/ caregivers with children who were born between May 1, 2016 and April 30, 2017 as against 12.8 percent mothers/caregivers of children who were born between May 1, 2017 and April 30, 2018). Moreover, about one in ten of the mothers/caregivers of children born between May 1, 2017 and April 30, 2018 reported to be scared of the side effects of vaccinating their children compared to 3.6 percent of the mothers/caregivers of children who were born between May 1, 2016 and April 30, 2017 vs. 10.1 percent (mothers/caregivers of children who were born between May 1, 2016 and April 30, 2017). Among the other major causes, mothers/caregivers didn't know that the child should be given vaccine (9.1 percent (mothers/caregivers of children who were born between May 1, 2017 and April 30, 2018 vs. 8.9 percent (mothers/caregivers of children born between May 1, 2016 and April 30, 2017), mothers/caregivers didn't know when to go for vaccine of MR (5.2 percent of the mothers of younger cohorts vs. 5.3 percent mothers/caregivers of the older cohort), the child was sick, so the vaccinator didn't give vaccine (4.4 percent mothers/caregivers with 12-23 months old children vs. 4.6 percent (mothers/caregivers with 24-35 months old children).

Table 14: Reasons for Partial Vaccination between Two Cohorts by National, Rural and Urban Areas in 2019

Reasons[5]	National	Urban	Rural	Reasons[6]	National	Urban	Rural
Was busy and so couldn't give vaccine	16.5	15.3	16.9	Was busy and so couldn't give vaccine	24.1	20.9	25.3
The child was sick	13.7	16.0	12.7	Don't remember	13.6	15.8	12.8
Don't remember	12.8	12.2	13.1	The child was sick	12.8	14.2	12.3
Fearing side effects	9.7	6.8	10.9	Didn't know about subsequesnt dose	8.9	5.8	10.0
Didn't know about subsequesnt dose	9.1	4.8	10.8	There was no vaccine in the center	5.8	5.4	6.0
Didn't know when to go for vaccine of MR	5.2	7.7	4.2	Didn't know when to go for vaccine of MR	5.3	3.7	5.9
The child was sick, so vaccinator didn't give	4.4	3.4	4.8	The child was sick, so t vaccinator didn't give	4.6	7.4	3.7
Will give vaccine in future	3.9	5.5	3.2	Fearing side effects	3.6	5.0	3.1
The session time was inconvenient	3.7	5.0	3.2	Didn't know when to go for 2nd/3rd dose	3.5	3.4	3.6
Didn't know when to go for 2nd/3rd dose	3.7	3.5	3.8	Faced problem after vaccination	3.3	1.7	3.9
There was no vaccine in the center	1.6	1.3	1.8	Will give vaccine in future	2.4	1.9	2.5
Was not at home	1.6	0.9	1.9	The session time was inconvenient	2.1	3.5	1.7
I thought the vaccinator would come home	1.6	1.7	1.5	Mother was sick	1.5	2.0	1.4
Vaccinator was not friendly	1.6	0.3	2.1	Was not at home	1.5	0.6	1.9
Due to migration	1.6	5.6	0.0	I thought the vaccinator would come home	1.4	0.9	1.6
Didn't know where to go for vaccine	1.5	3.9	0.6	There was no vaccinator in the center	1.2	2.2	0.8
Mother was sick	1.5	1.1	1.6	Vaccine centre was too far	0.9	0.5	1.0
Don't know	1.3	1.2	1.3	Don't believe in vaccination	0.8	1.4	0.6
Vaccine centre was too far	1.3	0.0	1.8	Didn't know where to go for vaccine	0.6	1.2	0.4
There was no vaccinator in the center	0.8	0.1	1.1	Injection was too painful for the child	0.4	0.5	0.4
Injection was too painful for the child	0.7	0.7	0.8	Vaccinator was not friendly	0.3	0.5	0.2
Faced problem after vaccination	0.7	0.6	0.7	They charge money to take vaccine	0.3	1.0	0.0
They charge money to take vaccine	0.6	1.4	0.3	There was a long queue in the vaccination	0.3	0.1	0.3
Others	0.4	0.3	0.5	Due to abscess	0.2	0.1	0.2
There was a long queue in the vaccination	0.2	0.0	0.3	Did not have vaccination card	0.1	0.2	0.1
Health worker did not give	0.1	0.4	0.0	Health worker did not give	0.1	0.1	0.0
Did not have vaccination card	0.1	0.0	0.1	Others	0.1	0.1	0.0
				Due to migration	0.1	0.1	0.0

[5] Children who born between May 2017 and April 30, 2018
[6] Children who born between May 2016 and April 30, 2017

4.15 KNOWLEDGE ABOUT THE COMMON SIDE-EFFECTS OF VACCINATION

CES 2019 assessed the knowledge of mothers/caregivers regarding the minor side-effects of vaccination. Overall, fever was the most reported known side-effect. Nationwide, 89.3 percent of the mothers/caregivers – 86.5 percent in the urban and 90.0 percent in the rural areas reported it (see Figure 92a). Among the rural divisions, more than 90.0 percent of the mothers/caregivers from Rangpur, Khulna, Mymensingh, and Barishal divisions reported fever as a side-effect (see Figure 92b). Similarly, except in NCC, RCC, CCC, and CumCC more than 80.0 percent of the mothers/caregivers reported fever (see Figure 92c) in this regard.

Figure 92a: Knowledge of Mothers about Common Side Effects by National, Rural and Urban Areas

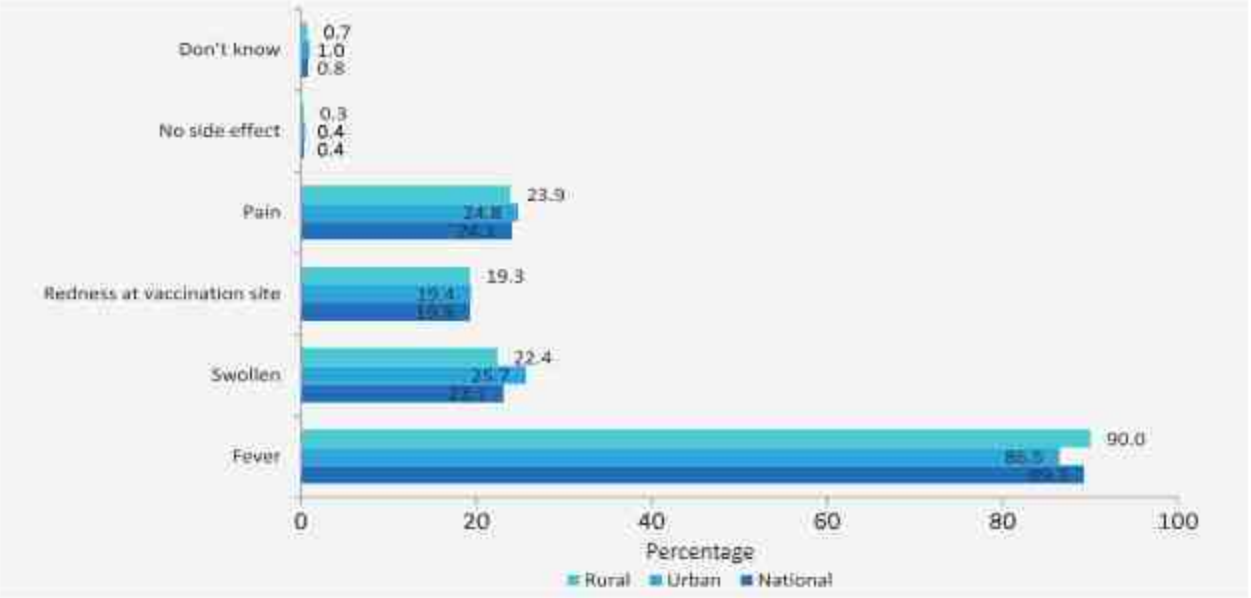


Figure 92b: Knowledge of Mothers about Common Side Effects in Rural Areas by Division

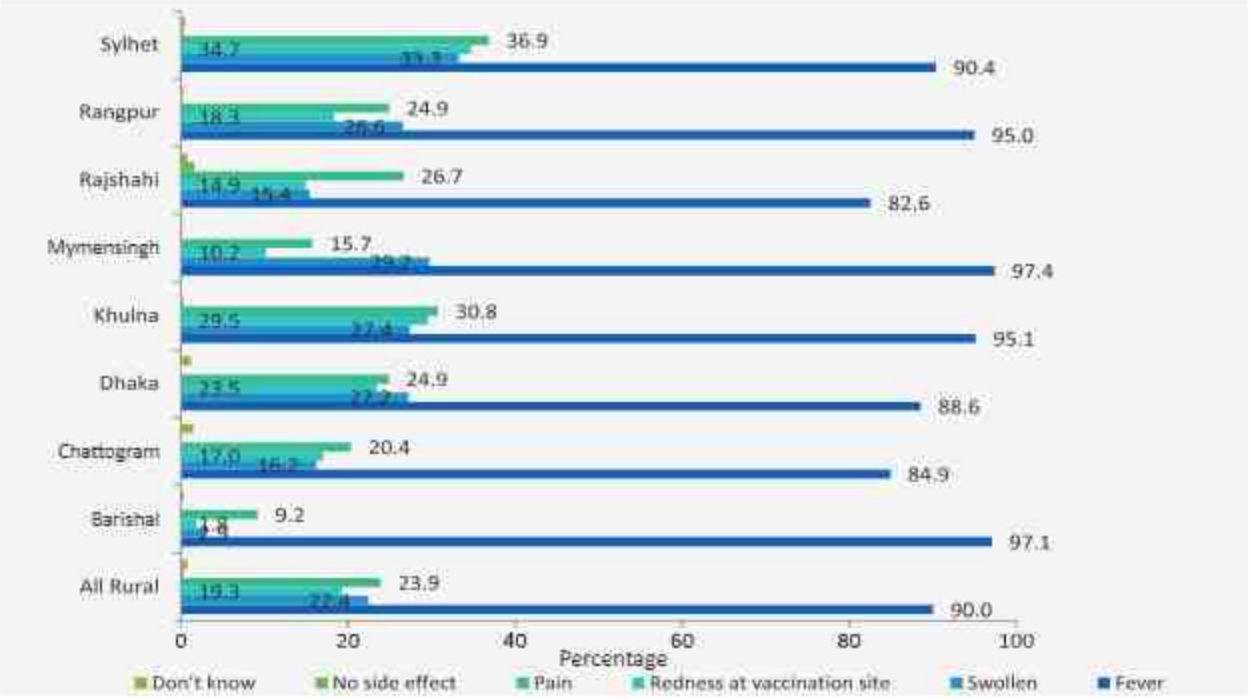
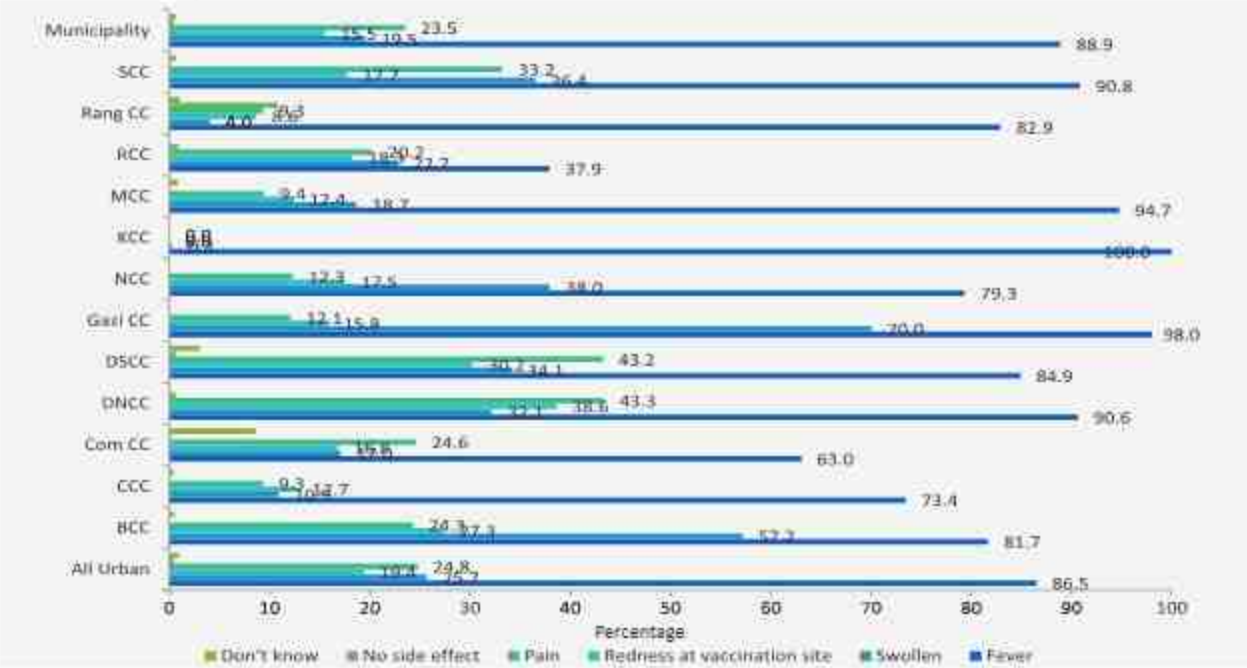


Figure 92c: Knowledge of Mothers about Common Side Effects in Urban Areas by City Corporations



4.16 KNOWLEDGE ABOUT THE NUMBER OF VISITS REQUIRED FOR COMPLETE VACCINATION

As a mother/caregiver should make five visits to a vaccination center to complete all the scheduled vaccines of her/ his children, CES 2019 appraised the knowledge of mothers/caregivers about the minimum number of visits required. Figure 92d shows that a little over half of the mothers/caregivers (52.0 percent) reported 5 visits. Urban-rural differentiation was 5.1 percentage points (47.9 percent in the urban and 53.0 percent in the rural areas). Among the rural divisions, knowledge about the five visits was found to be the highest in Sylhet division (67.7 percent) and the lowest in Rangpur division (42.5 percent) (see Figure 92e). Across the city corporations, knowledge of the five required visits varied widely – from 75.0 percent to 22.1 percent (see Figure 92f).

Figure 92d: Proportion of Mothers/Cariegivers having Knowledge about Number of Visits Required to Complete all theVaccine by National, Rural and Urban Areas in 2019

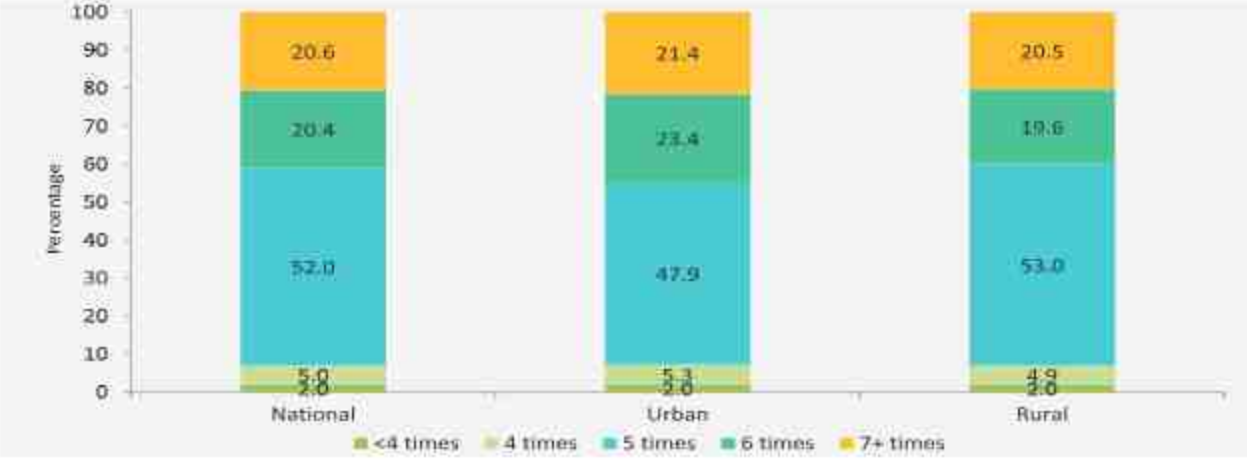


Figure 92e: Proportion of Mothers/Cariegivers having Knowledge about Number of Visits Required to Complete all theVaccine in Rural areas by Division in 2019

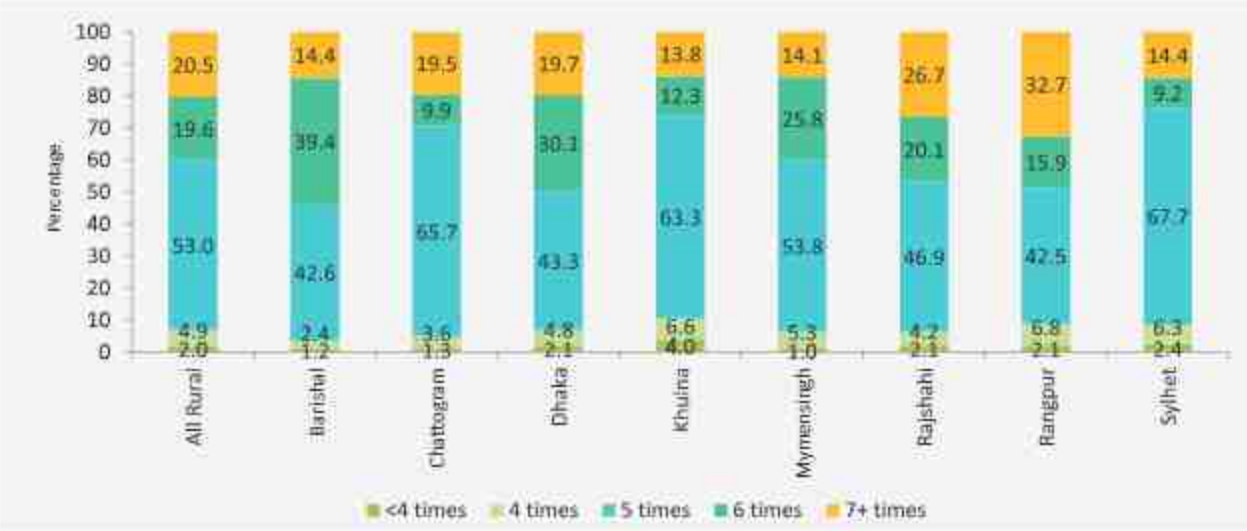
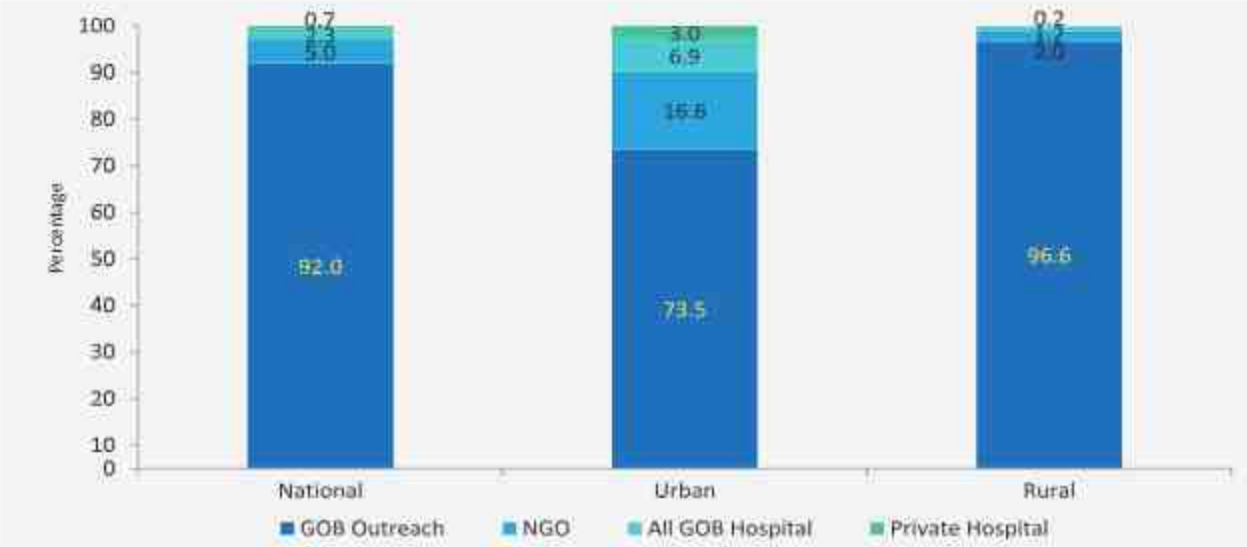


Figure 92f: Proportion of Mothers/Cariegivers having Knowledge about Number of Visits Required to Complete all the Vaccine in Urban Areas by City Corporations in 2019

4.17 SOURCES OF CHILDHOOD VACCINATION

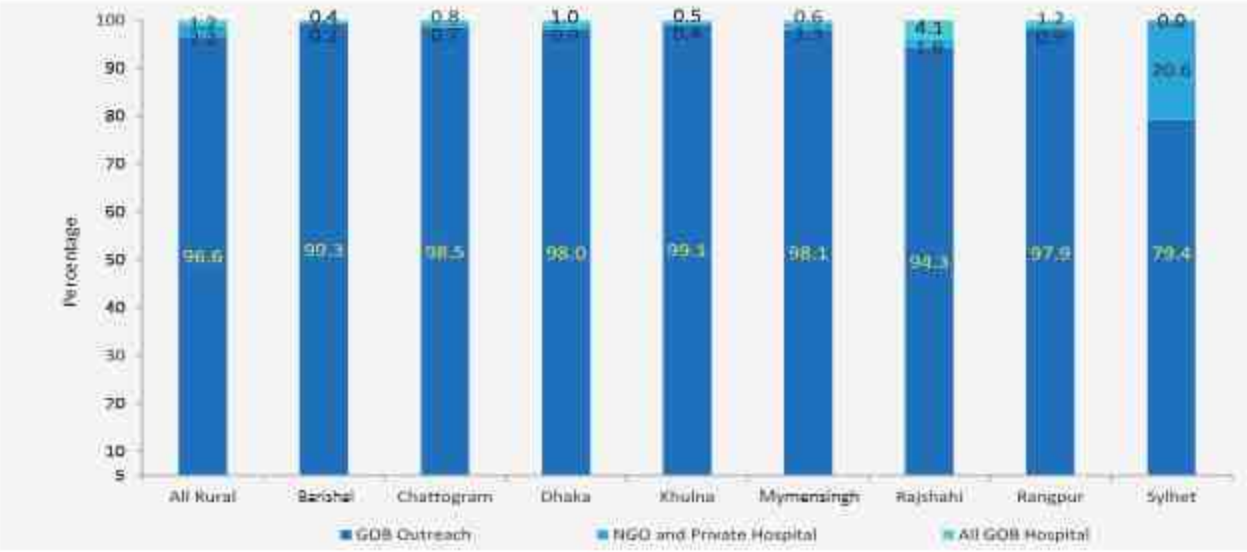
Children can receive vaccination from a number of sources: GoB outreach centers or hospitals, NGO hospitals /clinics or outreach centers, private hospitals, and/or clinics. These options for sources of Penta1 vaccine are presented in Figures 92g-92i. Overall, 92.0 percent of the children received Penta1 vaccine from the GoB outreach centers, 96.6 percent cases in the rural areas and 73.5 percent cases in the urban areas. Nationwide, the other sources include GoB hospitals (2.3 percent) and NGOs and/or private hospitals (5.7 percent) (see Figure 92g).

Figure 92g: Source of Vaccination by National, Rural and Urban Areas in 2019



By rural division, the highest proportion of vaccine recipients who received Penta1 from GoB outreach centers ranged from 99.3 percent in Barishal division to 79.4 percent in Sylhet division. In the rural divisions, private and NGO hospitals and clinics were the sources of Penta1 vaccine in 2.2 percent of cases (see Figure 92h).

Figure 92h: Source of Penta1 Vsccination in Rural Areas by Division in 2019



In city corporations, government facilities were again the prime source of Penta1 vaccination, except in DNCC, DSCC and KCC where majority of the mothers/caregivers reported about vaccination either in the NGOs, or private clinics. In other city corporations, this proportion varied between 18.3 percent and 2.5 percent (see Figure 92i).

Figure 92i: Source of Penta1 Vaccination in Urban Areas by City Corportion and Municipality in 2019

CHAPTER 5

TT VACCINATION COVERAGE AMONG MOTHERS WITH CHILDREN AGED 0-11 MONTHS

TT VACCINATION COVERAGE AMONG MOTHERS WITH CHILDREN AGED 0-11 MONTHS

Neonatal Tetanus (NT) is one of the major public health problems in the countries with low immunization coverage and unclean deliveries. Statistical data in this regard indicate that in Bangladesh almost two-thirds of the deliveries are being conducted at homes with poor hygienic condition, thus infecting mothers and their newborns with life threatening bacteria, called "Clostridium Tetani". In this context, Bangladesh has achieved a lot as the country has validated the Neonatal Tetanus (NT) elimination status in 2008. EPI is playing a vital role in achieving this NT validation status through providing 5 doses of TT vaccines among the women of child bearing age (15-49 years). EPI has made a lot of effort for the sustainable increase in TT5 vaccination coverage among the target groups with strong partnership with WHO and UNICEF. CES 2019 has captured the information and estimated the coverage among the newborns who were protected at birth (PAB) against NT. This chapter provides all the information in this aspect, which includes TT vaccination coverage among the mothers having children aged 0-11 months, programme quality, vaccination card retention rate, invalid doses, and the PAB among the newborns.

5.1 OBJECTIVES OF TT SURVEY

The following survey objectives were set under the TT coverage survey among the mothers having 0-11-month-old children:

- To estimate TT vaccination coverage
- To estimate TT card retention
- To estimate the incidence of invalid TT doses
- To know the sources of TT vaccination
- To estimate the proportion of the newborn babies who were protected at birth against Neonatal Tetanus
- To estimate post-partum Vitamin A coverage among the mothers having 0-11-month-old children

5.2 SELECTION OF SAMPLES

In this survey component, mothers who delivered children between 01-01-2018 and 31-12-2018 were the target group. The aforementioned samples were selected from the same clusters where the samples for other survey components in CES 2019 were selected. First, a list was made after identifying households with mothers who delivered children between 01-01-2018 and 31-12-2018 while visiting every household of the selected cluster. After that, a sampling frame was constructed with inclusion of all the eligible households from the list. From all the eligible households, five households were randomly selected for interviews to gather the required information through the survey tool, which, in this case, was a questionnaire.

5.3 TT VACCINATION

With an aim to achieve maternal and Neonatal Tetanus elimination objective, the Government of Bangladesh (GoB) has provided TT vaccination services through Expanded Programme on Immunization (EPI) under the Directorate General of Health Services (DGHS) since 1979. The vaccine is given to the woman of child-bearing age (15-49 years) for protecting her from Tetanus during her whole reproductive period and also her newborn baby from Neonatal Tetanus. A woman needs to have 5 TT doses to provide protection through her whole reproductive period which should be administered by following the TT

vaccination schedule as recommended by WHO: TT1- the first dose- as soon as she reaches the age of 15 years; TT2 - four weeks after TT1 is given; TT3- six months after TT2; TT4 - one year after TT3; and, TT5 - one year after TT4. As only one TT dose does not offer any protection, TT2 must be administered after TT1, thus providing a woman of reproductive age protection for a period of three years that begins after the administration of TT2. With the TT3 dose, the protection period is for five years after the administration of TT3, and with TT4 for 10 years after the administration of TT4. With TT5, the woman is protected for the rest of her reproductive period. Table 15 below shows the EPI-recommended TT vaccination schedule in Bangladesh.

Table 15: TT Vaccination Schedule

TT Doses	Minimum Interval between Doses	Years Protected
TT1	At 15 years age	No protection
TT2	4 weeks after TT1	3 years after the administration of TT2
TT3	6 months after TT2	5 years after the administration of TT3
TT4	1 year after TT3	10 years after the administration of TT4
TT5	1 year after TT4	Reproductive period

5.4 TT VACCINATION COVERAGE (CARD + HISTORY)

Like the childhood vaccination coverage, TT vaccination coverage was assessed as being crude and valid. Valid TT coverage was assessed in terms of the valid doses that a woman received. And, crude TT coverage was assessed in terms of all TT doses - both valid and invalid - that a woman received. A TT dose administered before the recommended interval was considered to be invalid. Thus, a TT3 dose given earlier than the recommended 6-month interval after a valid TT2 was enumerated as an invalid TT3 dose. The information of TT vaccination was obtained from a woman's TT card (if available). If it was not available, information was collected from the woman's vaccination history reported by her.

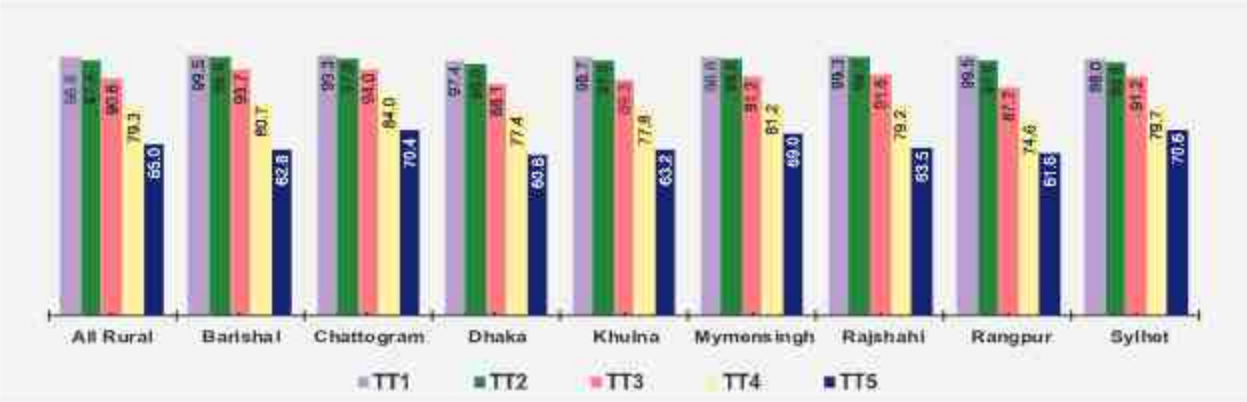
5.4.1 Levels of the Crude TT Vaccination Coverage

The distribution of crude TT vaccination coverage is presented in Figure 93 and Map 13. It shows that TT1 and TT2 vaccination coverage were 98.6 percent and 97.2 percent respectively. Both TT1 and TT2 coverage were slightly higher among the rural mothers than among their urban counterparts. However, TT3, TT4, and TT5 coverages were lower than the initial two doses across the country. The nationwide coverages of TT3, TT4, and TT5 were 89.8 percent, 78.3 percent, and 64.2 percent respectively. The coverages were a bit higher among the rural inhabitants than among their urban counterparts as 3-4 percentage points difference was observed in TT3, TT4, and TT5 coverage between the rural and the urban areas.

Figure 93: Crude TT Vaccination Coverage among Mothers of 0-11 Months Old Children by National, Rural and Urban Areas in 2019 (Card+History)

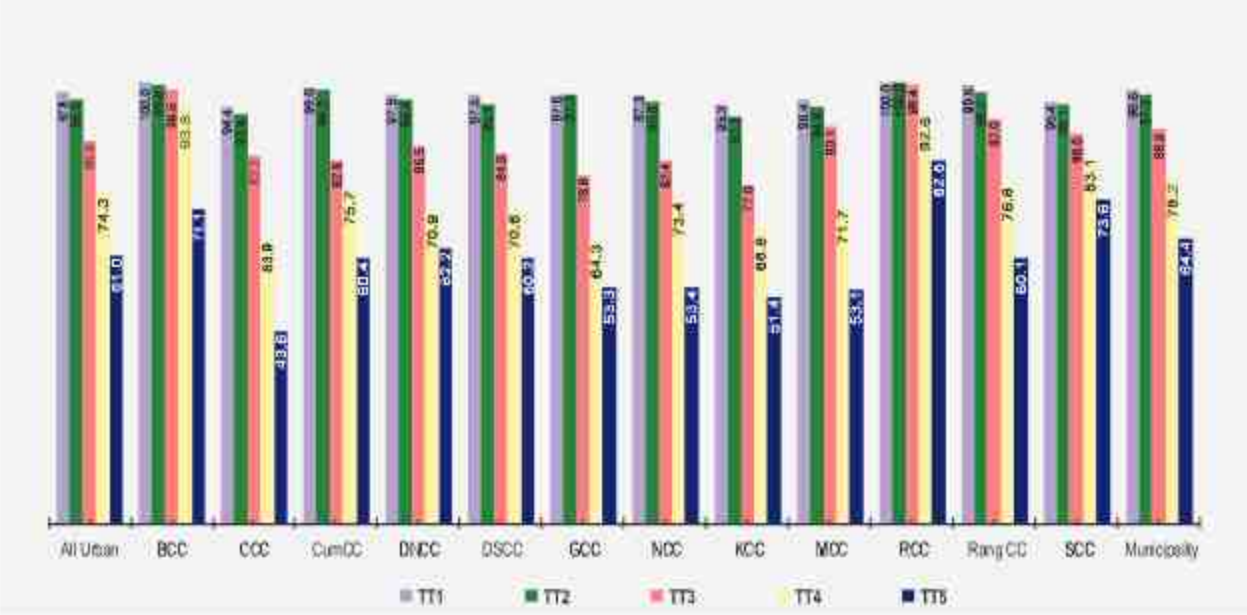
Among all the divisions, crude TT1 and TT2 coverages were at or above 96.0 percent. However, crude TT3 coverage was the highest in Chattogram (94.0 percent) and the lowest in Rangpur divisions (87.2 percent), which was considerably less than the highest one. By TT4 coverage, the gap between the highest- 84.0 percent in Chattogram- and the lowest- 74.6 percent in Rangpur- had almost ten percentage points difference; coverage gap was also much wider by TT5, ranging from 70.6 percent in Sylhet to 60.8 percent in Dhaka (see Figure 94).

Figure 94: Crude TT Vaccination Coverage among Mothers of 0-11 Months Old Children In Rural Areas by Division in 2019 (Card+History)



Across the city corporations, crude TT1 and TT2 coverages were at or above 92.3 percent for all, where both TT1 and TT2 coverage were universal in RCC and the lowest TT1 coverage in CCC (94.4 percent); in the case of TT2 it was in KCC (92.3 percent). Regarding TT3 coverage, it needs to be mentioned that the gap was more than 22 percentage points from the highest- RCC (99.4 percent)- to the lowest- KCC (77.0 percent). By TT4 coverage, the gap had widened substantially, with the highest in RCC (92.6 percent) and the lowest in CCC (63.9 percent). Regarding crude TT5, it is to be reported that women of RCC also had the highest coverage (82.5 percent). In most of the other city corporations, the rates ranged between 73.6 percent and 43.6 percent (see Figure 95).

Figure 95: Crude TT Vaccination Coverage among Mothers of 0-11 Months Old Children In Urban Areas by City Corporation in 2019 (Card+History)



5.4.2 Levels of Valid TT Vaccination Coverage

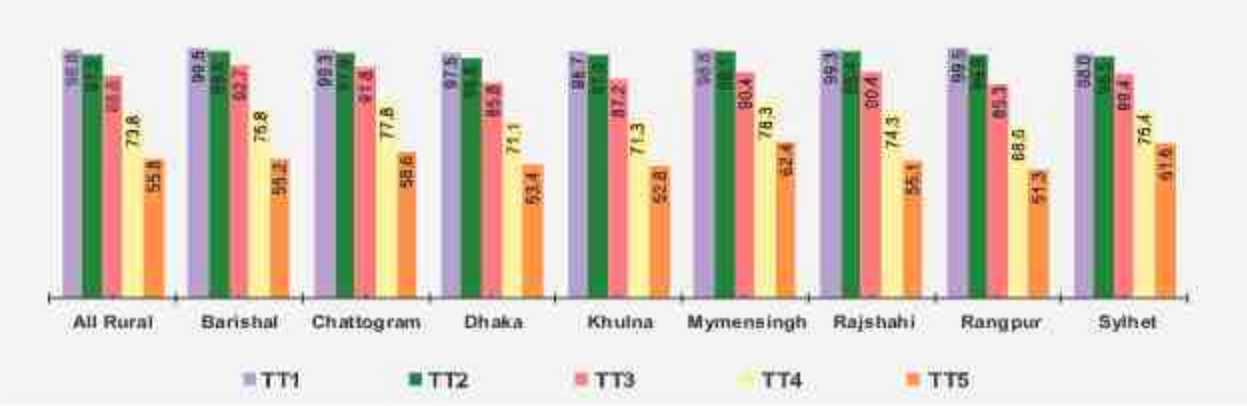
Valid TT dose is defined a situation when a woman received TT vaccines by following the EPI-recommended TT vaccination schedule. Nationwide, valid TT2 vaccination coverage was 97.1 percent. However, valid coverage rate was found to drop down to 87.7 percent regarding TT3, 73.0 percent regarding TT4, and 54.9 percent regarding TT5. The urban-rural analysis shows that valid doses of TT2 to TT5 coverage were higher among the rural women than those living in the urban areas (see Figure 96).

Figure 96: Valid TT Vaccination Coverage among Mothers of 0-11 Months Old Children by National, Rural and Urban Areas in 2019 (Card+History)

Among the all rural divisions, more than 96.0 percent of the women received two doses of valid TT vaccines in all the divisions except in Dhaka division. Valid TT2 coverage was the highest in Barishal (98.5 percent) while regarding TT3 it was also the highest in Barishal (92.7 percent). The lowest coverage of TT2 was observed in Dhaka division (95.8 percent). As regards valid TT3, the rate ranged between 85.3 percent

and 91.8 percent in other divisions. In the case of TT4, the highest rate was observed in Mymensingh with 78.3 percent while the lowest rate in Rangpur division with 68.6 percent. In the case of TT5, the highest coverage rate was found in Mymensingh with 62.4 percent while the lowest in Rangpur with 51.3 percent. Through the findings, it was indicated that at least half of the mothers in all the divisions were protected against Tetanus throughout their reproductive life (see Figure 97) as five doses of valid TT vaccine gives protection to a woman against Tetanus throughout her reproductive life.

Figure 97: Valid TT Vaccination Coverage among Mothers of 0-11 Months Old Children In Rural Areas by Division in 2019 (Card+History)



By city corporation, 92.3 percent or more women in all the city corporations received valid TT2 vaccine. However, there was a significant divergence in the case of valid TT3 coverage, with the highest rate in RCC (99.4 percent) and the lowest in GCC (69.9 percent). It ranged between 75.6 percent and 98.8 percent in other CCs. In terms of valid TT4, it was found to be the highest in RCC (92.6 percent) and the lowest in GCC (57.3 percent). By valid TT5 coverage, the spread between the highest and the lowest was substantial, with RCC at 75.2 percent and CCC at 36.1 percent (see Figure 98).

Figure 98: Valid TT Vaccination Coverage among Mothers of 0-11 Months Old Children in Urban Areas by City Corporation in 2019 (Card+History)

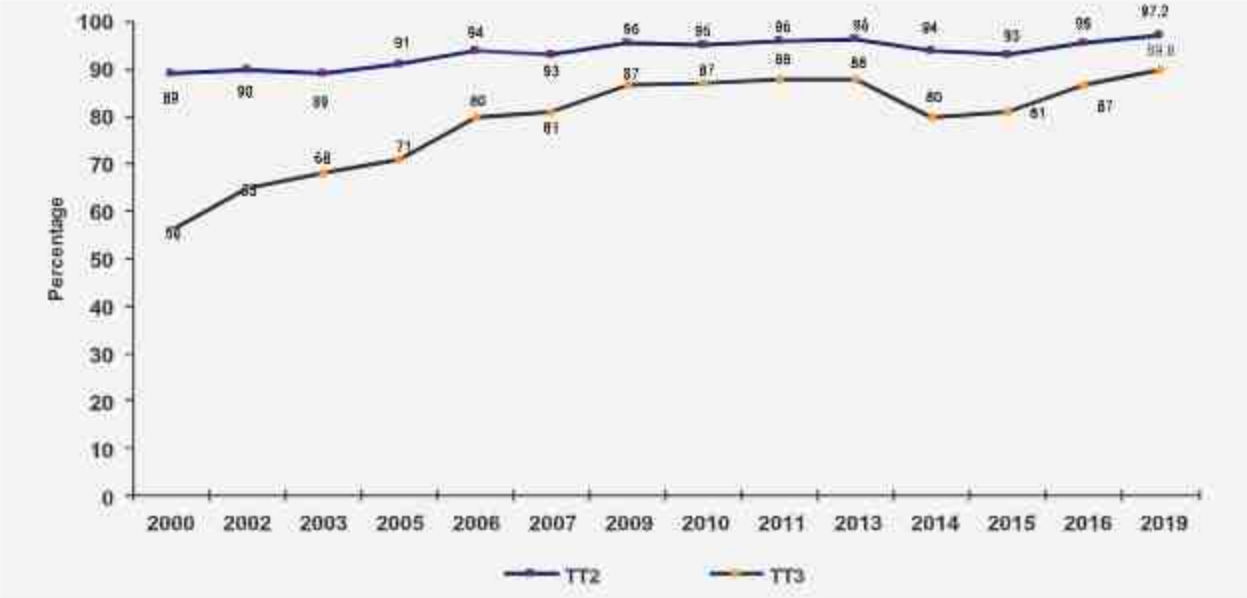
Map 13: Crude TT5 Vaccination Among Mothers with 0-11 Months Old Children by District

Map 14: Valid TT2 Vaccination Coverage Among Mothers with 0-11 Months Old Children by District

5.5 TRENDS IN THE CRUDE TT2 AND TT3 COVERAGE

Figure 99 shows the nationwide trend in crude TT2 and TT3 vaccination coverages from 2000 to 2019. It indicates that crude TT3 coverage gradually increased from 56.0 percent in 2000 to 89.8 percent in 2019. In contrast, TT2 coverage started higher and increased at a slower pace, with fluctuations since 2003. Between 2003 and 2019, it increased by 8.2 percentage points to 97.2 percent in 2019.

Figure 99: Annual Trend in Crude TT2 and TT3 Vaccination Coverage among Mothers of 0-11 Months Old Children at National Level from 2000 to 2019 (Card+History)



Trends in crude TT2 vaccination coverage by division are presented in Figures 100 to 106. While some divisions, such as Sylhet andChattogram, started at lower levels in 2000 (77.0 percent and 81.0 percent, respectively), all the divisions now reach the coverage levels of 96.3 percent and above with exceptions in Dhaka where it was 95.9 percent. It needs to be mentioned here that TT2 coverage increased in all the divisions from 2016 to 2019, except in Rangpur division where the coverage decreased by 1.0 percentage point. However, in Khulna division the coverage has increased by 5.3 percentage points.

Barishal division's crude TT vaccination coverage was 87.0 percent in 1994. However, there were some fluctuations; and, the highest coverage was at 98.8 in 2013. Afterwards, there was a decrease in the coverages in 2014 (89.5 percent) and 2015 (90.0 percent) which was at 90.0 percent. However, an increasing trend has been observed since 2016; the coverage was 98.3 percent in 2019.

In Chattogram division, crude TT2 coverage increased with frequent fluctuations between 1995 and 2019. The highest coverage was observed in 2013 where it was 99.2 percent. Then the coverage was 94.6 percent in 2015. Further decrease in the coverage was observed to be 93.0 percent in 2016. However, in CES 2019 the coverage increased by 4.4 percentage points at 97.4 percent.

In Dhaka division, crude TT2 coverage fluctuated considerably during the period between 2000 and 2005 and was then almost static from 2006 to 2011, ranging between 95.0 percent and 96.0 percent. After a decrease down to 89.7 percent in 2013, the rate further increased up to 97.6 percent in 2014 and, again, decreased down to 94.5 percent in 2016. With the increase of 1.4 percentage point, the coverage was 95.9 percent in 2019.

In Khulna division, crude TT2 coverage was 86.0 percent in 1993. There were fluctuations in the coverage from year to year although the highest coverage was observed in 2009 with 96.7 percent. In the following years, with some fluctuations the coverage was 91.0 percent in 2016. However, the coverage increased by 5.3 percentage points and reached 96.8 percent in 2019.

Rajshahi division has experienced a steady growth in the coverage in the last decade. Crude TT2 coverage, with some fluctuations, reached 94.0 percent in 2005. However, there were some fluctuations since 2016; the coverage was 96.5 percent in 2016 which rates increased up to 98.9 percent in 2019.

Crude TT2 coverage in Rangpur division was 97.0 percent in 2011 and 99.3 percent in 2013. However, it decreased down to 98.0 percent in 2016 which further decreased down to 97.2 percent in 2019. It is to be noted here that before 2011 Rangpur division was a part of Rajshahi division. Therefore, earlier findings about Rangpur division were presented under Rajshahi division.

In Sylhet division, a fluctuating but upward trend was observed in crude TT2 coverage. Crude TT2 coverage increased from 85.0 percent in 2005 to 92.9 percent in 2015; in 2016, it decreased down to 92.0 percent. However, there was an increase in the coverage by 4.8 percentage points and reached 96.8 percent in 2019.

Figure 100: Crude TT2 Vaccination Coverage among Mothers of 0-11 Months Old Children of Barishal Division from 1994 to 2019 (Card + History)

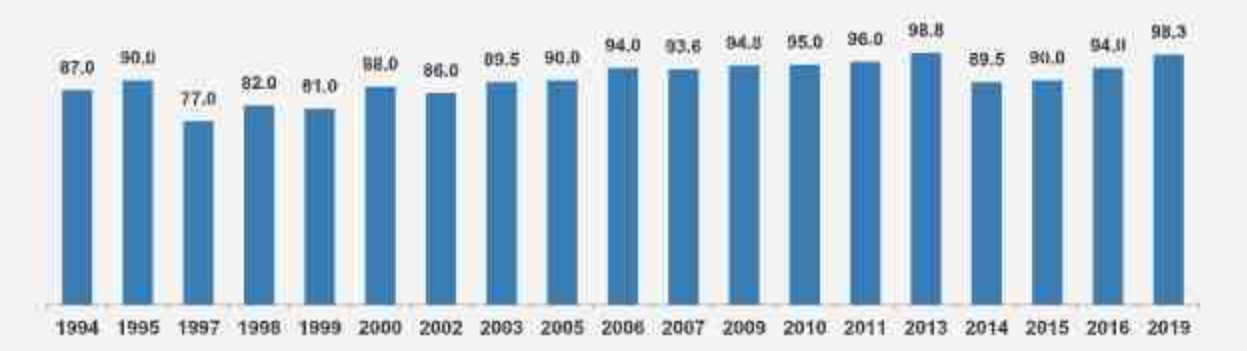


Figure 101: Crude TT2 Vaccination Coverage among Mothers of 0-11 Months Old Children of Chattogram Division from 1993 to 2019 (Card + History)

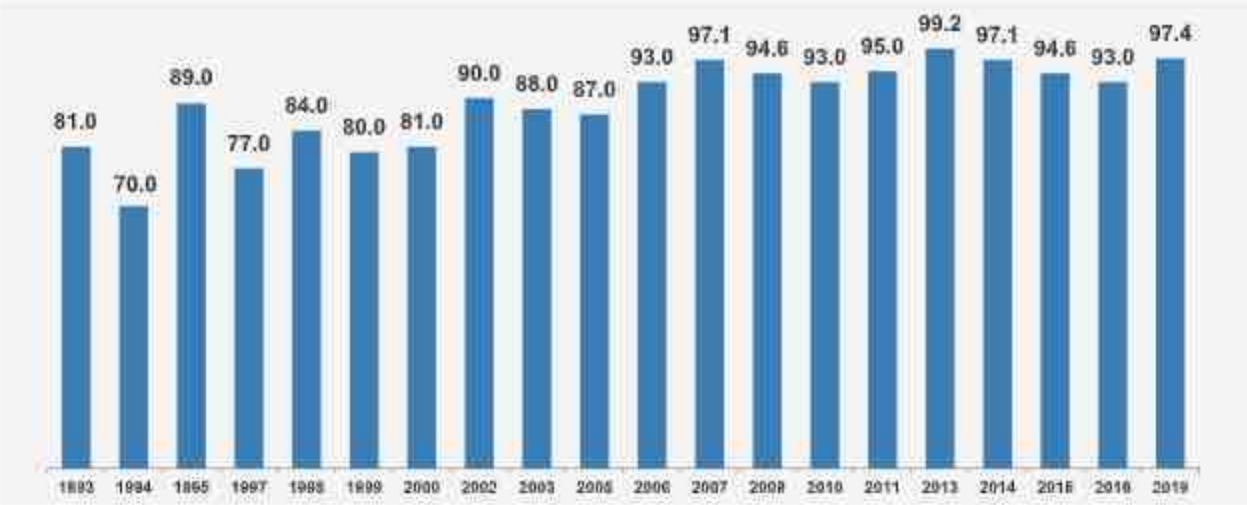


Figure 102: Crude TT2 Vaccination Coverage among Mothers of 0-11 Months Old Children of Dhaka Division from 2000 to 2019 (Card + History)

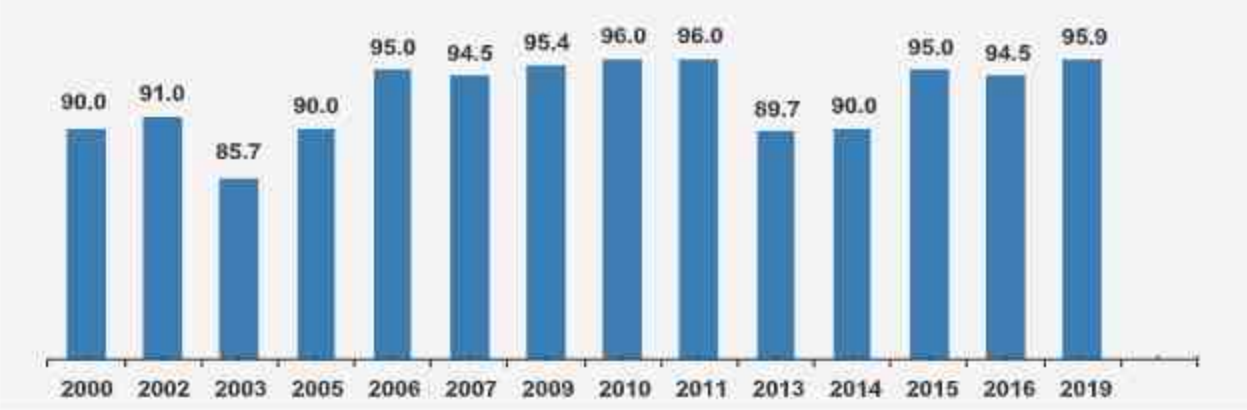


Figure 103: Crude TT2 Vaccination Coverage among Mothers of 0-11 Months Old Children of Khulna Division from 1993 to 2019 (Card + History)

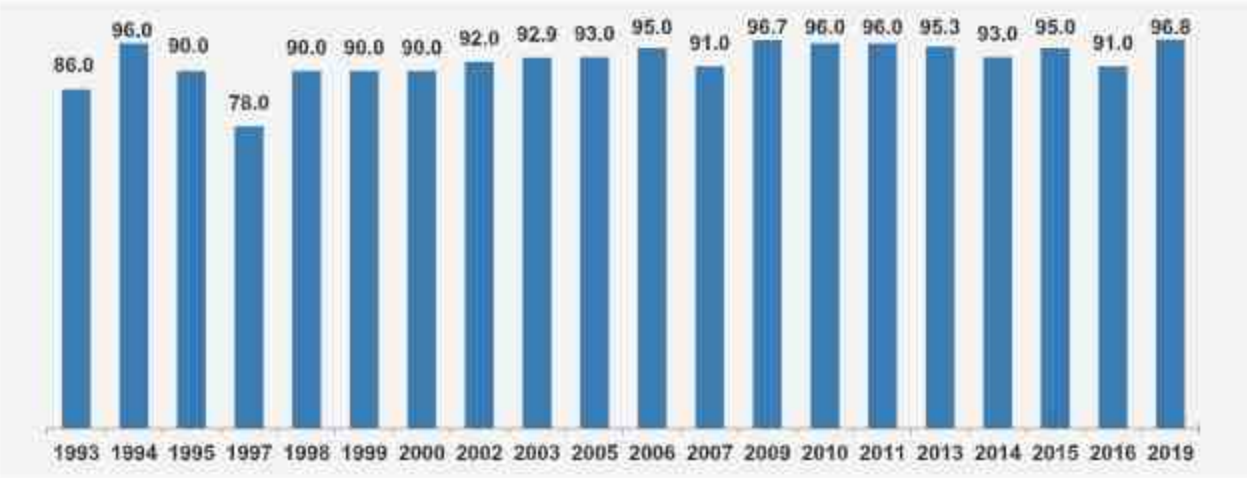


Figure 104: Crude TT2 Vaccination Coverage among Mothers of 0-11 Months Old Children of Rajshahi Division from 1993 to 2019 (Card + History)

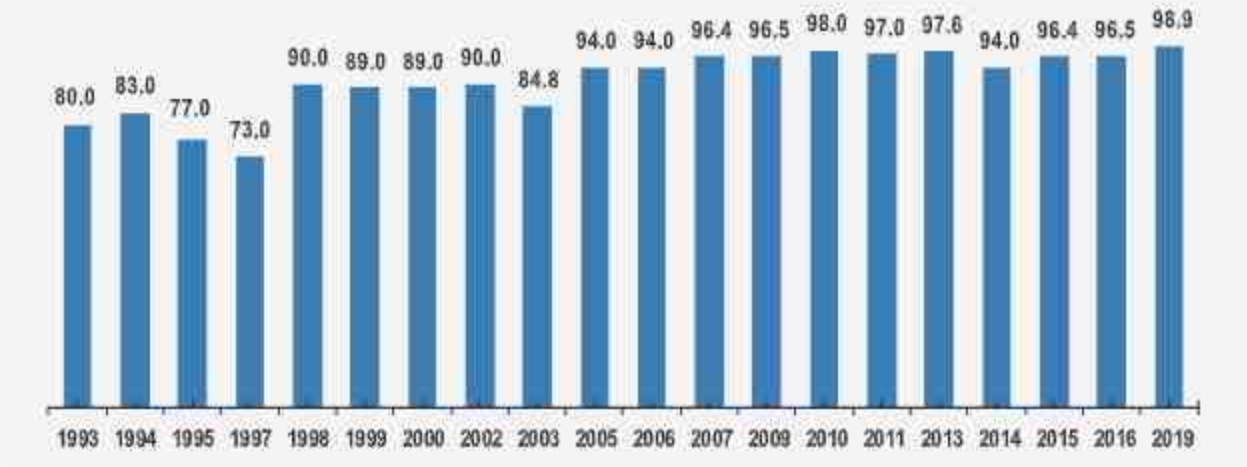


Figure 105: Crude TT2 Vaccination Coverage among Mothers of 0-11 Months Old Children of Rangpur Division from 2011 to 2019 (Card + History)

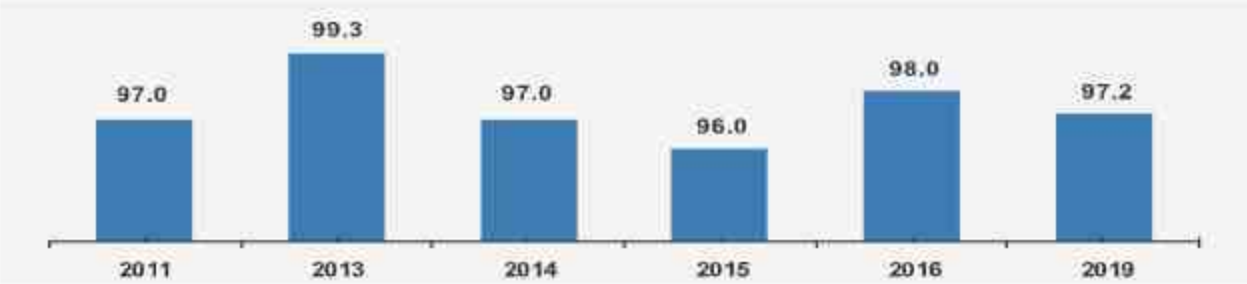
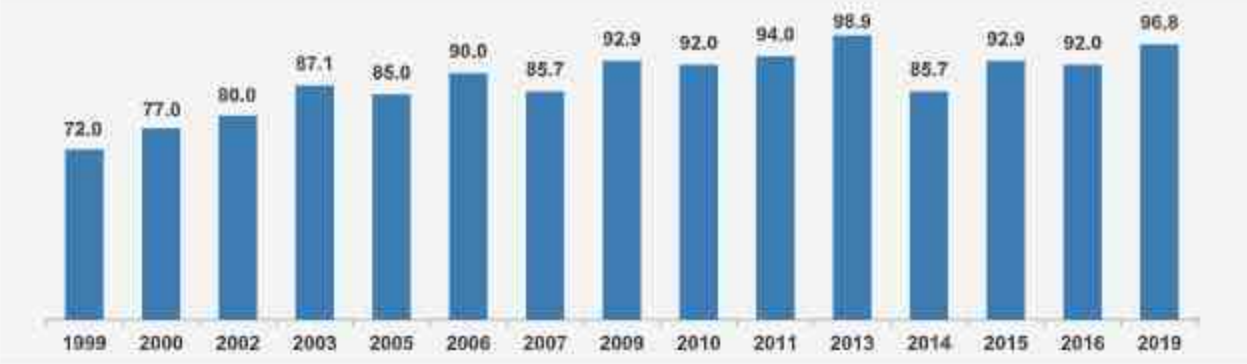


Figure 106: Crude TT2 Vaccination Coverage among Mothers of 0-11 Months Old Children of Sylhet Division from 1999 to 2019 (Card + History)



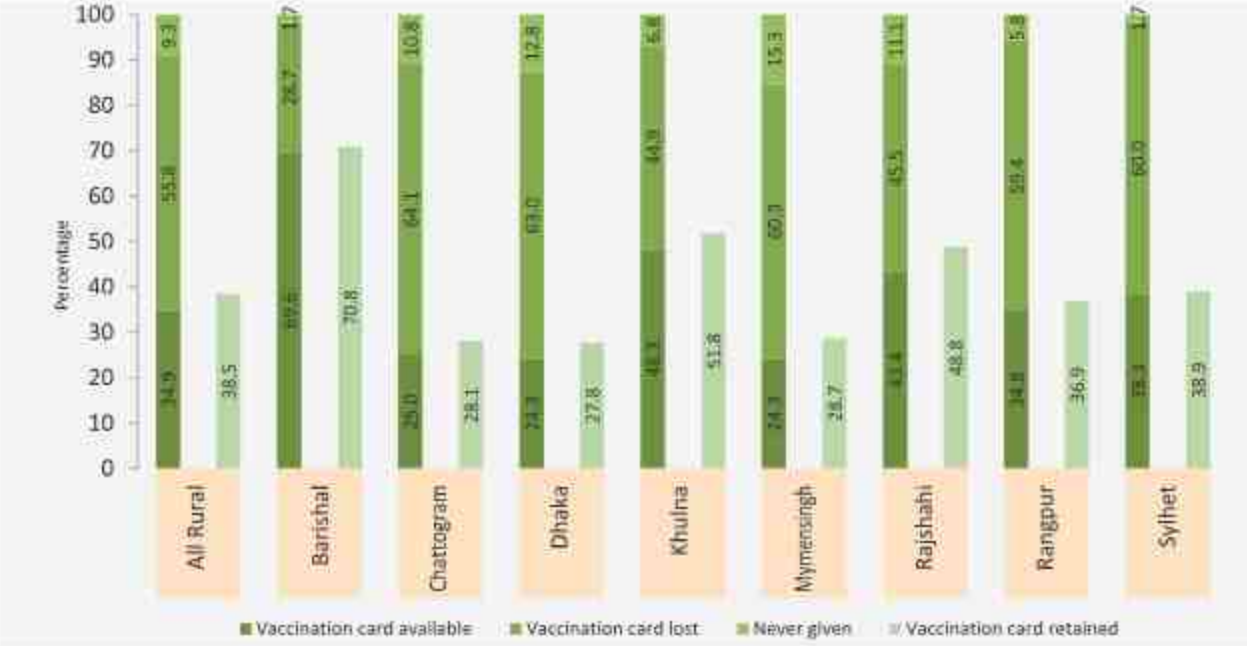
5.6 TT CARD STATUS AMONG MOTHERS

Nationwide, 33.3 percent cards were available during the time of data collection; and 57.8 percent appeared to be lost. In 91.2 percent cases, cards were issued at the time of vaccination. TT vaccination cards were found to be retained (percentage of cards available at the time of the survey against the total number available and lost, but not those never given) in the case of 36.5 percent nationwide (see Figure 107). Rural mothers were more likely to retain TT vaccination cards (38.5 percent), compared to their urban counterparts (28.9 percent).

Figure 107: TT Vaccination Card Status among Mothers of 0-11 Months Old Children by National, Rural and Urban Areas in 2019

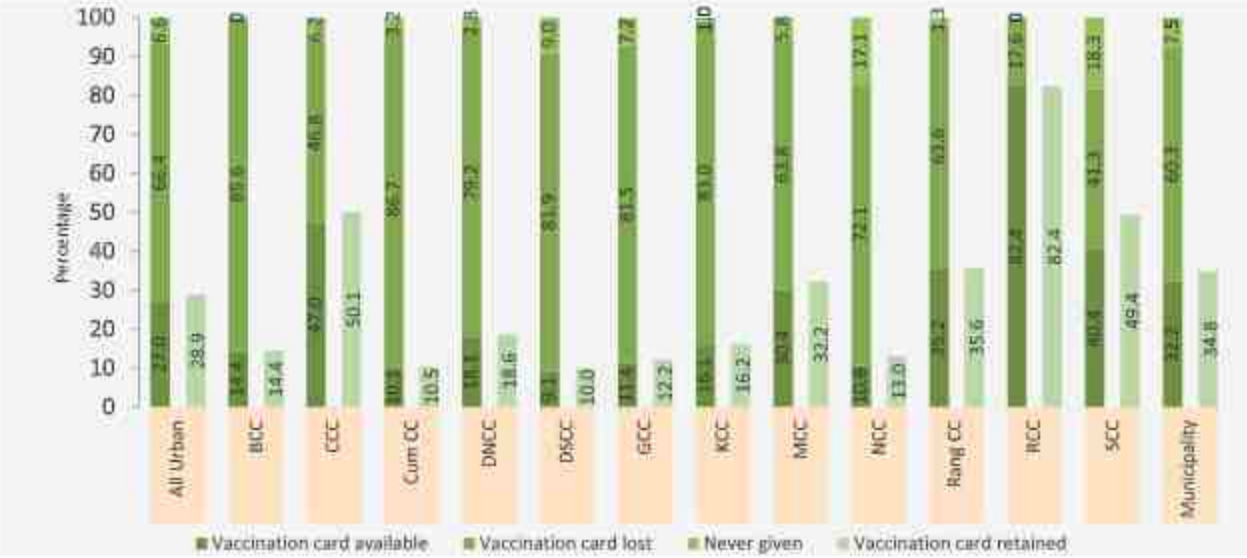
Among the rural divisions, availability of TT vaccination cards during the period of data collection was found to be the highest in Barisal division (69.6 percent) and the lowest in Dhaka and Mymensingh divisions (24.3 percent). The highest proportion of vaccination cards reported to be lost was in Dhaka division (63.0 percent) whereas this rate was the lowest in Barisal division (28.7 percent) (see Figure 108).

Figure 108: TT Vaccination Card Status among Mothers of 0-11 Months Old Children in Rural Areas by Division in 2019



TT vaccination card status by city corporation reports that 82.4 percent cards were found to be retained during the time of data collection by mothers residing in RCC. The lowest percentage of retained cards was in DSCC- 10.0 percent. While the lowest percentage of cards lost was in RCC (17.6 percent), and the highest was in DSCC (81.9 percent). The lowest rate of vaccination cards found to be retained was in DSCC (10.0percent), which was being followed by Cumilla City Corporation (10.5 percent) (see Figure 109).

Figure 109: TT Vaccination Card Status among Mothers of 0-11 Months Old Children in Urban Areas by City Corporation/ Municipality in 2019



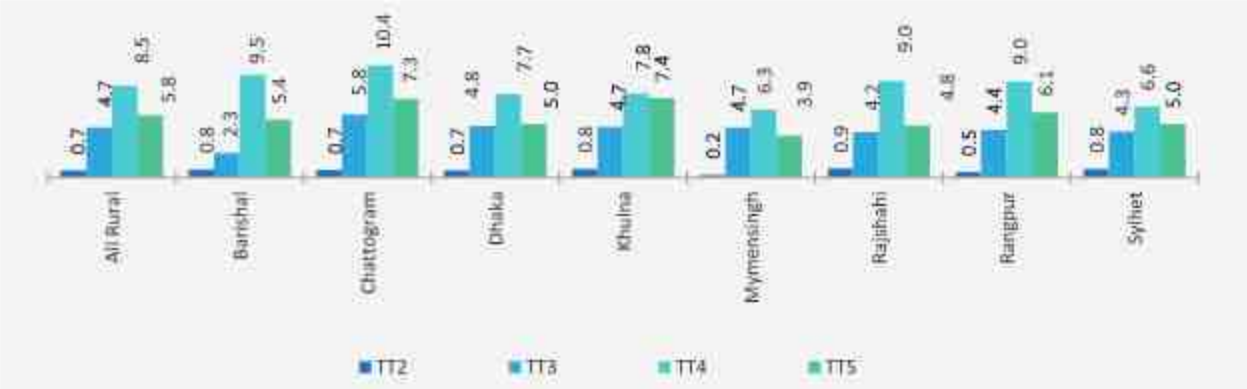
5.7 INCIDENCE OF INVALID DOSES

Nationwide, the incidence of invalid doses was 4.9 percent for TT3, and 8.2 percent for TT4; in the case of TT5 it was 5.8 percent. By residence, incidence of invalid TT3 was slightly higher in the urban areas (5.9 percent) than that in the rural areas (4.7 percent) whereas in the case of TT4, it was higher in the rural areas (8.5 percent) than that in the urban areas (6.7 percent). However, the incidence of invalid doses for TT5 was almost same in the rural and the urban areas (5.9 percent) (see Figure 110).

Figure 110: Incidence of Invalid TT Doses among Mothers of 0-11 Months Old Children by National, Rural and Urban Areas in 2019 (Card+History)

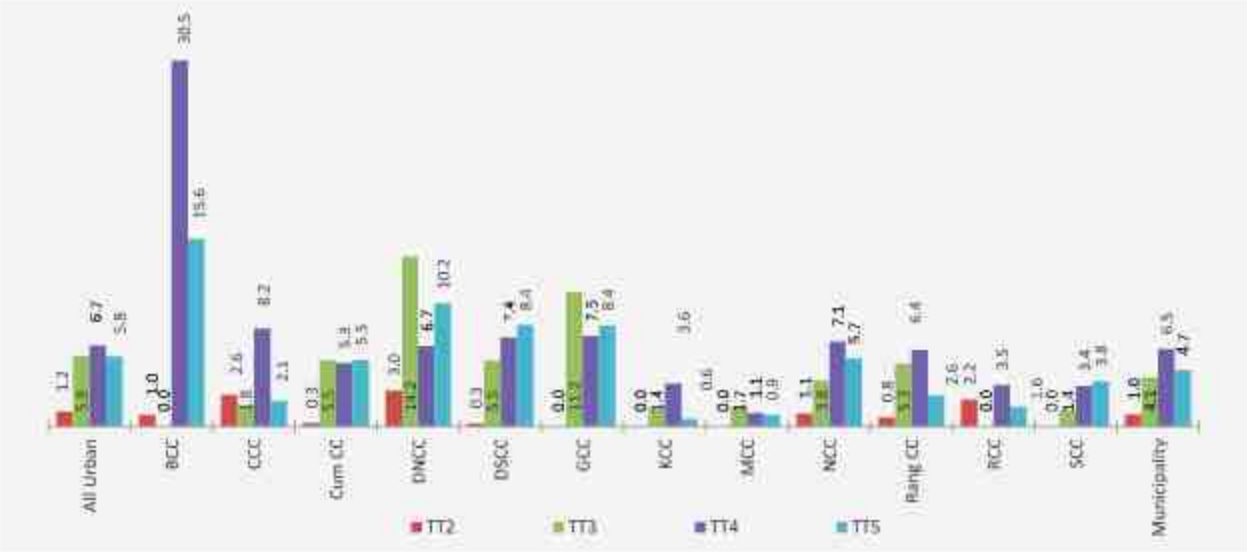
Incidence of invalid TT2 doses was 0.8 percent nationwide, while it was 0.7 percent in the rural areas and 1.3 percent in the urban areas. Among the rural divisions, there were some variations in the invalid doses of TT3, TT4, and TT5. Invalid doses of TT3 ranged between 2.3 percent in Barishal division and 5.8 percent in Chattogram division. Similarly, Incidence of invalid TT4 ranged between 6.3 percent in Mymensingh division and 10.4 percent in Chattogram division. The highest incidence of invalid TT5 was in Khulna (7.4 percent) whereas the lowest in Mymensingh divisions (3.9 percent). Among the other divisions, incidence of invalid TT5 ranged between 4.8 percent in Rajshahi and 7.3 percent in Chattogram division (see Figure 111).

Figure 111: Incidence of Invalid TT Doses among Mothers of 0-11 Months Old Children in Rural Areas by Division in 2019 (Card+History)



Among the city corporations, incidence of invalid TT2 doses was the highest in DNCC (3.0 percent), followed by CCC (2.6 percent), RCC (2.2 percent), NCC (1.1 percent), BCC (1.0 percent), Rang CC (0.8 percent), DSCC and Cum CC (0.3 percent). However, there was no invalid TT2 in GCC, KCC, MCC, and SCC. The highest and the lowest rates of invalid TT3 and TT4 doses varied greatly. For instance, incidence of invalid TT3 dose was the highest in DNCC (14.2 percent) and the lowest in KCC and SCC (1.4 percent), but there was no invalid TT3 in BCC and RCC, while regarding invalid TT4, it was the highest in BCC (30.5 percent) and the lowest in MCC (1.1 percent). However, invalid TT5 was again the highest in BCC (15.6 percent) and the lowest in KCC (0.6 percent). Overall, BCC had the highest incidence of TT4 and TT5 (see Figure 112).

Figure 112: Incidence of Invalid TT Doses among Mothers of 0-11 Months Old Children in Urban Areas by City Corporation/ Municipality in 2019 (Card+History)



5.8 SCREENING TT VACCINATION OF THE MOTHERS

Screening the mothers' TT status is an important means for addressing the missed opportunity of the subsequent TT doses. CES 2019 assessed the screening status by the vaccinators. Findings are presented from Figure 113 to Figure 115. Overall, 57.2 percent of the mothers across the country reported that their TT status was screened. Rural mothers (58.3 percent) were more likely to be screened, compared to those residing in the urban areas (52.7 percent) (see Figure 113).

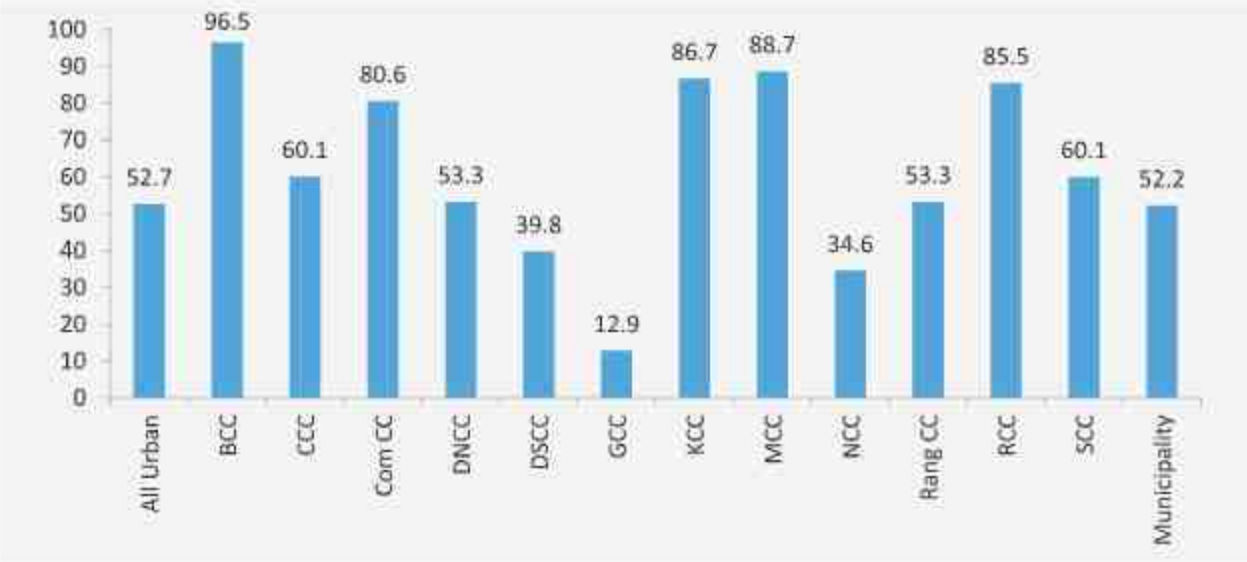
Figure 113: Percentage of Mothers of 0-11 Months Old Children Screened for TT Status during Child's Vaccination by National, Rural and Urban Areas in 2019

By rural division, the highest proportion of mothers who reported that their TT vaccination status was screened by the vaccinators (85.6 percent) was from Dhaka division. The proportion of the screened mothers was the lowest in Sylhet division (38.2 percent). It ranged between 42.7 percent and 76.7 percent in other divisions (see Figure 114).

Figure 114: Percentage of Mothers of 0-11 Months Old Children Screened for TT Status during Child's Vaccination in Rural Areas by Division in 2019

Among the city corporations, the proportion of screened mothers was the highest by far in BCC (96.5 percent), which was being followed by MCC (88.7 percent), KCC (86.7 percent), and, with a steady decline in the other city corporations to the lowest, held by GCC (12.9 percent) (see Figure 115).

Figure 115: Percentage of Mothers of 0-11 Months Old Children Screened for TT Status during Child's Vaccination in Urban Areas by City Corporation/ Municipality in 2019



5.9 CHILDREN'S PROTECTION AT BIRTH (PAB) AGAINST TETANUS

The status of Protection at Birth (PAB) against Tetanus of the surveyed children is presented in Figures 116 to 118. Nationwide, 94.6 percent of the children were protected at their birth against Tetanus, with 2.1 percentage points difference between the rural children and the urban children in this context (96.2 percent urban children were protected whereas it was 94.1 percent in the case of their rural counterparts). Among the divisions (also shown on Map 15) PAB against Tetanus was the highest in Barishal (96.6 percent), which was being followed by Chattogram (95.4 percent). Children living in Khulna division had the lowest protection against Tetanus at birth.

Among the city corporations, PAB status was found to be almost universal in BCC (99.6 percent) and DNCC (99.5 percent). Most of the city corporations obtained 90.8 percent and above, except KCC where it was 85.6 percent (see Figure 118).

Figure 116: Percentage of Newborns Protected at Birth (PAB) against Tetanus by National, Rural and Urban Areas in 2019

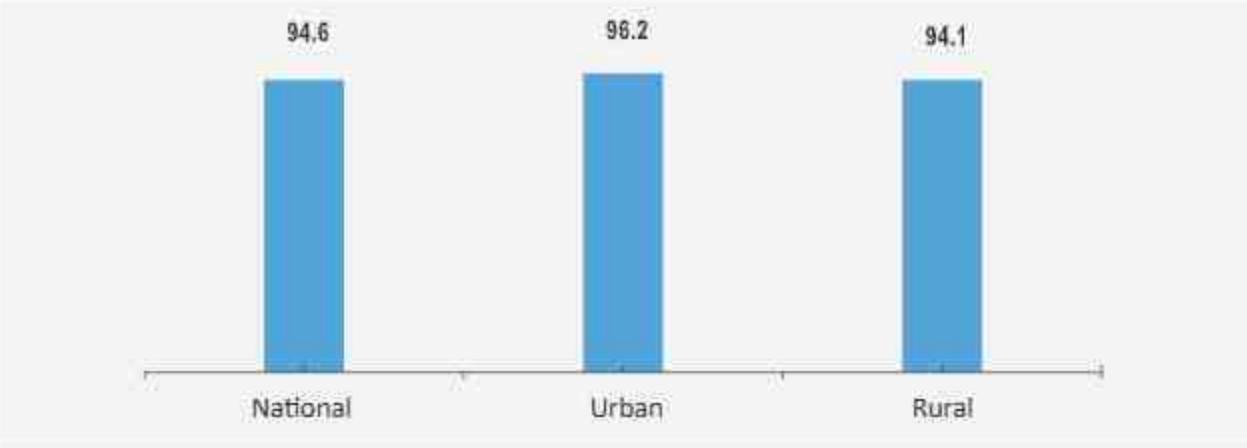


Figure 117: Percentage of Newborns Protected at Birth against Tetanus in Rural Areas by Division in 2019

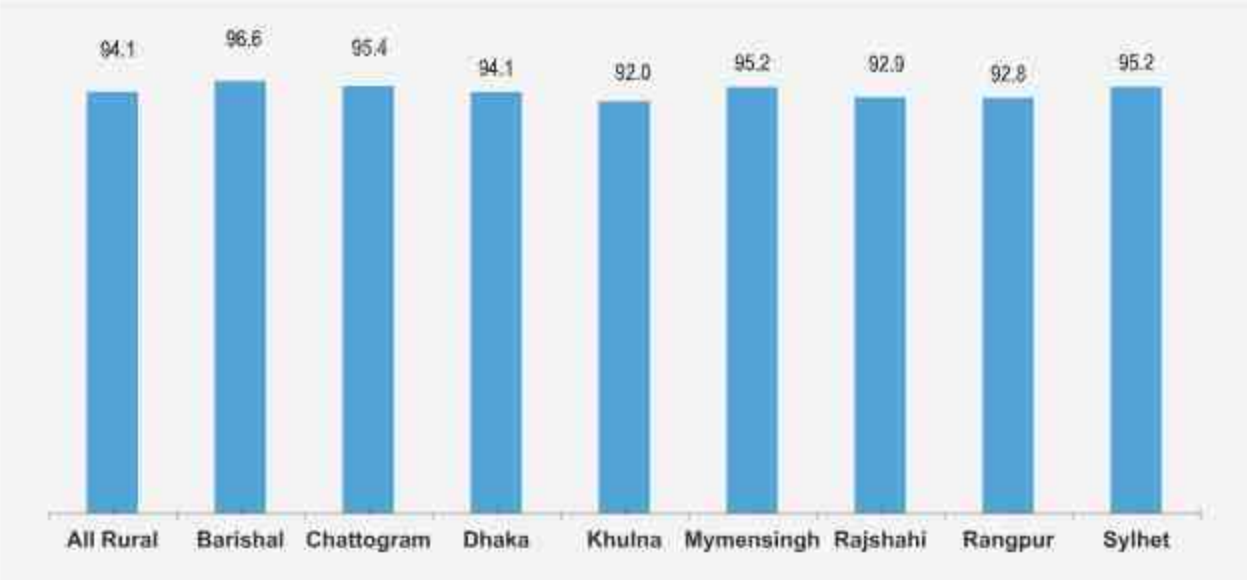
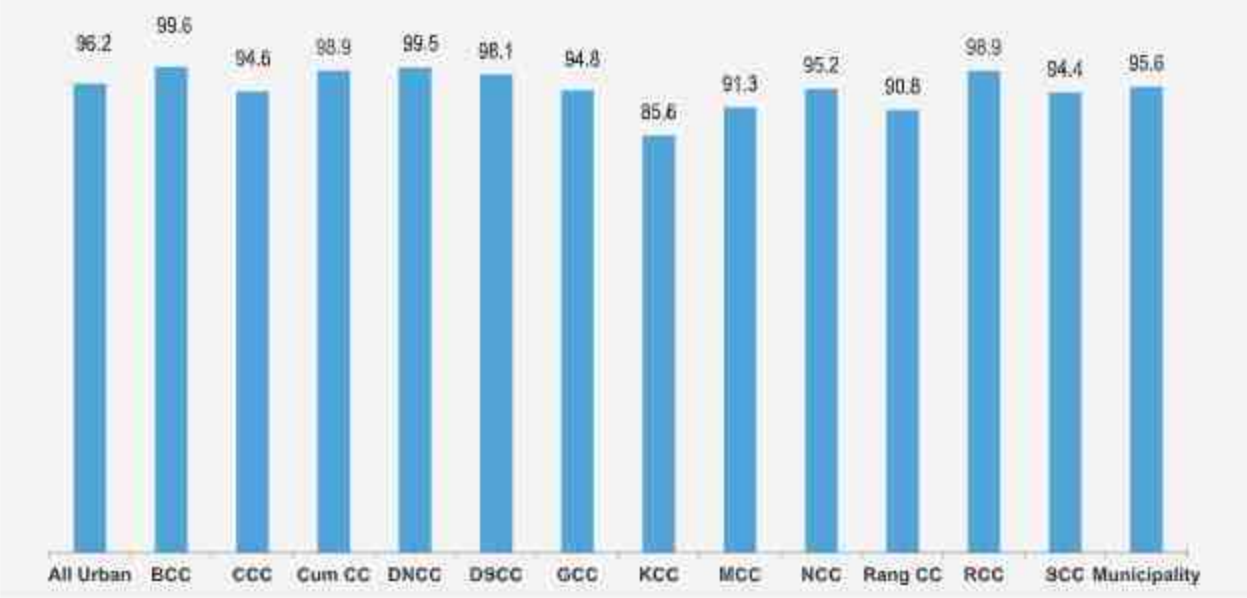


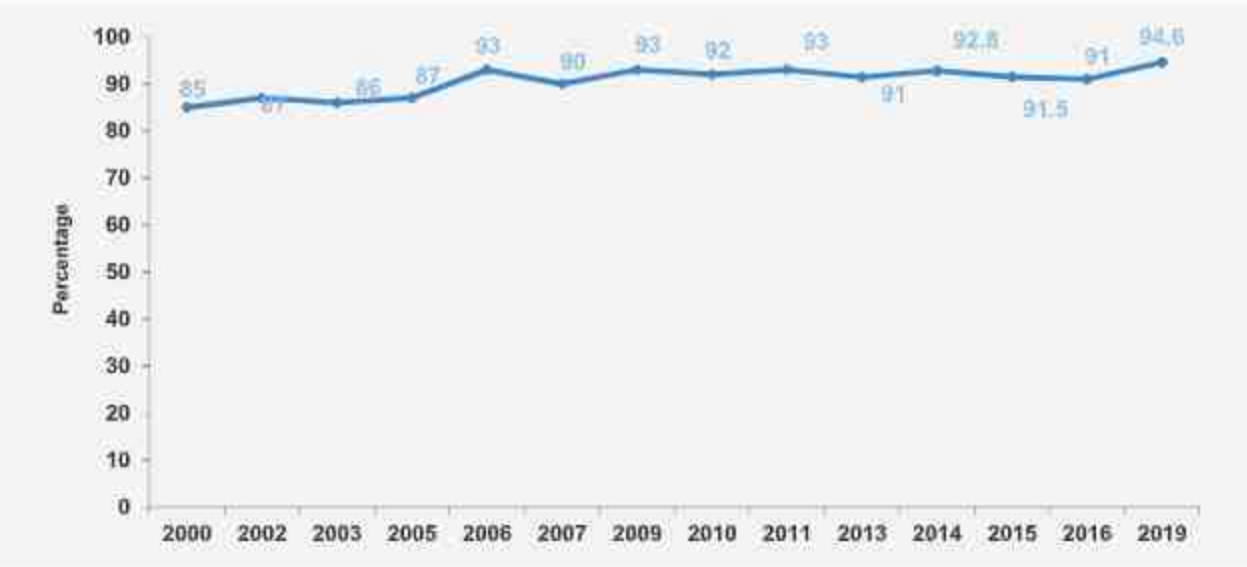
Figure 118: Percentage of Newborns Protected at Birth against Tetanus in Urban Areas by City Corporation/ Municipality in 2019



5.10 TRENDS IN PROTECTION AT BIRTH (PAB) AGAINST TETANUS

The nationwide trend in protection at birth against Tetanus is shown in Figure 119. It shows a slow but gradual increase with minor fluctuations in PAB since 2000. PAB against Tetanus increased by 7 percentage points – from 85 percent in 2000 to 92 percent in 2010. PAB was almost stagnant in the last one decade; it varied with some fluctuations between 93 percent and 90 percent. PAB was 91 percent in 2013 and increased up to 93 percent in 2014. However, it again decreased down to 91 percent in 2016 while it increased by 2.4 percentage points in 2019; rates it became 94.6 percent.

Figure 119: Percentage Distribution of Newborns Protected at Birth against Tetanus at national Level from 2000-2019



Map 15: Newborn Protected at Birth against Tetanus by District

5.11 TT2 COVERAGE AND PAB STATUS

Figure 120 presents TT2 coverage by mothers' age and the status of PAB of newborn babies. It shows that 91 percent of the newborn babies were protected at their birth, as against all (96.0 percent) TT2. By the age of mothers, the gap between TT2 coverage and PAB was the highest among the mothers aged 40+ years; it was 90.0 percent in the case of TT2 coverage while 76.0 percent regarding PAB, which was being followed by mothers aged 35-39 year (94.0 percent vs 85.0 percent). In the case of other age groups, TT2 coverage and PAB also had some variations. Similar to the nationwide level, the gap between TT2 coverage and PAB was the highest among the mothers aged 40+ years living in rural areas. PAB was 16.0 percentage points lower than TT2 coverage (see Figure 121).

The analysis of TT2 coverage and PAB indicates that TT2 coverage and PAB are not inter-related. In relation to TT2 coverage, PAB was not found the same even nationwide. This might be due to the process of giving birth to the child after 3 years of receiving TT2.

Figure 120: Nationally Percentage of Mother Received TT2 and Percentage of Newborn Protected at Birth by Age Group of Mother in 2019

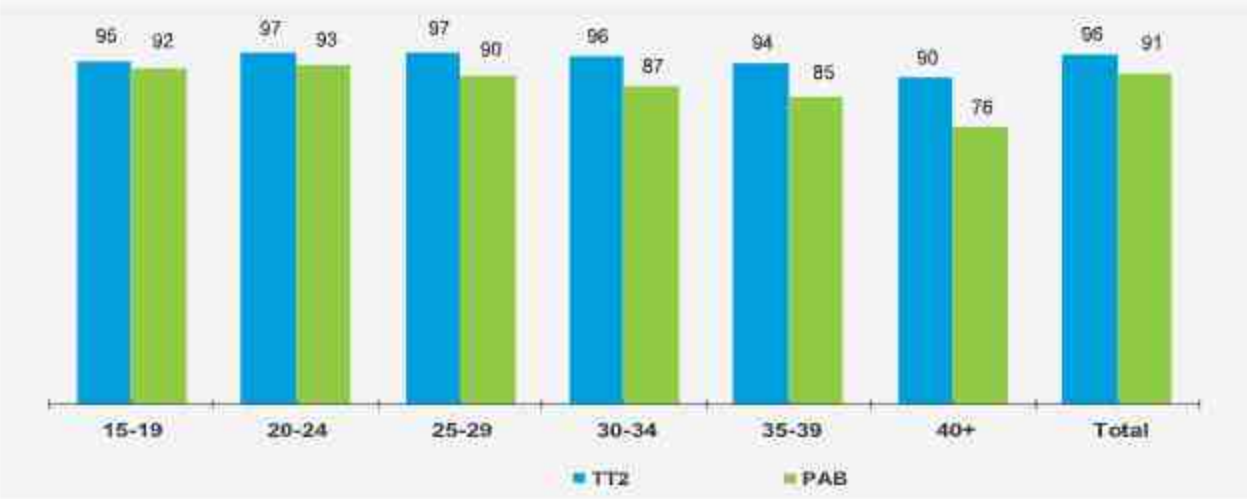
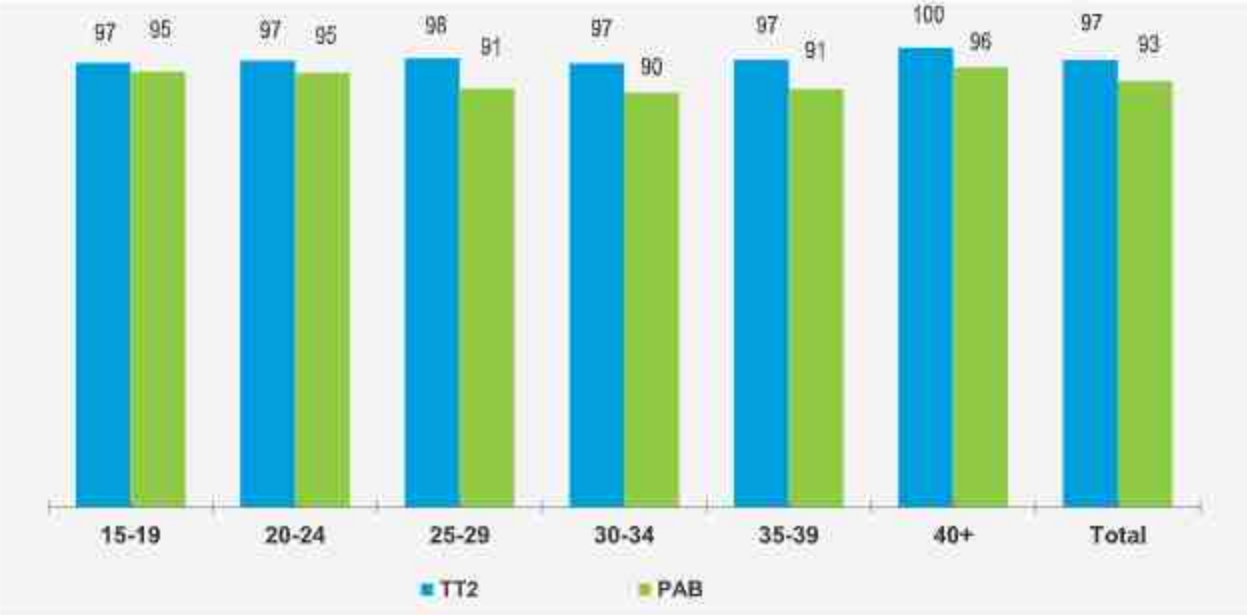


Figure 121: Percentage of Mother Received TT2 and Percentage of Newborn Protected at Birth by Age Group of Mother in Rural Areas in 2019

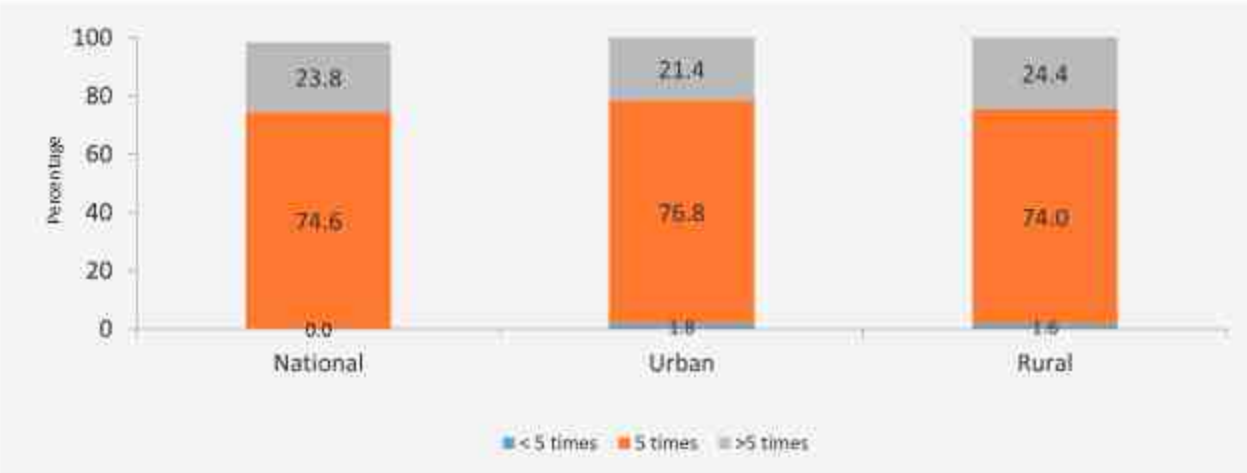
Figure 122: Percentage of Mother Received TT2 and Percentage of Newborn Protected at Birth by Age Group of Mother in Urban Areas in 2019



5.12 MOTHERS' KNOWLEDGE ABOUT NUMBER OF TT DOSES

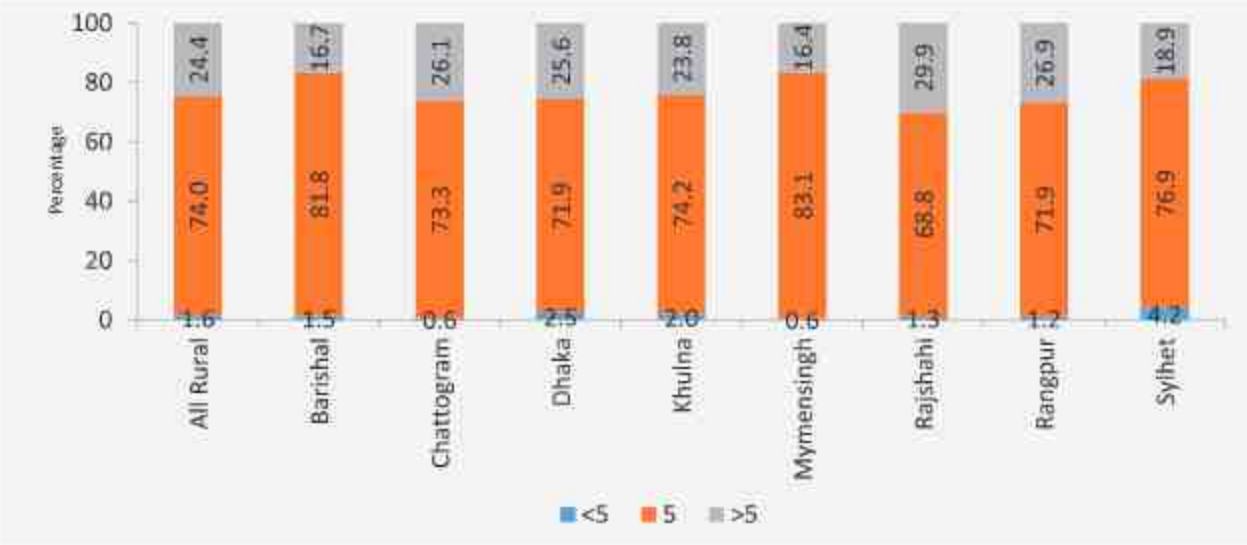
Figure 123 presents the mothers' knowledge about the number of TT doses required for their protection against Tetanus throughout their reproductive age. Nationwide, about three-fourth of the respondents (74.6 percent) reported about knowing five doses of TT vaccine. Respondents living in the urban areas had better knowledge than those living in the rural areas (76.8 percent vs. 74.0 percent).

Figure 123: Knowledge about Number of TT Doses Required to Protect a Woman against Tetanus by National, Rural and Urban Areas in 2019



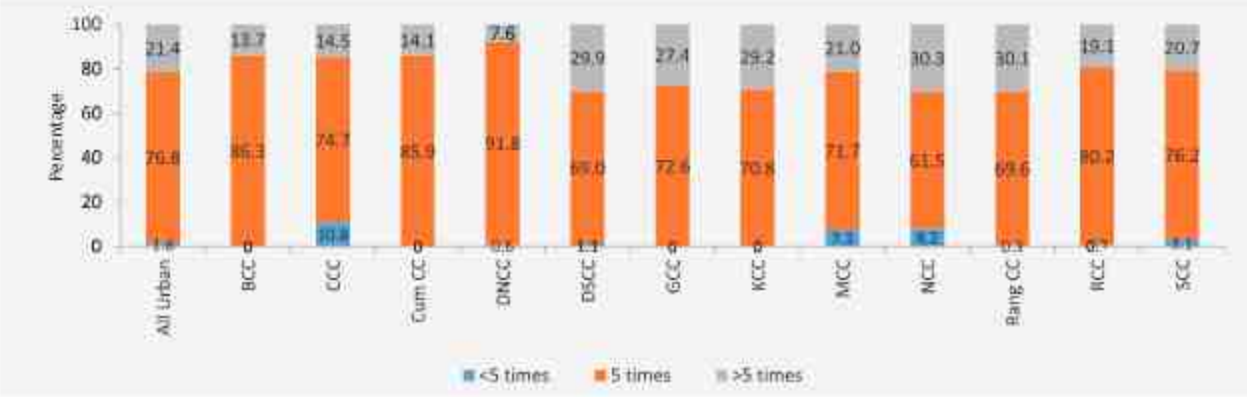
Among the divisions, awareness about the five required doses of TT vaccine was found to be the highest among the mothers in Mymensingh division (83.1 percent); mothers in Rajshahi division (68.8 percent) had the least awareness about the recommended doses (see Figure 124).

Figure 124: Knowledge about Number of TT Doses Required to Protect a Woman against Tetanus in Rurals by Division in 2019



Respondents who were living in DNCC (91.8 percent), and Cum CC (85.9 percent) possessed better knowledge about the required number of TT doses than those residing in other city corporations. It was found that 61.5 percent among those residing in NCC knew about the correct required number of TT doses (see Figure 125).

Figure 125: Knowledge about Number of TT Doses Required among 18-49 Years Old Women in Urban Areas by City Corporations and Municipality in 2019



5.13 SOURCES OF TT VACCINATION

The sources of TT1 vaccine are presented in Figure 126. Overall, in 92.0 percent cases TT1 vaccine was received from the GoB outreach centers. It was more higher in the rural areas (96.3 percent) than in the urban areas (75.1 percent). Nationwide, other sources included GoB hospitals (2.5 percent), NGOs, and private clinics/ hospitals (5.5 percent).

Figure 126: Sources of TT1 Vaccination by National, Rural and Urban Areas in 2019

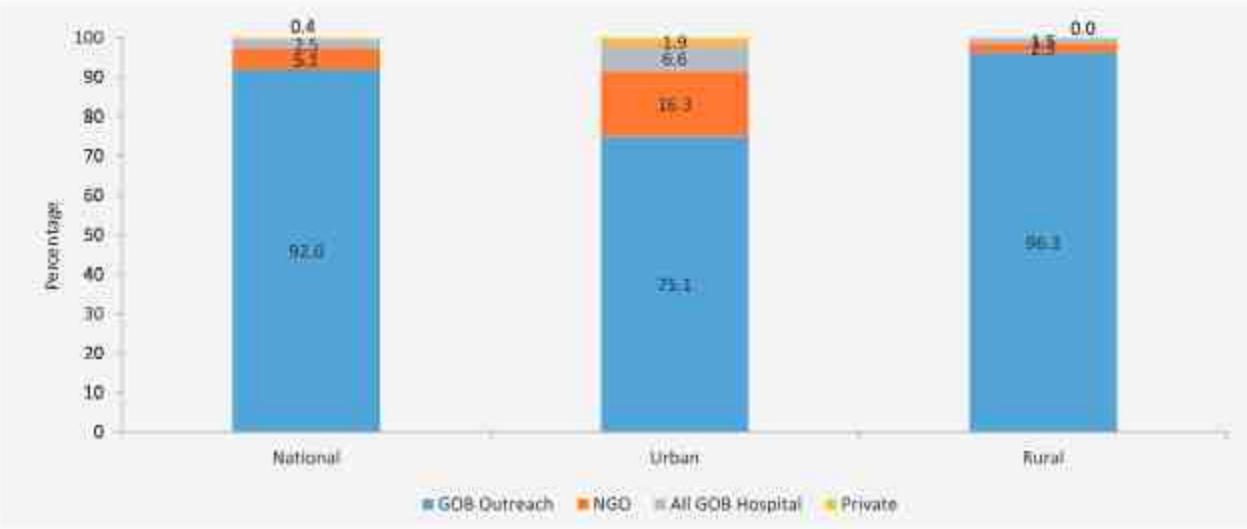
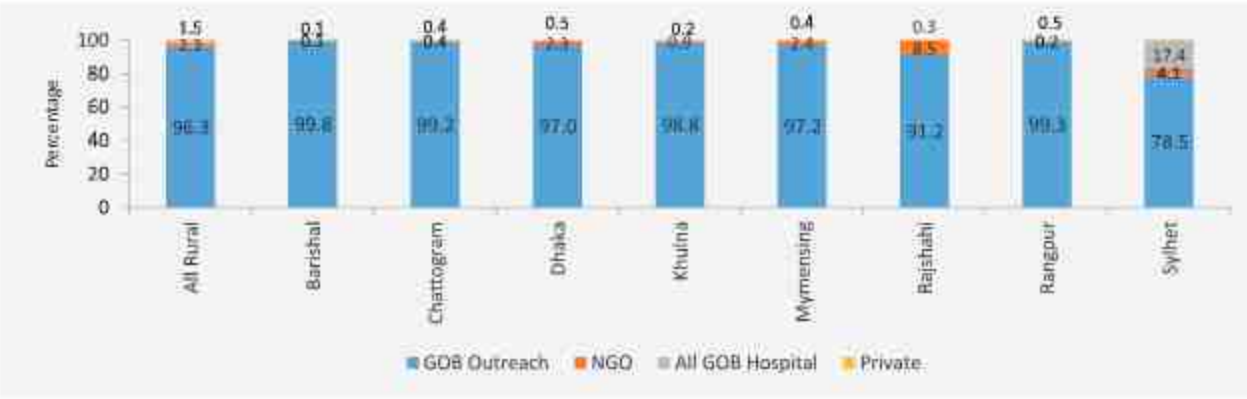


Figure 127 shows the distribution of sources of TT1 doses by rural division. Again, the vast majority received their TT1 doses from GoB outreach centers, with rates ranging between 99.8 percent in Barishal division and 78.5 percent in Sylhet division. NGOs and private sources were found to be of a very low status in all divisions in this regard.

Figure 127: Sources of TT1 Vaccination in Rural Areas by Division in 2019



By city corporation, distribution of sources of TT1 dose was again for the most part GoB outreach centers; but there was more variety in the urban areas than that in the rural areas. The data show that all the respondents in BCC and GCC received TT1 from GoB outreach centers. At the other end of the scale, it was found that 96.0 percent went to private facilities in KCC (see Figure 128).

Figure 128: Sources of TT1 Vaccination in Urban Areas by City Corporation and Municipality in 2019

CHAPTER 6

TT5 VACCINATION COVERAGE AMONG THE 18-49 YEARS OLD WOMEN

TT5 VACCINATION COVERAGE AMONG THE 18-49 YEARS OLD WOMEN

Expanded Programme on Immunization (EPI) provides TT vaccines to all the women of child bearing age (15-49 years) through its routine vaccination programme. To confirm adequate protection of newborn babies against Neonatal Tetanus, EPI aims to complete all the five doses of TT to all the target women by maintaining minimum interval between the doses. Based on the vaccination schedule, the shortest possible period to complete all the 5 doses of TT would be two years and seven months. If a woman starts TT vaccination at the age of 15 years and keeps to the exact scheduled intervals, she would be able to complete all the required doses before the age of her marriage where she would be protected from Tetanus throughout her reproductive years.

6.1 OBJECTIVES OF TT5 VACCINATION COVERAGE

The Tetanus Toxoid (TT) survey was undertaken to achieve the following objectives with relation to women aged between 18 and 49 years:

- The number who had completed all the five doses of TT
- Rate of TT card retention
- Sources of TT vaccination
- Reasons for not receiving TT

6.2 SELECTION OF SAMPLES

The survey samples for TT5 were selected from the same clusters as were the samples for Chapter 5, where the samples were selected by following the WHO's new sampling technique. First, a list was compiled from women aged 18-49 years who were identified within each household. From that list, a sampling frame with all eligible household with at least one woman was made. Finally, eight eligible households were selected randomly to examine the eligible women's TT vaccination status through a pre-designed structured questionnaire.

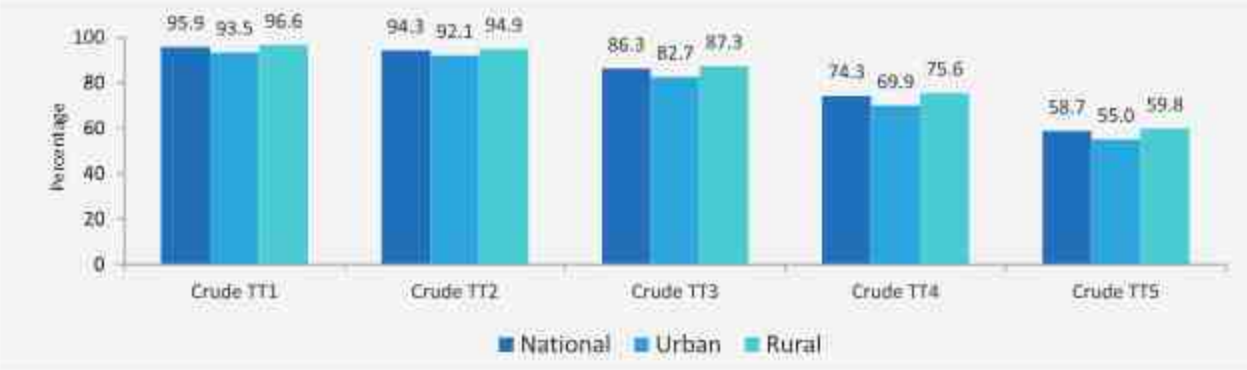
6.3 LEVELS OF TT VACCINATION COVERAGE

The Coverage Evaluation Survey (CES) 2019 estimated two types of TT vaccination coverage: crude and valid. Crude TT vaccination coverage includes all the TT vaccines administered to a recipient, irrespective of following the EPI ¬recommended TT vaccination schedule. On the other hand, valid coverage is estimated from only those doses of vaccine, which were administered according to the EPI-recommended TT vaccination schedule. Both types of coverage are discussed below.

Crude Vaccination Coverage

Figure 129 shows that nationwide 58.7 percent of the women received all the 5 doses of TT vaccines with some variation in the coverage between the rural (59.8 percent) and the urban (55.0 percent) women. On the way to TT5, there had been a steep downward trend in the crude coverage between TT doses. Having started with TT1 at 95.9 percent nationwide, the rate had dropped to 86.3 percent for TT3 and 74.3 percent for TT4 dose. A similar pattern of the declining trend was observed both in the rural and the urban areas.

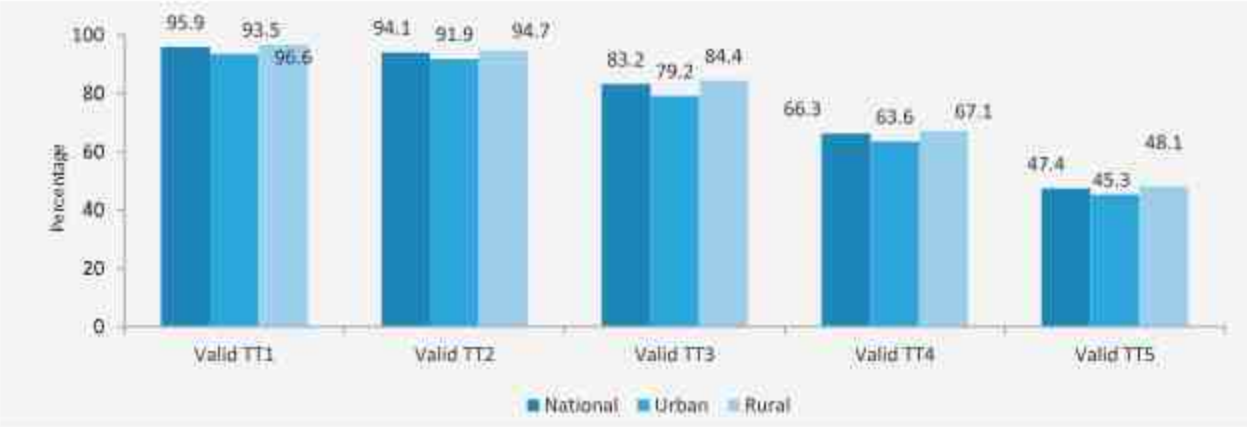
Figure 129: Crude TT Vaccination Coverage among Women Aged 18-49 Years Old by National, Rural and Urban Areas in 2019 (Card+History)



As regards valid TT vaccination coverage, less than half (47.4 percent) of the surveyed women received all the five doses of valid TT vaccine across the country, 48.1 percent in the rural areas and 45.3 percent in the urban areas. Like crude TT coverage, valid TT coverage for the subsequent doses was also found to have decreased substantially from 95.9 percent in the case of TT1 to 47.4 percent regarding TT5 (see Figure 130).

By residence, valid TT coverage was higher in the rural areas than that in the urban areas for all TT doses. The gap in coverage between the rural and the urban areas was found to be high for TT3 dose (84.4 percent vs79.2 percent). But the gap was lower in the case of TT2 dose (94.7 percent vs 91.9 percent).

Figure 130: Valid TT Vaccination Coverage among Women Aged 18-49 Years Old by National, Rural and Urban Areas in 2019 (Card+History)

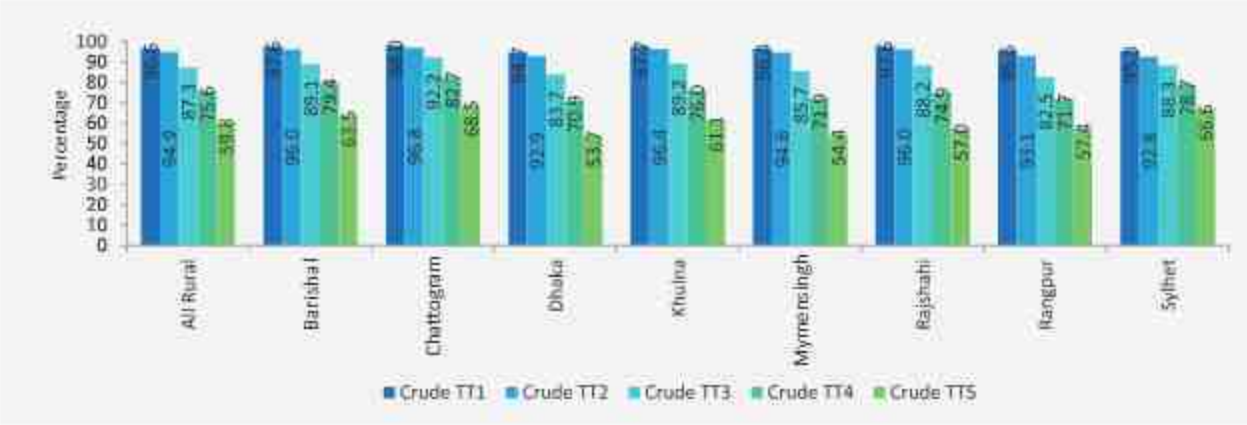


6.4 TT VACCINATION COVERAGE BY RURAL DIVISION

Crude TT Vaccination Coverage

Figure 131 shows Crude TT5 Vaccination Coverage in the rural areas by division. Crude TT5 Coverage was the highest in Chattogram (68.5 percent); the lowest in Dhaka divisions (53.7 percent); it ranged between 54.4 percent and 66.6 percent in other divisions. As the initial dose, TT1 coverage was at or above 94.7 percent in all the divisions. The pattern of the decreasing coverage by subsequent doses was seen and is presented here. However, the highest decrease in TT coverage from the first dose (TT1) to the last dose (TT5) was observed in Mymensingh division - 42.0 percent.

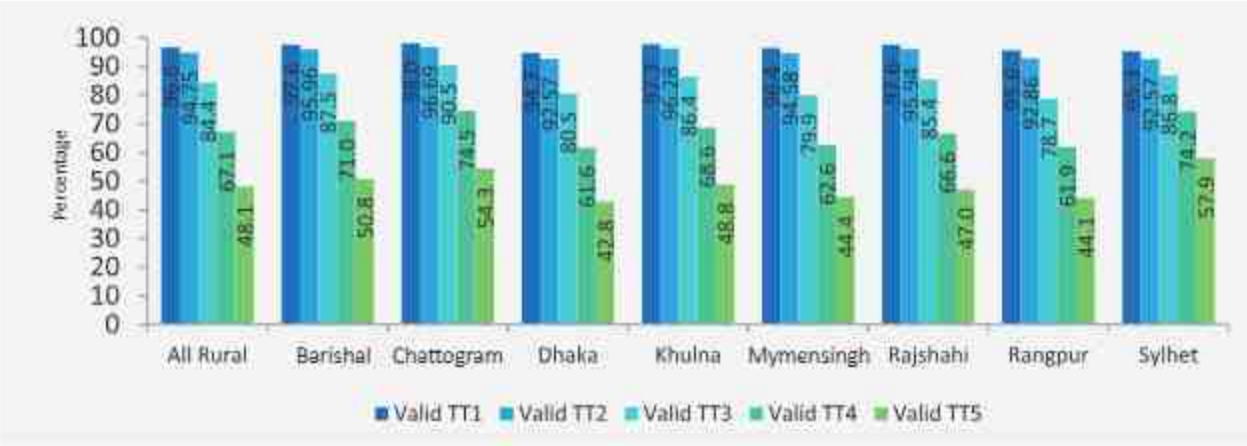
Figure 131: Crude TT Vaccination Coverage in Rural Areas by Division in 2019



Valid TT Vaccination Coverage

Valid TT vaccination coverage was defined as the vaccination coverage obtained by administering the TT vaccines as per the EPI-recommended TT vaccination schedule. Valid TT vaccination coverage for the women aged 18-49 years in the rural areas by division is presented in Figure 132. Five doses of valid TT vaccine ensure immunity against Tetanus for the entire reproductive life of a woman. While the first and the second rounds of TT coverage were at or above 92.6 percent in all the rural divisions, by TT5 it had dropped to no higher than 57.9 percent in Sylhet and as low as 42.8 percent in Dhaka division.

Figure 132: Valid TT Vaaccination Coverage in Rural Areas by Division in 2019



6.5 LEVELS OF THE COVERAGE BY THE SURVEY UNIT

As a ready reference, the rates of valid TT coverage among the women aged between 18-49 years by the division / city corporation are given in the Appendix Tables.

6.6 TT VACCINATION COVERAGE BY CITY CORPORATION

In CES 2019, similar to those in the rural divisions, assessments of TT vaccination coverage were conducted in 12 city corporations. The TT vaccination coverage scenario across the city corporations is presented in Figures 133 and 134.Figure 133 presents crude TT vaccination coverage, while Figure 134 shows valid vaccination coverage.

Crude TT Vaccination Coverage

Figure 133 highlights crude TT vaccination coverage by city corporation. It shows that all the women (100.0 percent) in BCC and RCC received TT1. The lowest TT1 coverage was in KCC (76.1 percent). TT1 coverage ranged between 77.3 percent and 97.7 percent in the other city corporations (see Figure 132). On the other hand, crude TT5 coverage was the highest in RCC (92.2 percent) and the lowest in GCC (36.1 percent)- a spread of 56.1 percentage points.

Figure 133: Crude TT Vaccination Coverage in Urban Areas by City Corporations and Municipality in 2019

Valid TT Vaccination Coverage

Valid TT vaccination coverage by city corporation is presented in Figure 134. As TT1 is the gateway for receiving all the other doses of TT vaccine, discussion on valid TT1 dose is not necessary in this section. Valid TT2 coverage was also universal in RCC (100.0 percent) and the lowest in KCC (73.0 percent); and it ranged between 99.8 percent and 76.8 percent in the other city corporations.

Figure 134 also depicts reproductive life-time protection against Tetanus with five valid TT doses. It shows that the highest proportion of women achieved life time protection status in RCC (85.9 percent) and the lowest in GCC (30.5 percent), ranging between 56.6 percent to 34.6 percent in other city corporation.

Figure 134: Valid TT Vaccination Coverage in Urban Areas by City Corporations and Municipality in 2019

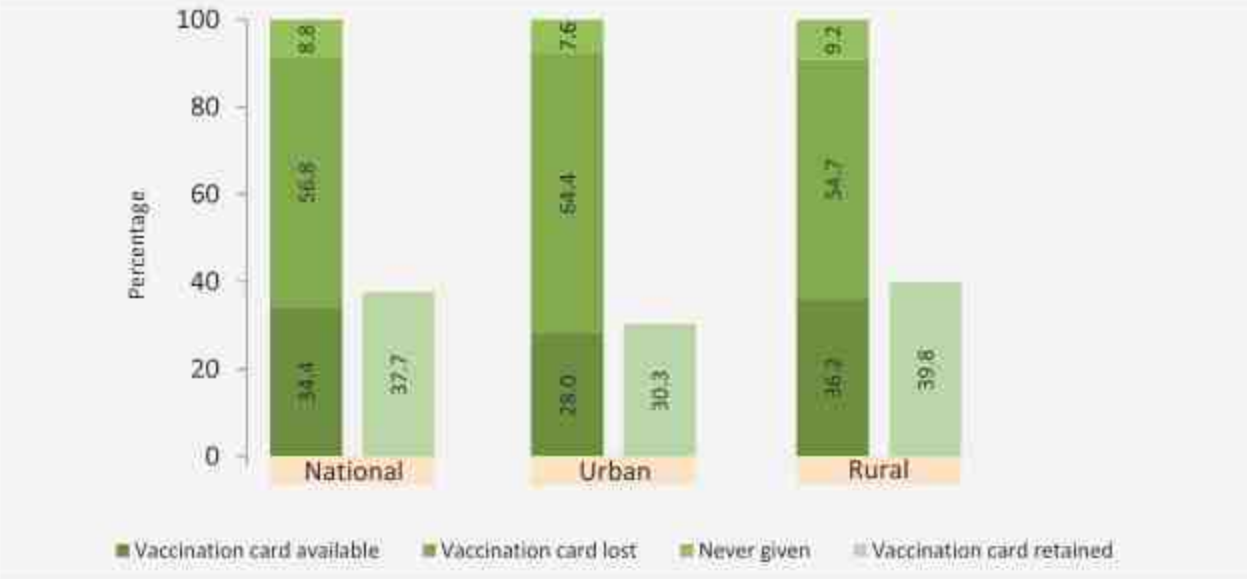
Map 16: Crude TT5 Vaccination Coverage among Child Bearing Aged Women by District

Map 17: Valid TT5 Vaccination Coverage among Child Bearing Aged Women by District

6.7 STATUS OF RETENTION OF TT CARDS BY WOMEN

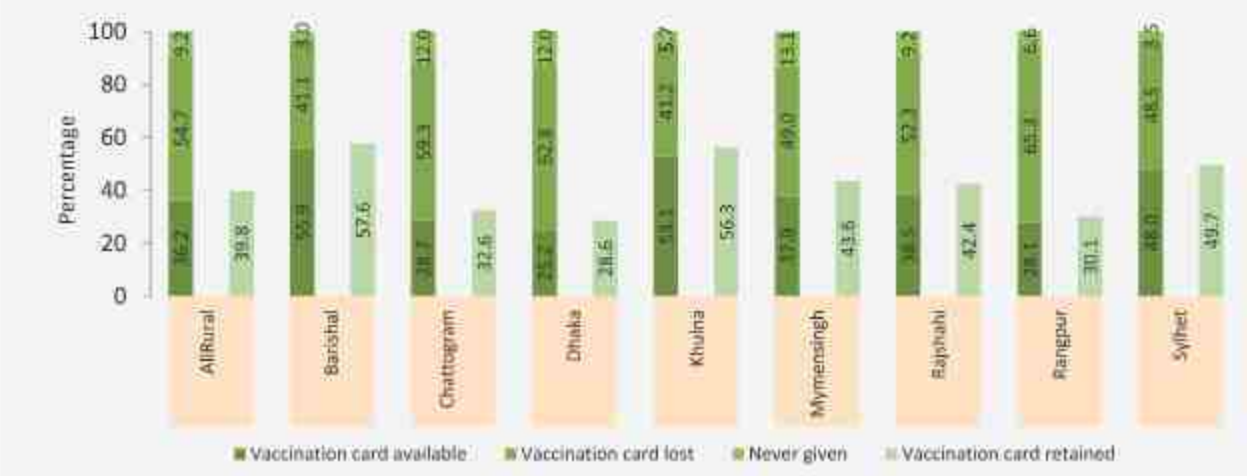
TT vaccination card is an important document; its availability helps one avoid unnecessary administration of TT dose. It saves vaccines as well. CES 2019 calculated the card retention rate through a separate analysis. It is presented in Figure 135, which shows that nationwide, card retention was e 36.5 percent. Rural women are more likely to retain the vaccination card (38.5 percent), as opposed to 28.9 percent of those residing in the Urban areas (see Figure 135).

Figure 135: Vaccination Card Retention Rate by National, Urban and Rural Areas in 2019



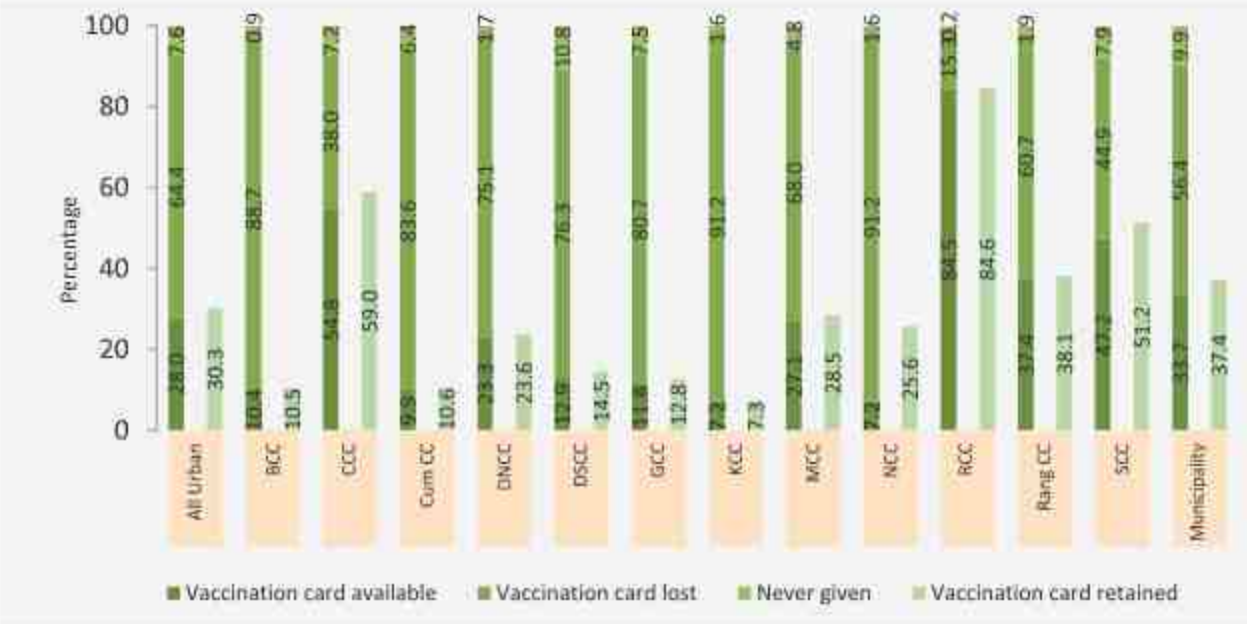
Among the rural divisions, card retention rate was the highest in Barishal (57.6 percent) and the lowest in Dhaka (28.6 percent). It ranged between 30.1 percent and 56.3 percent in other divisions (Figure 136).

Figure 136: TT Vaccination Card Retention Rate in Rural Areas by Division in 2019



In the city corporations, card retention rate was found to be the highest in RCC (84.6 percent) and the lowest in KCC (7.3 percent), with the other city corporations covering a range from 59.0 percent to 10.8 percent (see Figure 137).

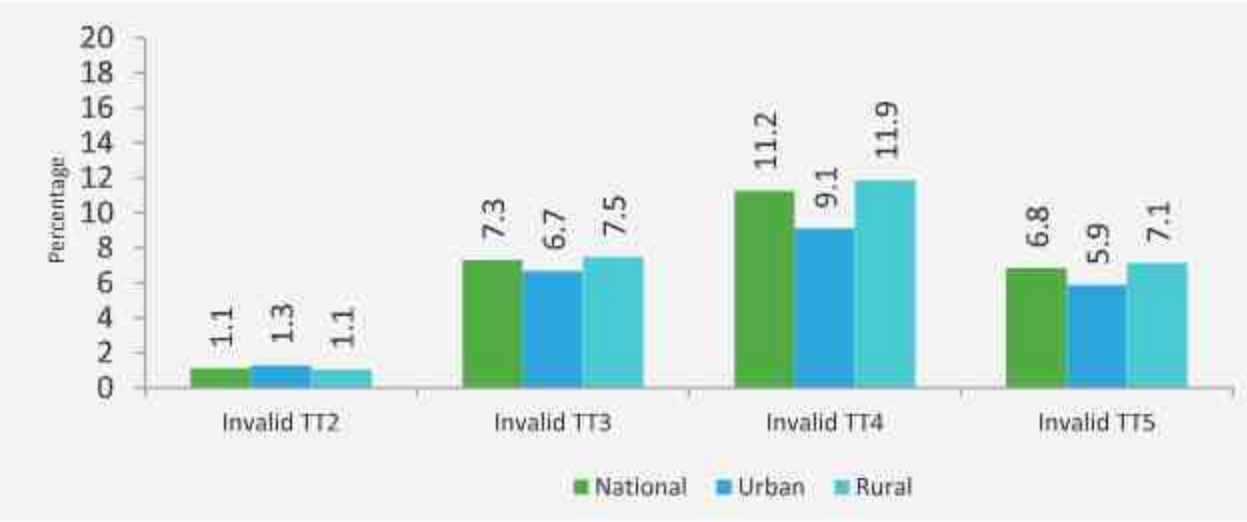
Figure 137: TT Vaccination Card Retention Rate in Urban Areas by City Corporation and Municipality in 2019



6.8 INCIDENCE OF INVALID DOSES

An invalid dose occurs if a woman receives any subsequent dose of TT vaccine before the minimum interval between two doses, as recommended by the EPI schedule. Invalid TT doses were estimated by analyzing the gap between the consecutive doses (see Figure 138). Nationwide, incidence of invalid doses was most prevalent in the case of TT4 (11.2 percent), followed by TT3 (7.3 percent), TT5 (6.8 percent), and TT2 (1.1 percent). The proportion of women who received invalid doses was higher in the rural areas, compared to those living in the urban areas except for TT2. Overall, the most prevalent one in the case of TT4, it was 11.9 percent in the rural areas and 9.1 percent in the urban areas.

Figure 138: Incidence of Invalid TT Doses among Women Aged 18-49 Years Old by National, Rural and Urban Areas in 2019 (Card+History)



As with the nationwide findings, incidence rate of invalid TT4 was higher than any other doses in all divisions. However, the highest rate was observed in Barishal division (15.2 percent) and the lowest in Sylhet division (6.7 percent). While analyzing the invalid doses of TT3, it was observed that the highest rate was in Mymensingh (11.9 percent) and the lowest in Sylhet divisions (5.4 percent). In the case of invalid TT5 doses, it was the highest in Rangpur (9.6 percent) and the lowest in Mymensingh (4.2 percent).

Figure 139: Incidence of Invalid TT Doses in Rural Areas by Division in 2019

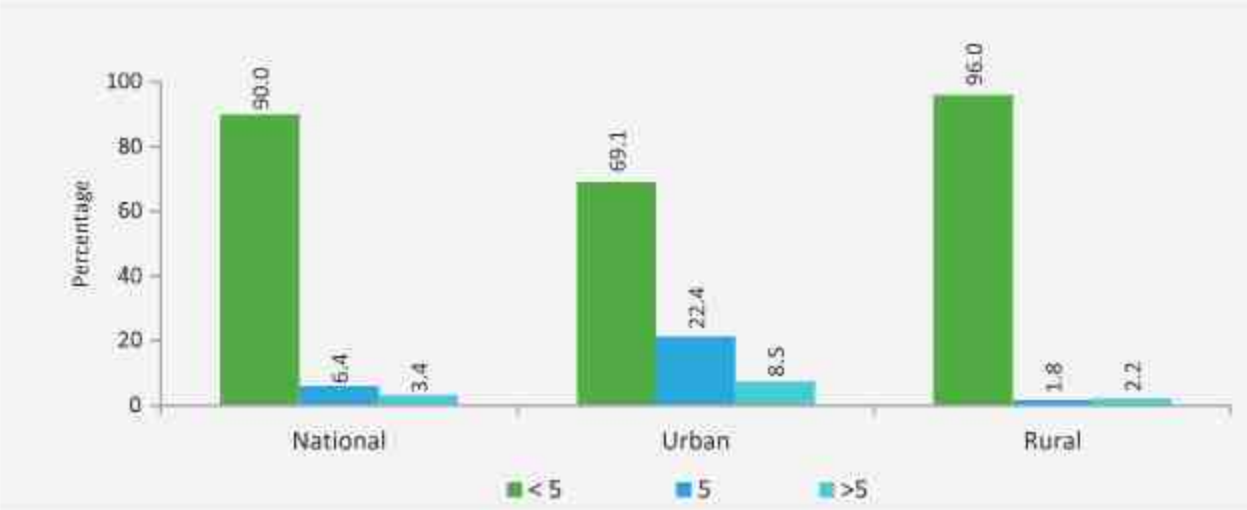
Among the city corporations, invalid TT doses were generally lower than their rural counterparts although in BCC the invalid TT4 was as high as 36.0 percent and the lowest in MCC (1.6 percent). In the case of invalid TT5, it was the highest again in BCC (9.8 percent) and the lowest in KCC (1.4 percent) (see Figure 140).

Figure 140: Incidence of Invalid TT Doses in Urban Areas by City Corporation and Municipality in 2019

6.9 WOMEN'S KNOWLEDGE ABOUT TT DOSES

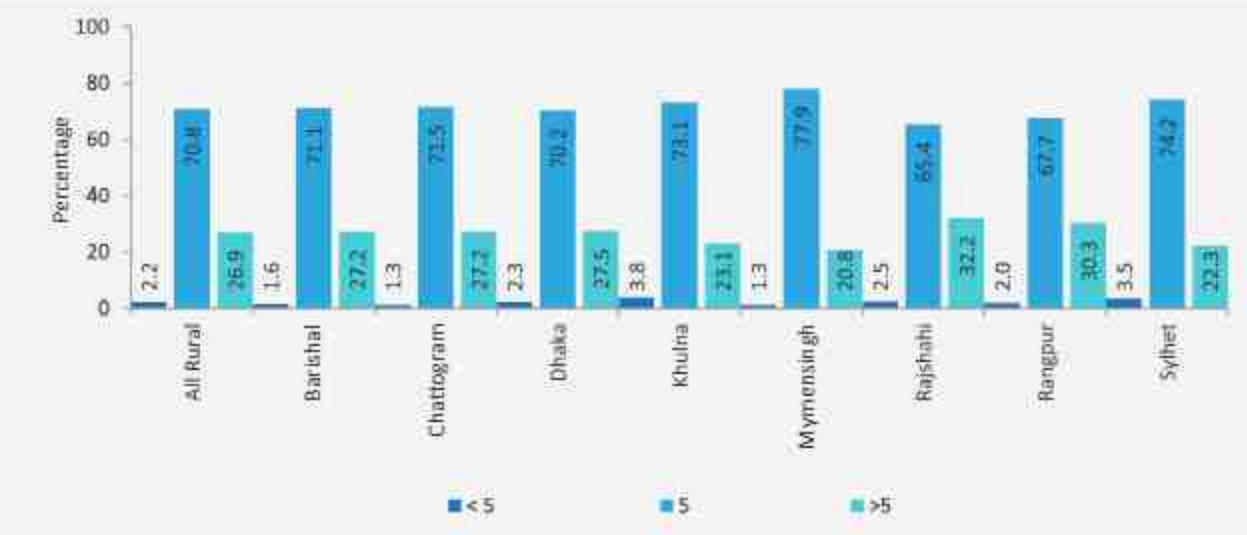
According to the EPI, to attain adequate lifetime protective antibody against Tetanus, a woman should receive five doses of TT vaccine. On this point, women's knowledge of the required number of TT vaccines was assessed in CES 2019. Nationwide, 90.0 percent of the surveyed women reported that five doses of TT vaccine were needed to be administered for one's life-time protection. By residence, more women from the urban areas referred to 5 times (69.1 percent) than their rural counterparts (96.0 percent) (see Figure 141).

Figure 141: Knowledge about Number of TT Doses Required among Women Aged 18-49 Years Old by National, Rural and Urban Areas in 2019 (Card+History)



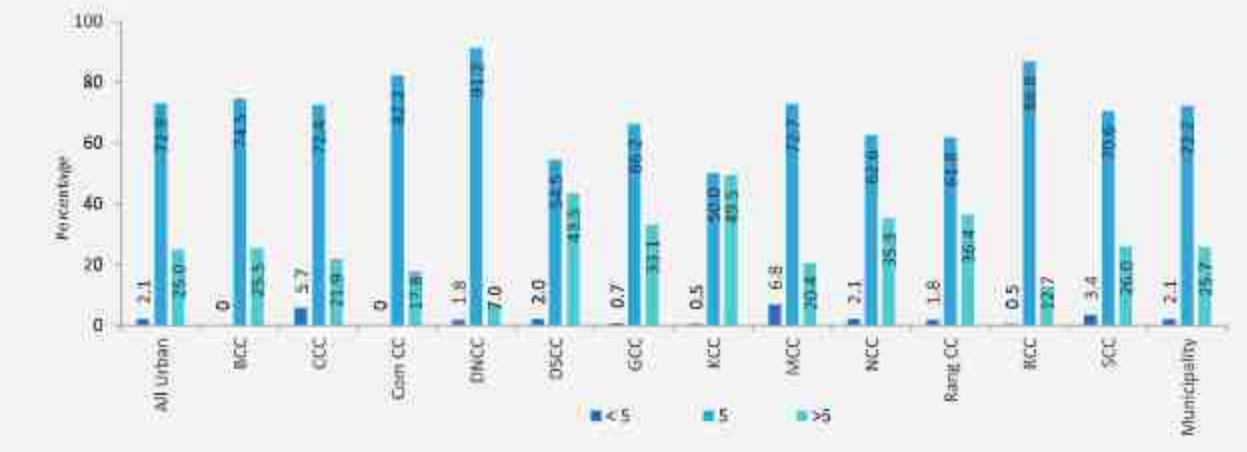
Among the rural divisions, the highest proportion of women to know about the required five doses of TT vaccine was in Mymensingh division (77.9 percent) and the lowest in Rajshahi division (65.4 percent) (see Figure 142).

Figure 142: Knowledge about Number of TT Doses Required among 18-49 Years Old Women in Rural Areas by Division in 2019



In the urban areas, overall 72.9 percent of the women had knowledge about the five required doses of TT vaccination. One's knowledge about the five doses was found to be the highest in DNCC (91.2 percent) and the lowest in KCC (50.0 percent), with the intermediary levels ranging between 54.5 percent in DSCC and 86.8 percent in RCC (see Figure 143).

Figure 143: Knowledge about Number of TT Doses Required among 18-49 Years Old Women in Urban Areas by City Corporations and Municipality in 2019



6.10 SOURCES OF TT VACCINATION

Nationwide, 90.0 percent of the women received TT1 vaccines from the government outreach centers, with a difference of 26.9 percentage points between the rural (96.0 percent) and the urban (69.1 percent) areas (see Figure 144). Some variations from this pattern were also observed among the rural divisions (see Figure 145). GOB outreach centers were the most common source of TT1 vaccination in Barishal for the highest proportion (99.8percent); the smallest proportion received their TT1 vaccines from GoB outreach centers in Sylhet (77.2 percent). Among the city corporations, government outreach centers were also the most prominent source of TT1 vaccination in BCC (95.0 percent); it was the lowest in KCC (8.3 percent) (see Figure 146).

Figure 144: Source of TT Vaccination by National, Rural and Urban Areas in 2019 (Card+History)

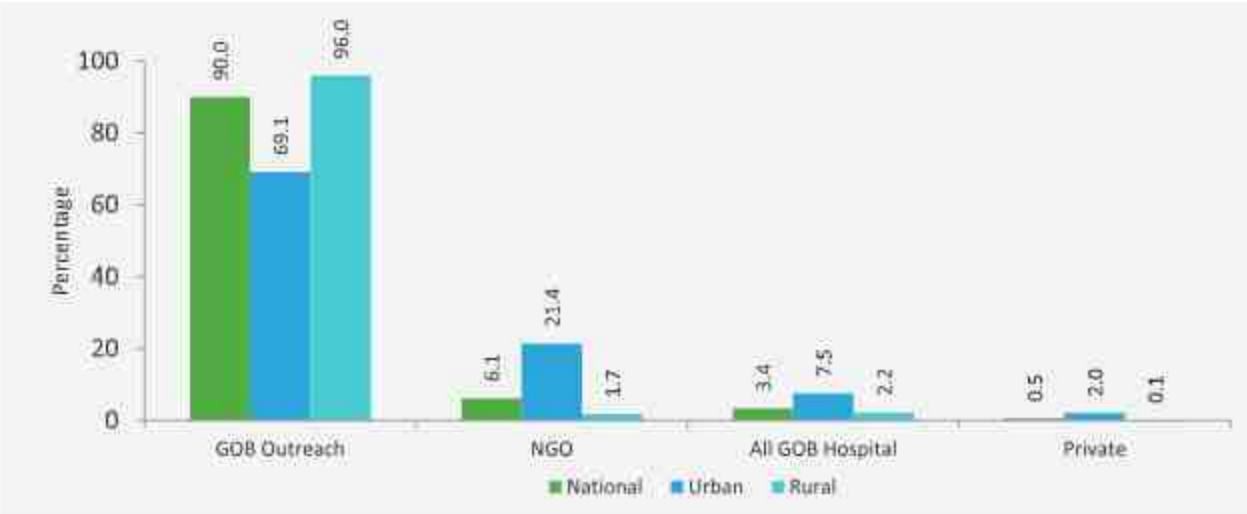


Figure 145: Source of TT Vaccination among 18-49 Years Old Women in Rural Areas by Division in 2019

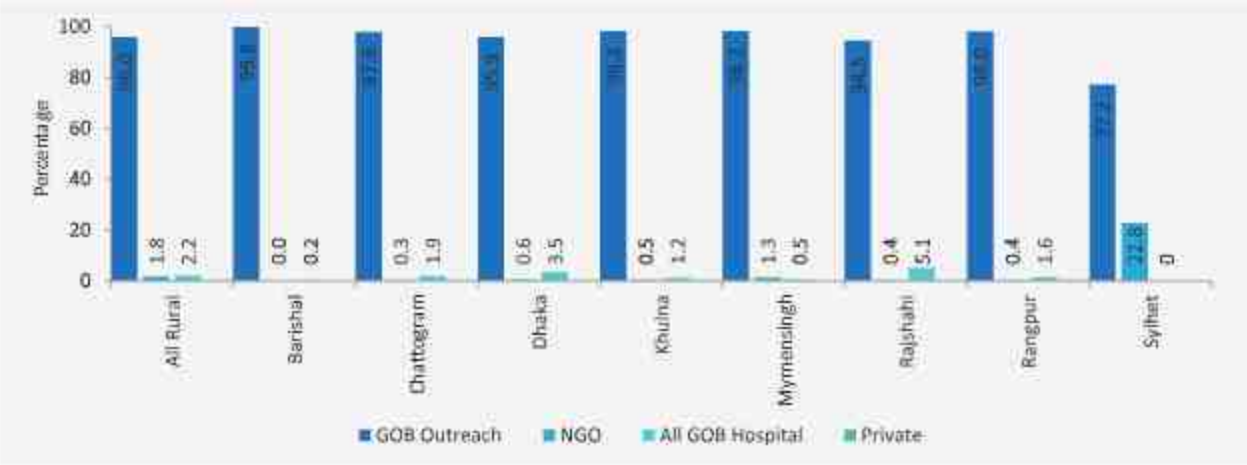
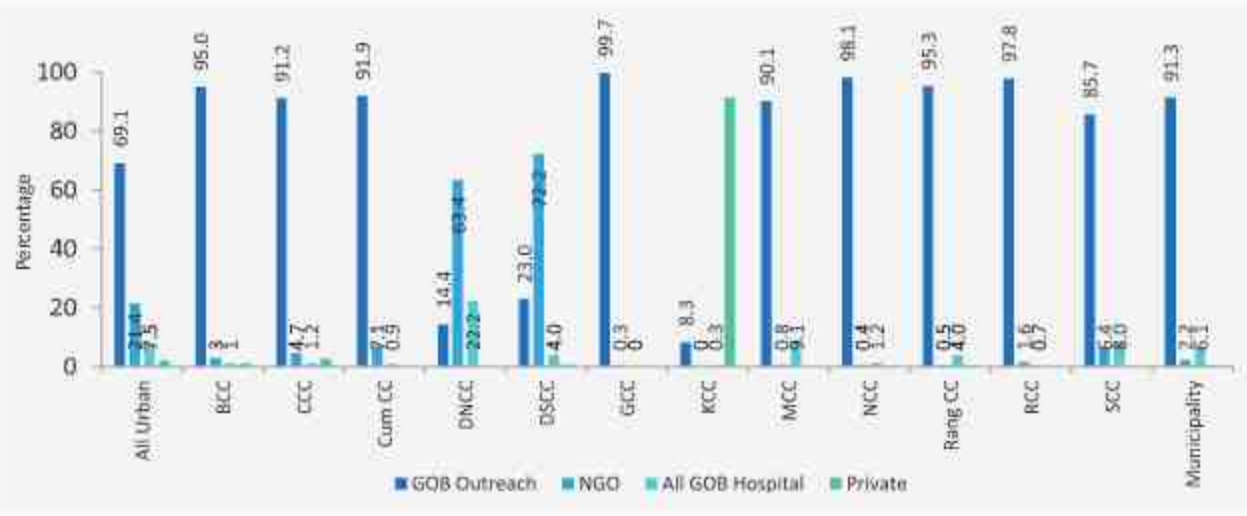


Figure 146: Source of TT Vaccination among 18-49 Years Old Women in Urban Areas by City Corporations and Municipality in 2019



6.11 REASONS FOR NOT RECEIVING TT VACCINATION

Table 16 presents reasons for not receiving TT vaccination. A little over one quarter (27.4 percent) mentioned that "feel fear" was a reason for the state of non-vaccination. However, 21.0 percent of the women reported that they were not aware of it while 19.1 percent of the women did not give any importance to vaccination. Another 10.3 percent were not aware of it, or no one told them anything about getting TT vaccines.

The data show no such significant difference in the answers given by the stakeholders living in the rural and the urban areas excepting the mothers who did not know and did not give any importance to it. Reasons for non-vaccination of TT by rural division and city corporation are presented in Table 17 and Table 18.

Table 16: Reasons For Not Receiving TT Vaccination by National, Rural and Urban Areas in 2019

Reasons	National	Urban	Rural
Feel fear	27.4	25.1	28.7
Did not know	21.0	27.2	17.5
Did not give importance	19.1	24.4	16.0
Not aware/nobody tell me	10.3	8.6	11.3
Feel shy	1.2	1.5	1.0
Don't believe in vaccine	0.9	0.3	1.2
In laws did not like	0.2	0.0	0.4
TT vaccine was finished	4.6	0.9	6.7
Was sick	7.8	6.6	8.4
Husband don't like	0.4	0.6	0.3
Was not at home	0.1	0.0	0.1
High distance from home	0.2	0.0	0.4
Do not know	6.8	4.8	8.0

Table 17: Reasons For Not Receiving TT Vaccination in Rural Areas by Division in 2019

Reasons	All Rural	Barishal	Chattogram	Dhaka	Khulna	Mymensingh	Rajshahi	Rangpur	Sylhet
Feel fear	28.7	20.8	42.2	25.7	34.2	29.7	43.7	16.2	24.2
Did not know	17.5	14.3	18.0	24.0	22.3	11.0	8.1	7.3	27.8
Did not give importance	16.0	16.2	9.9	18.1	6.0	16.7	16.8	21.4	15.0
Not aware/nobody tell me	11.3	6.1	2.5	8.4	9.7	15.0	16.9	22.7	4.6
Feel shy	1.0	0.0	0.8	1.7	0.0	0.9	1.0	1.0	0.0
Don't believe in vaccine	1.2	2.6	1.7	0.9	1.4	2.7	0.7	0.0	1.7
In laws did not like	0.4	2.0	0.0	0.7	1.0	0.0	0.0	0.0	0.0
TT vaccine was finished	6.6	24.8	10.4	1.4	1.7	0.8	7.1	15.5	7.5
Was sick	8.5	7.2	6.2	11.3	16.9	7.6	3.7	5.8	5.1
Housband don't like	0.3	0.0	0.0	0.0	1.1	0.9	0.0	0.6	0.0
Was not at home	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
High distance from home	0.4	0.0	0.9	0.0	0.0	2.8	0.0	0.0	0.0
Do not know	8.0	6.0	7.4	7.6	5.7	11.9	2.0	9.5	14.3

Table 18: Reasons for Not Receiving TT Vaccination in Urban Areas by City Corporation in 2019

Reasons	All Urban	CCC	CumCC	DNCC	DSCC	GCC	NCC	KCC	MCC	Rang CC	SCC	Municipality
Feel fear	25.1	2.3	45.6	51.0	22.9	20.2	22.8	54.7	25.1	19.0	30.5	36.7
Did not know	27.2	67.2	21.9	10.0	27.8	18.5	2.0	2.6	3.5	9.0	40.5	7.6
Did not give importance	24.4	25.3	19.0	19.4	7.2	37.8	52.4	31.9	36.5	35.2	2.9	16.6
Not aware/nobody tell me	8.6	1.1	13.5	9.9	13.8	15.6	12.8	0.9	0.0	21.2	2.8	9.7
Feel shy	1.5	0.0	0.0	9.7	2.5	0.0	0.0	0.0	0.0	0.0	0.0	3.1
Don't believe in vaccine	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	1.2
In laws did not like	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TT vaccine was finished	0.9	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	10.2	0.0	3.5
Was sic	6.6	3.1	0.0	0.0	19.5	5.5	2.3	1.0	12.7	5.4	3.1	9.7
Husband don't like	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Was not at home	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
High distance from home	0.6	0.0	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0	1.2
Do not know	4.8	1.0	0.0	0.0	3.4	2.5	7.7	7.9	22.2	0.0	16.4	10.7

CHAPTER 7

VITAMIN A COVERAGE DURING VITAMIN A PLUS CAMPAIGN

VITAMIN A SUPPLEMENTATION COVERAGE DURING VITAMIN A PLUS CAMPAIGN

Vitamin A is an important micronutrient whose deficiency bears a great threat to the health and survival of children and mothers. WHO recognizes it as the leading cause of preventable childhood blindness and a major public health concern.Its deficiency also increases risk of childrens' death from some diseases, such as measles and diarrhea. To mitigate the aforesaid risk, the Government of Bangladesh (GoB) has conducted nationwide Vitamin A Plus campaigns periodically on a regular basis. Most recently, GoB conducted a nationwide Vitamin A Plus Campaign in February - April 2019. CES 2019 made an assessment of Vitamin A coverage among the children aged 6-59 months through obtaining data on Vitamin A plus campaign held in February 2019.

7.1 OBJECTIVES OF VITAMIN A COVERAGE SURVEY

Vitamin A Coverage survey was carried out as one of the components of CES 2019 with a view to accomplishing the following objectives:

- To estimate Vitamin A coverage among the children aged 6-11 months (born between 14-02-2018 and 12-08-2018) and 12-59 months (born between 07-3-2014 and 13-02-2018)
- To know the reasons for not taking Vitamin A

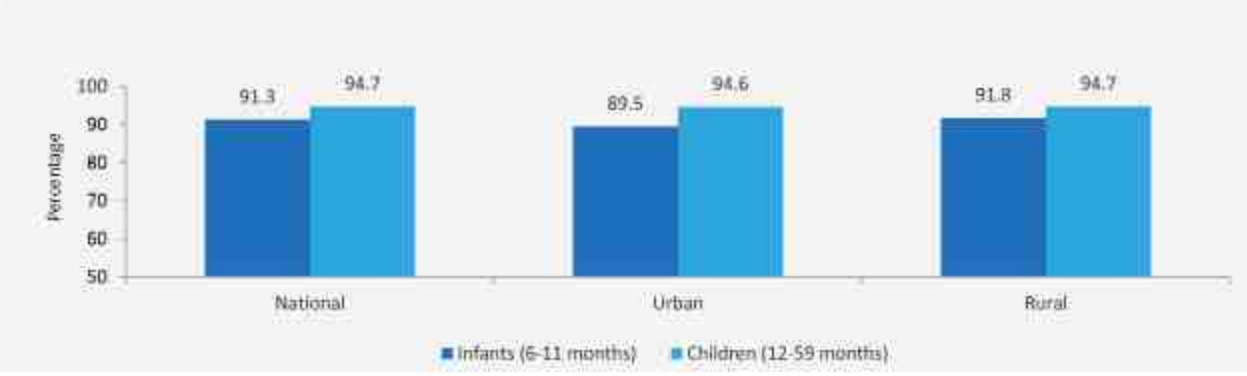
7.2 SAMPLE SELECTION

Vitamin A coverage survey was carried out with representative samples from among the 6-59 months old children drawn from the cluster samples of CES 2019. Interviewers listed all the eligible children (aged between 6-59 months) in every household of the selected clusters during their household visits in order to make the sampling frame. Afterwards, 3 households with 6-11 months old children and 5 households with children aged 12-59 months were selected randomly from the sampling frame to administer the structured questionnaire.

7.3 VITAMIN A SUPPLEMENTATION COVERAGE

CES 2019 found that nationwide 91.3 percent of the infants aged 6-11 months and 94.7 percent of the children aged 12-59 months received Vitamin A capsules, where the coverage was almost the same in the urban and the rural areas (see Figure 147 and Maps 18 and19).

Figure 147: Coverage among infants aged 6-11 months & children aged 12-59 months during Vitamin A plus campaign by national, urban & rural areas in 2019



7.4 VAC COVERAGE BY RURAL DIVISIONS

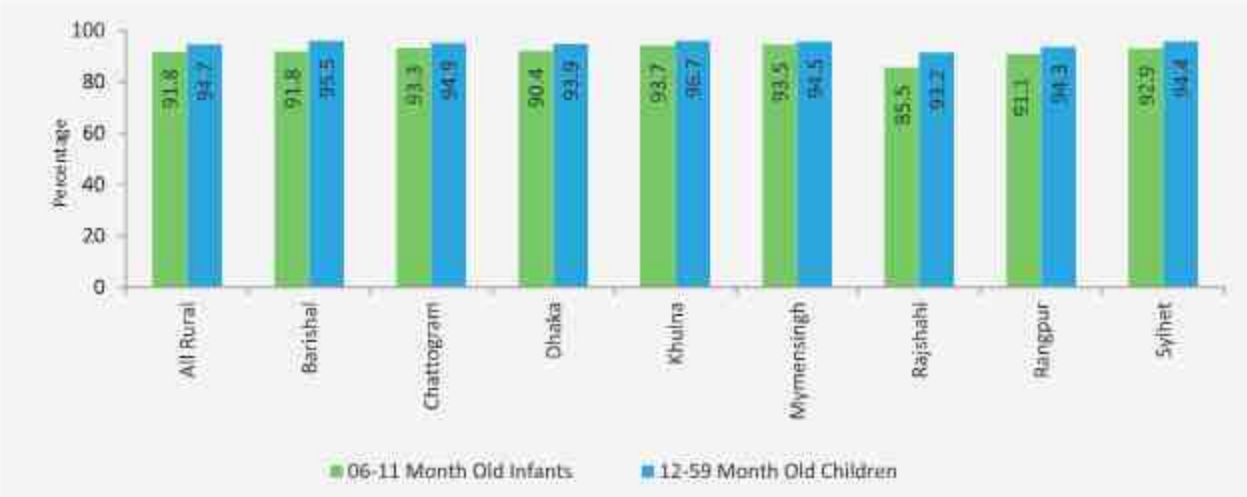
Infants Aged 6-11 Months

Vitamin A Coverage (VAC) was found to be the highest in Khulna (93.7 percent) while it was the lowest in Rajshahi division (85.5 percent). The coverage in other divisions ranged between 90.4 percent and 93.5 percent.

Children Aged 12-59 Months

Figure 148 shows VAC coverage by rural division. It indicates that VAC coverage for children aged between 12 and 59 months was above 93.0 percent in all the divisions. It was the highest in Khulna division (96.7 percent) and the lowest in Rajshahi division (93.2 percent).

Figue 148: Vitamin A supplementation Coverage during Vitamin A Plus Campaign among Infants aged 6-11 months, Children aged 12-59 months in Rural Areas by Division in 2019



7.5 VAC COVERAGE BY CITY CORPORATION AND MUNICIPALITY

Infants Aged 6-11 Months

Across the city corporations, as presented in Figure 149, VAC coverage was found to be the highest in CumCC (97.6 percent) among 06-11 months old infants* and it was the lowest in DNCC (82.5 percent). It ranged between 83.0 percent and 94.2 percent in other city corporations.

Children Aged 12-59 Months

VAC coverage among children 12-59 months old was the highest in CumCC (98.7 percent); it went as low as 86.2 percent in DNCC.

Figure 149: Vitamin A supplementation Coverage during Vitamin A Plus Campaign among Infants aged 6-11 months, Children aged 12-59 months in Urban Areas by City Corporation in 2019

7.6 SEX DIFFERENTIALS IN VITAMIN A COVERAGE

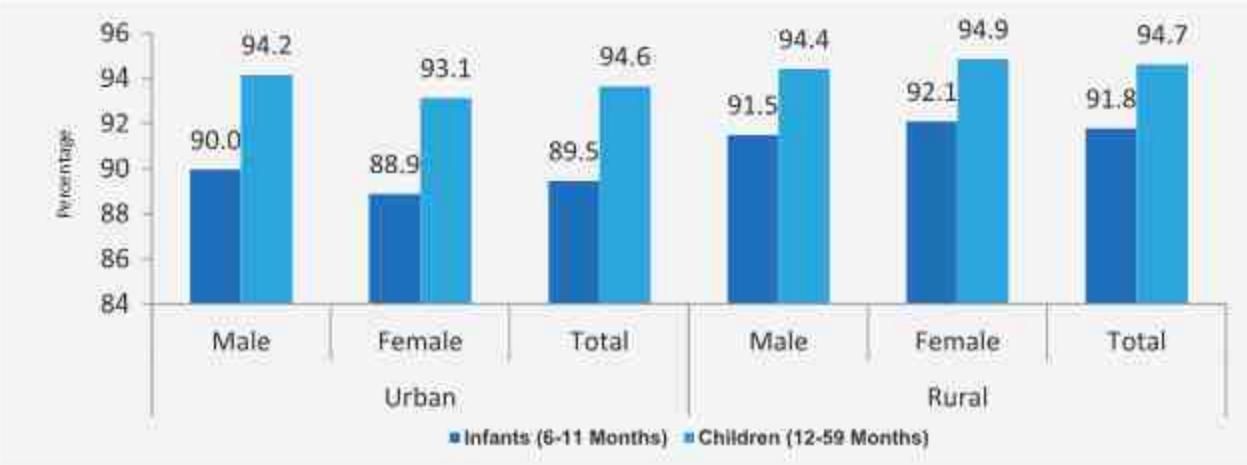
Infants Aged 6-11 Months

By sex, it is evident in Figure 150 that VAC coverage was almost the same among the females (88.9 percent) and the males (90.0 percent) in the urban areas. Similarly, there was 0.6 percentage points difference in the coverage between the males (91.5) and the females (92.1 percent) in the rural areas.

Children Aged 12-59 Months

Figure 150 presents VAC coverage among the 12-59 months old children by sex. It shows that in rural 94.4 percent of the males received Vitamin A capsules during the Vitamin A plus Campaign as against 94.9 percent of the females. In the urban area, it was 1.1 percentage point higher among the males (94.2 percent) than among the females (93.1 percent). However, in the rural areas, it was 0.5 percentage point higher among the females (94.9 percent) than among the males (94.4 percent).

Figure 150: Vitamin A Suplementaion Coverage during Vitamin A Plus Campaign among Children Aged 6-11 months and 12-59 Months by Sex in 2019



7.7 REASONS FOR CHILDREN NOT RECEIVING VAC DURING THE VITAMIN A PLUS CAMPAIGN

Reasons for not receiving Vitamin A during the Vitamin A Plus campaign were also investigated in CES 2019 and presented in Table 19. It shows that more than half (58.1 percent) of the mothers/caregivers did not know about Vitamin A Plus campaign. While 14.4 percent answered that they were not at home during the campaign, another 6.3 percent informed that they had been very busy during the time of vaccination. However, 1.6 percent women were afraid of side-effects.

Table 19: Reasons for Children not receiving Vitamin A Supplementation during Vitamin A Plus Campaign by National, Rural and Urban Areas in 2019

Reasons	National	Urban	Rural
Didn't know	58.1	59.5	57.6
Was not at home	14.4	7.4	16.8
Was very busy	6.3	4.7	6.8
Went on traveling	5.4	5.4	5.4
The child was sick, so didn't take him to the vaccination centre	3.9	6.3	3.1
The child was sick, so the health worker didn't give vaccine	1.7	3.6	1.1
Was afraid of side effects	1.6	1.4	1.6
The centre was too far	1.5	0.9	1.7
The session time was inconvenient	1.2	2.5	0.8
Health worker was not available	1.2	0.3	1.5
Vitamin A was not available	1.0	0.6	1.1
The child was fed in the previous time	0.9	3.5	0.1
Did not think it is important	0.7	1.8	0.4
Was waiting to come back home with vitamin A	0.7	1.4	0.4
Don't believe in Vitamin A	0.5	0.1	0.6
Vaccinator did not feed	0.3	0.2	0.3
Others	0.3	0.2	0.3
There was a long queue	0.1	0.1	0.1
Child cries	0.1	0.2	0.1
Mother was ill	0.1	0.0	0.1
For Rain	0.0	0.0	0.1
Number	2,960	763	2,197

Table 20: Reasons for Children not receiving Vitamin A Supplementation during Vitamin A Plus Campaign in Rural Areas by Division in 2019

Reasons	All Rural	Barishal	Chattogram	Dhaka	Khulna	Mymensingh	Rajshahi	Rangpur	Sylhet
Didn't know	57.6	76.1	40.7	49.9	77.8	30.8	67.1	63.1	69.9
Was not at home	16.8	5.0	21.3	21.1	6.3	21.2	17.0	16.7	10.3
Was very busy	6.8	4.7	10.0	6.2	6.7	12.9	3.8	6.9	4.4
Went on traveling	5.4	0.4	13.6	4.7	2.7	9.6	1.5	2.9	7.0
The child was sick, so didn't take him to the vaccination centre	3.1	2.3	4.1	5.4	0.0	7.9	0.9	1.4	3.8
The centre was too far	1.7	0.8	2.9	1.5	1.7	3.4	0.6	1.5	2.1
Was afraid of side effects	1.6	0.9	1.6	2.4	0.6	7.7	0.3	1.0	0.9
Health worker was not available	1.5	2.7	0.1	1.3	0.0	2.6	3.7	0.6	0.0
Vitamin A was not available	1.1	2.4	1.0	2.1	0.7	0.0	1.1	0.4	1.0
The child was sick, so the health worker didn't give vaccine	1.1	0.7	1.2	1.0	0.9	1.1	1.2	1.5	0.0
The session time was inconvenient	0.8	1.4	1.8	0.5	0.3	1.3	0.1	0.9	0.0
Don't believe in Vitamin A	0.6	0.0	0.8	0.9	1.1	0.0	0.8	0.0	0.7
Was waiting to come back home with vitamin A	0.4	0.0	0.2	0.6	0.9	1.5	0.5	0.0	0.0
Did not think it is important	0.4	0.0	0.4	0.1	0.0	0.0	0.0	1.7	0.0
Vaccinator did not feed	0.3	2.2	0.0	0.5	0.0	0.2	0.5	0.0	0.0
Others	0.3	0.0	0.0	0.7	0.0	0.0	0.4	0.5	0.0
Mother was ill	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.5	0.0
There was a long queue	0.1	0.0	0.1	0.5	0.0	0.0	0.0	0.0	0.0
The child was fed in the previous time	0.1	0.0	0.0	0.1	0.0	0.0	0.4	0.0	0.0
Child cries	0.1	0.4	0.0	0.2	0.1	0.0	0.0	0.0	0.0
For Rain	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0
Religious/Social obstacles	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Child was sleeping	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 21: Reasons for Children not receiving Vitamin A Supplementation during Vitamin A Plus Campaign in Urban Areas by City Corporation and Municipality in 2019

Reasons	All Urban	BCC	CCC	Cum CC	DNCC	DSCC	GCC	KCC	MCC	NCC	Rang CC	RCC	SCC	Municipality
Didn't know	59.5	83.8	5.9	37.4	61.4	46.2	91.3	88.3	65.2	82.9	42.1	0.0	76.8	63.9
Was not at home	7.4	0.0	13.4	17.9	5.9	6.3	3.6	0.0	9.4	0.0	5.2	100.0	4.5	8.9
The child was sick, so didn't take him to the vaccination centre	6.3	0.0	8.1	0.0	6.0	19.3	0.0	3.1	1.5	0.0	0.0	0.0	0.8	4.2
Went on traveling	5.4	0.0	3.0	0.0	11.8	0.0	0.0	0.0	2.2	0.0	15.0	0.0	6.4	4.6
Was very busy	4.7	0.0	24.1	0.9	0.8	1.1	4.4	0.0	19.1	0.0	3.6	0.0	8.1	5.1
The child was sick, so the health worker didn't give vaccine	3.6	0.0	6.2	0.0	0.0	15.5	0.0	0.0	0.0	0.0	2.9	0.0	0.2	3.2
The child was fed in the previous time	3.5	0.0	30.8	0.0	4.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
The session time was inconvenient	2.5	0.0	0.0	0.0	2.8	4.7	0.7	0.0	1.5	2.6	1.7	0.0	0.0	2.6
Did not think it is important	1.8	0.0	0.0	0.0	3.1	5.7	0.0	0.0	0.0	0.0	6.6	0.0	0.0	0.4
Was waiting to come back home with vitamin A	1.4	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	9.1	0.0	0.0	2.0
Was afraid of side effects	1.4	5.4	3.7	0.0	1.4	0.0	0.0	0.0	0.0	4.9	0.0	0.0	1.4	1.6
The centre was too far	0.9	10.8	4.7	0.0	0.0	1.2	0.0	0.0	0.0	0.0	9.5	0.0	1.8	0.8
Vitamin A was not available	0.6	0.0	0.0	43.8	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.1
Health worker was not available	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8
Child cries	0.2	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.0	0.0	0.0	0.0	0.0	0.5
Others	0.2	0.0	0.0	0.0	0.0	0.0	0.0	4.7	0.5	0.0	4.1	0.0	0.0	0.3
Vaccinator did not feed	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
There was a long queue	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2	0.0	0.0	0.0	0.0
Don't believe in Vitamin A	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	0.0	0.0	0.0	0.0
Number	763	6	39	11	91	41	43	37	64	32	47	1	63	288

7.8 SOURCES OF INFORMATION ABOUT VITAMIN A PLUS CAMPAIGN

According to the results shown in Table 22, mosque-miking was the most prominent source of information about the Vitamin A Plus Campaign (39.6 percent) which was being followed by GoB Health workers: 27.8 percent, family/ neighbor/friends: 25.3 percent, mobile miking: 17.0 percent, and Television: 11.3 percent.

Table 22: Sources of Information about Vitamin A Supplementation during Vitamin A Plus Campaign by National, Rural and Urban Areas in 2019

Sources	National	Urban	Rural
Mosque Miking	39.6	25.4	43.5
GOB Health Worker	27.8	14.4	31.6
Family/neighbor/friends	25.3	32.5	23.2
Mobile Miking	17.0	19.7	16.2
Television	11.3	20.1	8.8
Health Workers' home visit	10.9	6.0	12.3
Don't know	7.4	8.5	7.1
Other volunteers Visit	3.9	2.3	4.3
Mobile SMS	3.0	7.9	1.7
NGO worker Visit	1.7	3.2	1.3
City Corporation's / Municipality Health Worker	1.0	3.2	0.4
Teacher visit	0.7	0.9	0.6
Newspaper	0.6	1.3	0.4
Poster	0.1	0.4	0.1
Radio	0.1	0.2	0.1

Map 18: Vitamin A Coverage among 06-11 Months Old Infants by District

Map 19: Vitamin A Coverage among 12-59 Month-Old Children by District

CHAPTER 8

QUALITATIVE FINDINGS

FINDINGS OF QUALITATIVE SURVEY

In Bangladesh, the Ministry of Health and Family Welfare along with different non-government and private organizations across the country have implemented the EPI programme. In the rural areas, Health Assistants (HA) and Family Welfare Assistants (FWA) are the field levels workers responsible for conducting EPI sessions. In contrast, EPI programme in the urban setting is different in nature. In the urban areas, EPI activities are performed through different NGOs under the supervision of the Ministry of Local Government. It is very much evident that EPI coverage in the urban areas is lower than that in the rural areas. For investigating the reasons for variance in coverage, CES 2019 conducted qualitative survey along with quantitative survey among the service providers and service recipients in Dhaka North City Corporation and Dhaka South City Corporation as well as in other rural districts. Findings are separately presented below.

8.1 FINDINGS OF IN-DEPTH INTERVIEWS (IDI)

In CES 2019, information was collected on coordination, dropout management, invalid dose monitoring system, and other relevant issues connected with the vaccination programme. The following facts were revealed in the discussion.

Coordination: In the urban areas, all the EPI activities are coordinated by the Health Officer/Chief Health Officer of City Corporation, depending upon the administrative pattern of the city corporations. Based on the discussion of providers and recipients, it is found that every zone has got several wards. Almost each Ward has one EPI Wardroom. EPI Wardroom supplies vaccines and coordinates EPI activities of other NGOs/satellite site. Vaccination reports are submitted to the Zone office; Zone office submits the report to the City Corporation. As part of the routine activities, a monthly meeting is held with all the EPI service providers at the Zonal Office with an aim to discuss about the progress of EPI activities, including drop-out, left-out, invalid doses, and action needed for further improvement of the programme.In the rural areas, every Upazila Health Complex under the Upazila Health and Family Planning Officer coordinates the EPI activities and ensures vaccines and other logistics in the field level under the coordination of Medical Technologist- EPI (MT EPI). Both in the urban and the rural areas, at ward level EPI activities are run by following the annual EPI micro-plans prepared before the beginning of a new year.

Drop-out management: Drop-out management is one of the crucial areas for improving the vaccination coverage in both the urban and the rural areas. In the urban areas, the drop-out list is maintained at the Zone and Ward levels where vaccinators follow up the drop-out cases through mobile phones and record the outcome. However, exclusive management of dropout is absent at all the NGO levels. We visited 1 NGO and 2 private facilities but could not find any drop-out list at the outreach level. On the other hand, the drop-out list was found at the Ward/Zone level. Drop-out management initiatives were observed in 1 NGO, which was also not vibrant as expected. The table below of a zone proves that there is a system to track the drop-out cases, but no action to be taken in this regard.

EPI Center	No. of session held	Monthly target	MR1 Vaccinated	MR 1 drop-out	MR2 Vaccinated	MR2 drop-out
1	20	26	16	10	27	1
2	01	02	02	0	01	1
3	0	0	0	0	0	0
4	01	02	04	02	03	1
5	02	03	01	01	0	2
6	01	02	05	03	05	03
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9	0	0	0	0	0	0
10	02	04	05	01	09	05
Total	27	39	03	06	45	07

While discussing with one Zone from DNCC and one Zone from DSCC, it was found that the number of satellite clinics varied slightly from one Ward to another which did not represent the proportionate distribution. One Ward had no satellite clinic. Giving reasons the NGO personnel said, "There are 3 static clinics surrounding the ward. Three static sites are enough to cover the whole Ward; therefore, there is no need of satellite site in this Ward." However, while making an analysis of the catchment areas of this Ward, the survey observed areas with the disadvantaged groups of people.

Similar findings were noticed in the rural areas. There are drop-out cases in the register, but widely pronounced system of recording mobile phones of parents was not noticed in all the cases.

The quantitative finding shows that 1 out of every 7 mothers of non-vaccinated children reported this lack of awareness about the vaccination center as a cause of dropout, and almost similar number of mothers in DNCC area with partially vaccinated children reported that they could not vaccinate their children due to their household chores.

This finding shows that the demand side awareness and willingness are still too far against the expectation. Self-demand is not created largely in the urban areas. Accessibility of EPI service in the rural areas should be ensured by EPI programme in the urban areas through proper collaboration with the Ministry of Local Government of GoB.

Monitoring the Invalid Doses: Invalid dose monitoring is another important activity that can improve the valid vaccination coverage as well as reduce the vaccine wastage as invalid dose has got no value in attaining immunity among the vaccine recipients. While making inquiries in this matter no such document was found in the NGO concerned although the officials there claimed that they had gone for such monitoring. However, the same scenario has been observed in the city corporation as EPI supervisor also pronounced the same words like the concern official of the NGO.

Other administrative issues: During the period of discussion on other administrative issues, EPI supervisor of DNCC informed that there was a shortage in supply of tally sheets and registers which hampered quality EPI service delivery. EPI Supervisor said in this regard ***"As there is shortage of tally sheets, it would not be possible to cross check the true vaccination coverage and the vaccines used/wastage."*** Shortage of vaccines was also reported by the Health Assistant from the rural areas.

8.2 FINDINGS OF FOCUS GROUP DISCUSSION (FGD)

In CES 2019, FGDs were conducted among the mothers/caregivers for making an assessment of their knowledge about the vaccination center as well as the reasons for drop-out cases. The findings revealed that mobility of mothers from one place to another hampered the event of vaccination. Mothers'/caregivers' preoccupation with their household activities restricts themselves to bring their children to the vaccination center. In this regard, one mother commented "I did not vaccinate the child with MR because I was busy repairing the household and forgot to vaccinate the child."

Moreover, due to mobility, drop-out occurred from both the supply and the demand sides. One of the mothers of DSCC disclosed: The child was given vaccine at the village. "We have shifted to Dhaka. Here, I didn't know where the vaccination site was."

Illness sometimes refrained the children from vaccination. One of the mothers of DNCC admitted: "Due to my illness, I could not give MR vaccine to my child. After my recovery, the date of vaccination was found to be over. So, I did not take him to the vaccination center."

Demand of money was also depicted as the reason for partial or never having vaccination. While being asked about the case of never-vaccinated children of their surrounding areas or neighbors, one of the mothers declared: there is a non-vaccinated child in our house. The family members did not vaccinate him/her due to lack of money. Taka 50 is required for registration and for making card. They don't even have money to purchase food. How would they vaccinate the child?

Finally, the respondents' suggestions were sought for further improvement of EPI programme so that all vaccines could be ensured. Most of the participants did not give any suggestion in this regard.

CHAPTER 9

DISCUSSION AND RECOMMENDATIONS

DISCUSSION AND RECOMMENDATIONS

9.1 DISCUSSION

The Government of Bangladesh (GoB) and its partners exerted tremendous effort to achieve EPI's desired vaccination coverage objectives which proved its effectiveness in the last decade in particular. As an important means of appraisal of the EPI programme, the Coverage Evaluation Survey (CES) 2019 was carried out between April, 2019 and September, 2019. This chapter presents with a brief discussion on the key findings of CES 2019. Afterwards, a list of recommendations has been made with an aim for further improvement of the EPI programme.

Nationwide, 95.3 percent children received all the eligible vaccines by the age of 23 months, irrespective of age for starting the vaccination and/or minimum intervals between doses. Bangladesh is attempting to reach at least 95 percent valid vaccination coverage at the national level, and 90 percent in each district by the age of 12 months. However, CES 2019 result shows that nationwide, 83.9 percent of the children received it. The urban-rural analysis shows that rural children (85.0 percent) were more likely to receive the valid doses compared to their urban counterparts (79.2 percent).

Across the divisions, both crude and valid vaccination coverages were the highest in Barishal division (98.5 percent and 91.8 percent, respectively). Crude coverage was found to be the lowest in Mymensingh division (92.9 percent). Similarly, the lowest valid coverage was also in Mymensingh division (80.4 percent). The second highest performing division is Rajshahi (86.0 percent). Only Barishal division has reached the district target of at least 91.8 percent.

For the districts, the objective is that all reach at least 90 percent. In Bangladesh, out of 64 districts, eight districts have reached the target of full vaccination coverage of 90 percent in 2019 while there were four districts with 90 percent coverage in 2016. So, sustaining the high coverage rate is also a challenging task which demands special attention from EPI.

The data show that those who were left-out and who dropped out of the vaccination schedule contributed to the lower crude coverage. For BCG, the first dose of childhood vaccination schedule, coverage was 99.7 percent, which indicates that about <1.0 percent of the surveyed children still remained unvaccinated. However, crude fully vaccination coverage was 95.3 percent nationwide, which means that 4.7 percent of the surveyed children dropped out before receiving any subsequent dose of vaccination after receiving BCG. Since the national finding is the reflection of the divisional findings and the divisional findings point towards district coverage, the same interpretation can be applicable in general to the divisions and districts. However, the left-out and drop-out rates do vary from one district to another. As an example of the impact the drop-out rate can have, it may be mentioned here that crude coverage was the lowest in Bandarban district (88.7 percent) among all the districts, with Penta1-MR1 drop-out rate of 7.8 percent, the second highest among all the districts and significantly limiting the district's crude coverage. Because of the impact it could have on the crude vaccination rate, reducing the drop-out rate should be given special attention by the EPI programme.

Drop-outs from vaccinations are caused mostly from the demand side. However, qualitative survey revealed that supply side was also a cause. CES 2019 findings show that mother/caregiver being busy and not taking the child for vaccination (9.9 percent) was the most prevailing reason for partial vaccination. The other most common reasons are: illness of the child; the mother/caregiver being scared of side effects. All these reasons reflected that there was lack of right information about the vaccination service.

So, the community-level health workers should visit households and monitor the drop-out cases during the vaccination session. As regards the supply side, it needs to be mentioned here that mothers/caregivers were scared of making further visits to receive the missed antigen. One of the mothers disclosed: "After crossing the due date, we didn't go for vaccination. We were not sure whether vaccine would be given after the date; so, we didn't go for any vaccine." – Mother of DSCC

Another mother admitted: "I did not give MR1 vaccine due to the illness of my child. And, later I did not visit the vaccination center apprehending that the vaccinator might probably scold me. ."- Mother of DNCC

Further, the act of administering lower invalid doses accelerates the rise in vaccination coverage. Nationwide, valid coverage was 11.4 percentage points lower than crude coverage (83.9 percent and 95.3 percent, respectively), with 3.5 percent of Penta1, 1.0 percent of Penta2, 1.0 percent of Penta3, and 7.8 percent of MR found to be invalid. The highest valid vaccination coverage was observed in Bhola district (95.6 percent), where invalid rates by antigen were for Penta1 1.9 percent, Penta2 0 percent, Penta3 0 percent, and MR 1.4 percent. In contrast, among the districts, the lowest valid vaccination coverage was found in Khagrachari (64.9 percent). It was the district that also had the higher drop-out rate; its invalid Penta1 was 6.5 percent, Penta2 1.4 percent, Penta3 2.6 percent, and MR1 24.5 percent. The analysis reveals that both the drop-out rate and the invalid dose contributed to the lower full vaccination coverage in Khagrachari- a combination common in districts where Full valid vaccination coverage was poorer. Since the act of administering invalid doses was mainly caused by the supply side, EPI should identify the causes of administering invalid doses and address those causes properly.

CES 2019 included MR2 vaccination coverage survey among 24-35 months old children who was born between May 1, 2016 and April 30, 2017. The finding shows that about 93 percent of the children received all the vaccines including MR2 by the age of 23 months across the country. As individual antigen, crude MR2 coverage was found to be 92.6 percent with slight variation between the urban and the rural areas (91.1 percent in urban and 93.0 percent in the rural areas). Taking a look at Crude Full Vaccination Coverage by residence, children from rural areas were more likely to receive all the recommended vaccines than those from urban areas (92.9 percent vs. 90.8 percent). Regarding Valid Full Vaccination Coverage including MR2, 82.4 percent of the children received all the scheduled doses of all antigens as per EPI recommended vaccination schedule. Antigen specifically, BCG coverage was 99.8 percent. Penta1 coverage was 99.7 percent, Penta2 98.6 percent, and Penta3 94.5 percent across the country. The gap between Crude MR1 and Valid MR2 coverage was 8 percentage points. It indicates high incidence of administering invalid dose as well as dropout from MR1 to MR2.

Overall, 92.6 percent of the children received crude MR2, with 89.1 percent children receiving the valid doses of MR2. However, nationwide MR1-MR2 drop-out rate was found to be 3.5 percent. Like other antigens under current EPI Childhood vaccination schedule. EPI has also disease reduction objectives. One of the objectives is to eliminate Measles through ensuring at least two doses of MR vaccines (MR2). Therefore, people engaged in the programme should provide more attention to increase both MR1 and MR2 vaccination coverage through minimizing the drop-out rate from MR1 to MR2 as well.

9.2 Recommendation

Based on the detailed discussion on the findings of the various survey components of CES 2019 presented above, the EPI authorities may consider the following recommendations for further improvement of the programme:

- Intervention towards identification of low performing areas, tracking and vaccinating un-vaccinated and partially vaccinated children can increase the vaccination coverage

- Refreshers training for both the government and non-government health managers and frontline health workforces would be helpful to minimize invalid doses
- Paying more attention to strengthening supervision and monitoring at all levels would bring positive changes in vaccination coverage
- Apart from pen and paper monitoring, technology-based monitoring system could be more effective to improve the vaccination coverage, both in quantitative and qualitative aspects.
- Strengthening coordination with Ministry of Local Government, City Corporations, NGOs, and private health facilities would ensure increased vaccination coverage among in the urban and the slum population.
- Despite good proportion of protection at birth against Neonatal Tetanus and high coverage for TT1 and TT2, TT campaign programme in schools, colleges, and garments factories could be established to ensure reproductive life time protection against Tetanus.
- Full Vaccination Coverage (FVC) was found to be lower in urban, slum and hard-to-reach areas than national average. Equity focused strategy needs to be developed to increase the vaccination coverage in urban, slum and hard-to-reach areas
- Considering the current childhood vaccination schedule under EPI, Full Vaccination Coverage (FVC) may be estimated by including: 1 dose of BCG; 3 doses of OPV; Pentavalent; and PCV; 2 doses of IPV; and 2 doses of MR

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APPENDICES

APPENDIX A : Valid Full Vaccination Coverage by Survey Units (in figures). (Fully Immunized Arranged in Ascending Order by All Districts and City Corporation)

APPENDIX B : Vaccination Coverage by Survey Units (in Tables)

APPENDIX C : Valid Full Vaccination Coverage including MR2 by Survey Units (in figures). (Fully Immunized Arranged in Ascending Order by All Districts and City Corporation)

APPENDIX D : Vaccination Coverage including MR2 by Survey Units (in Tables)

APPENDIX E : Programme Quality (Droup-out rate, Incidence of Invalid Dose, Card Retention Rate in Tables by District)

APPENDIX F : TT Vaccination Coverage by Survey Units (in Tables)

APPENDIX G : Vitamin A Supplementation Coverage by Survey Units (in Tables)

APPENDIX H : Effective Sample Size, Confidence Interval, Wealth Quintile Procedure, and Sampling Weight

APPENDIX I : English Questionniare

APPENDIX A: Valid Full Vaccination Coverage by Survey Units (in figures). (Fully Immunized Arranged in Ascending Order by All Districts and City Corporation)

Figure 1. Valid Full Vaccination Coverage by Age 12 Months among 12-23 Months Old Children by Districts and City Corporation in Barishal Division

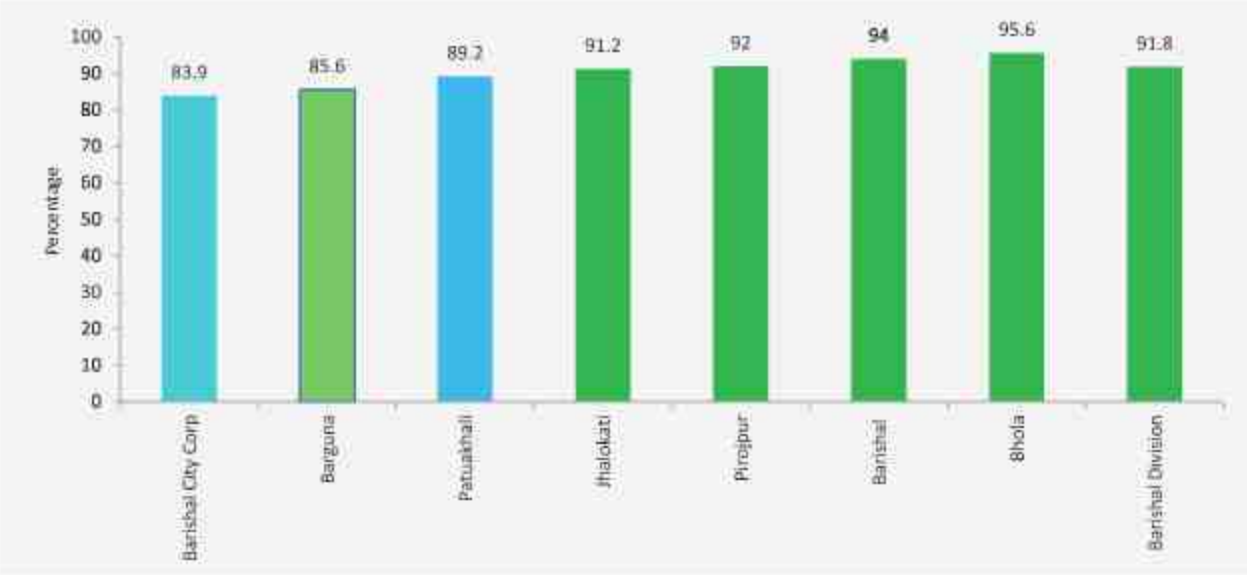


Figure 2. Valid Full Vaccinatiion Coverage by Age 12 Months among 12-23 Months Old Children by Districts and City Corporations in Chattogram Division

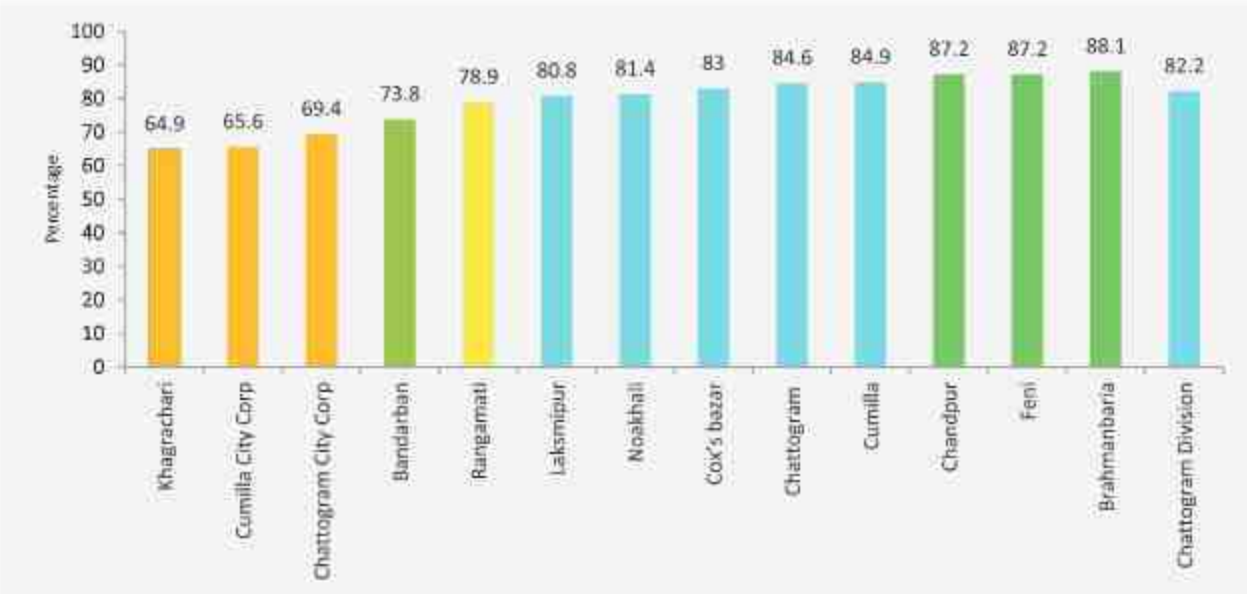


Figure 3. Valid Full Vaccination Coverage by Age 12 Months among 12-23 Months Old Children by Districts and City Corporations in Dhaka Division

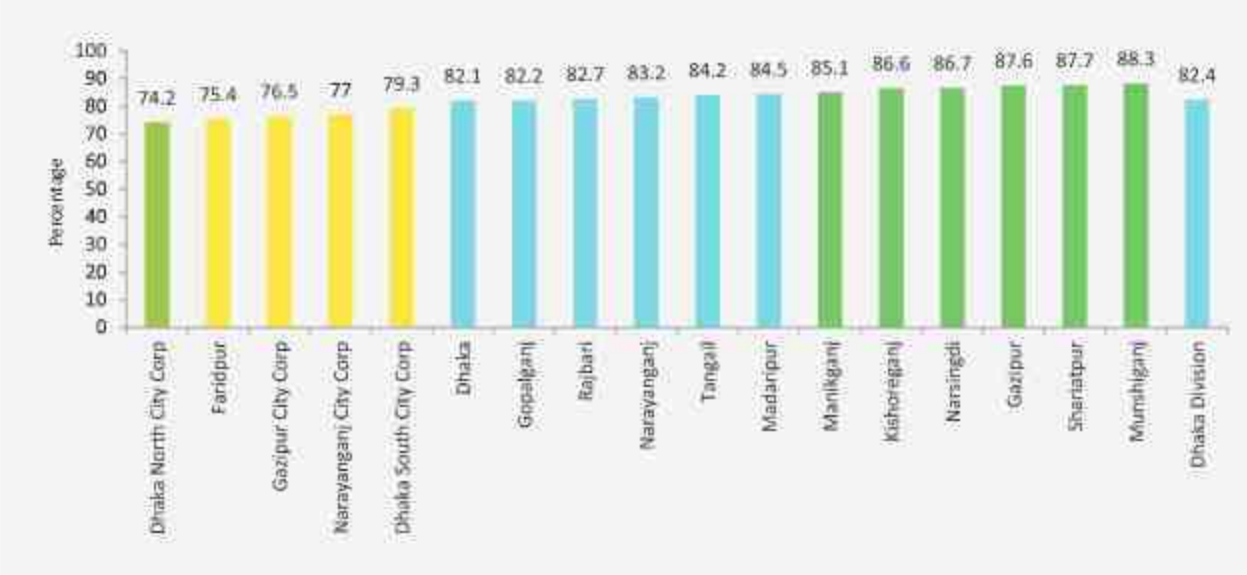


Figure 4. Valid Full Vaccination Coverage by Age 12 Months among 12-23 Months Old Children by Districts and City Corporation in Khulna Division

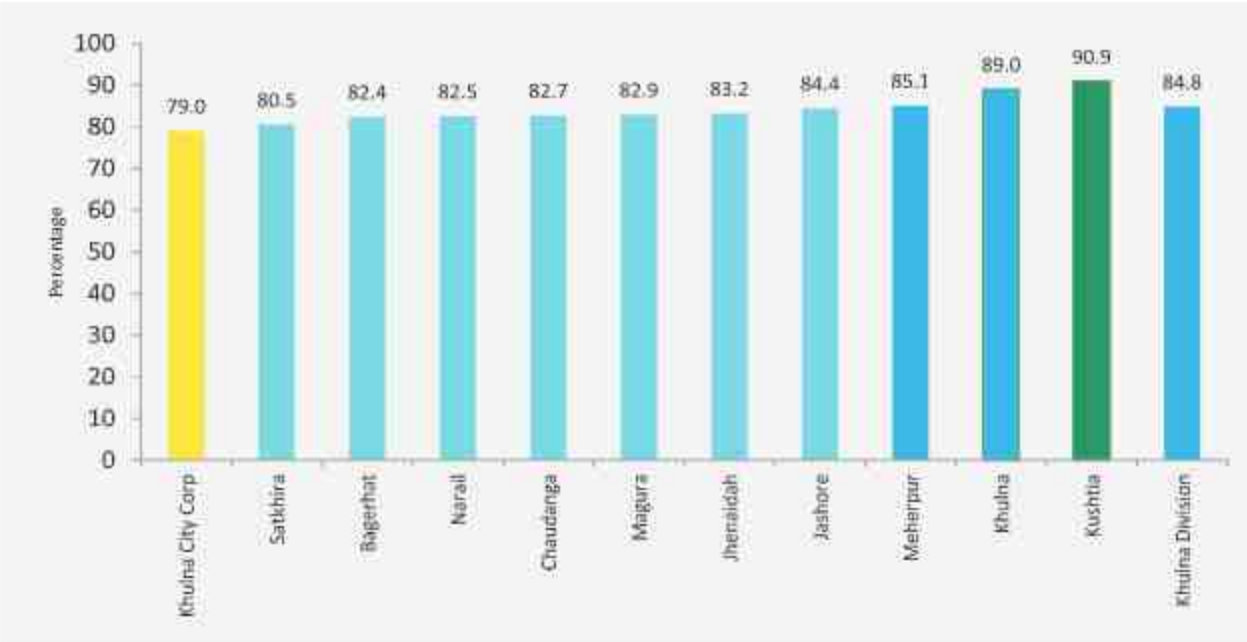


Figure 5. Valid Full Vaccination Coverage by Age 12 Months among 12-23 Months Old Children by Districts and City Corporation in Mymensingh Division

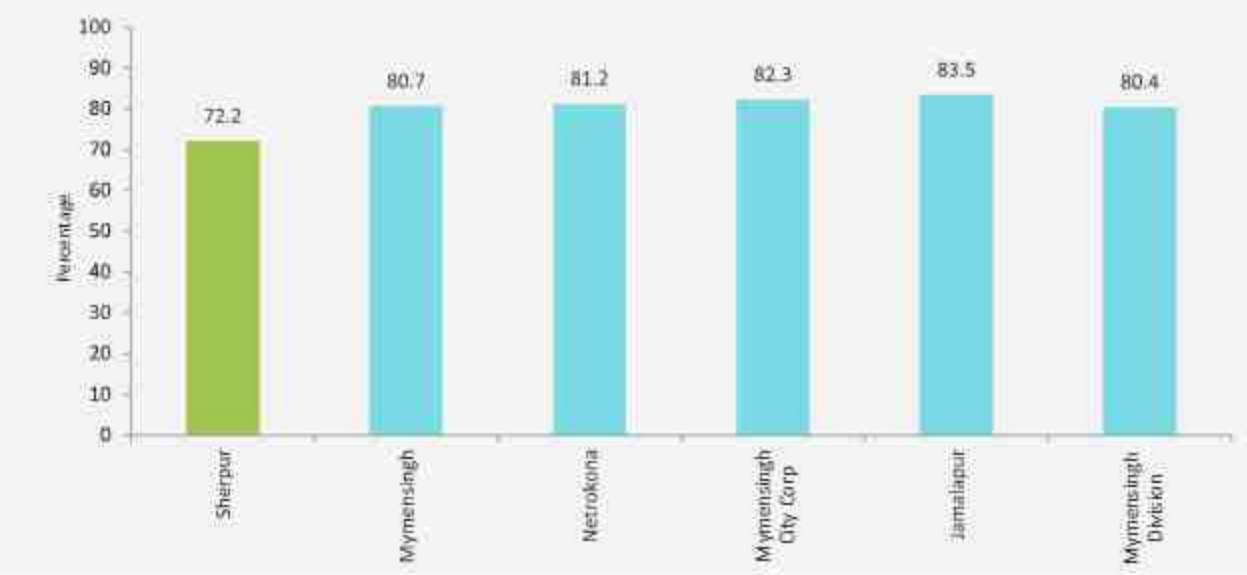


Figure 6. Valid Full Vaccination Coverage by Age 12 Months among 12-23 Months Old Children by Districts and City Corporation in Rajshahi Division

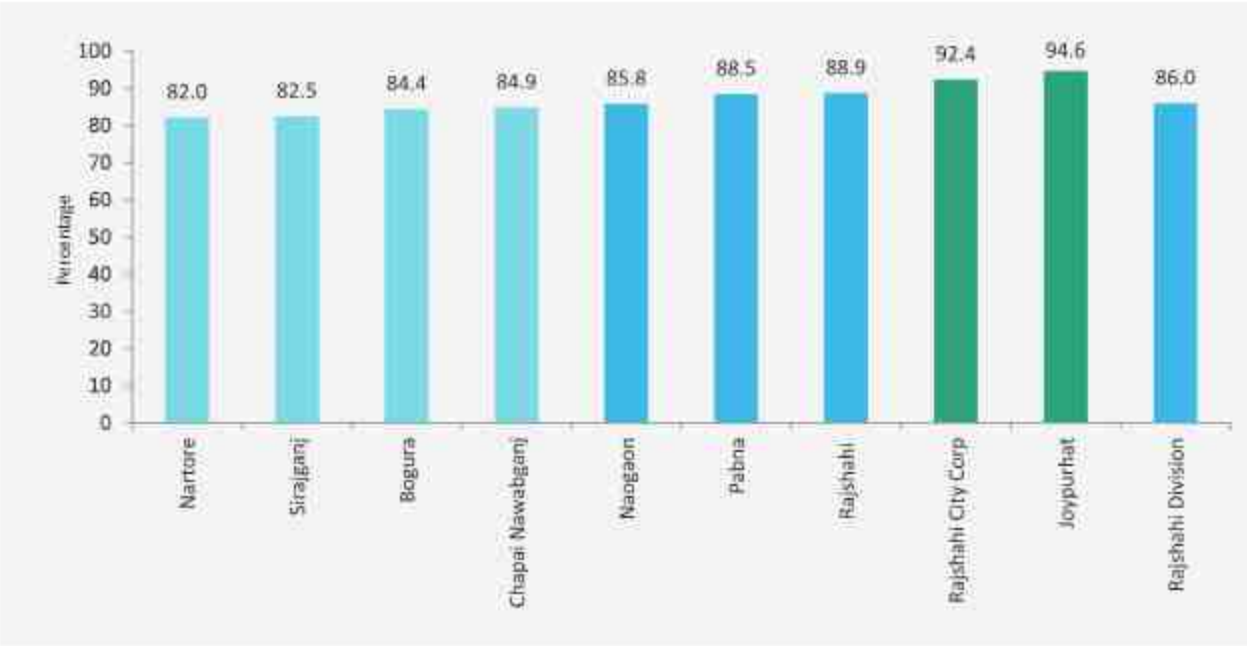


Figure 7. Valid Full Vaccination Coverage by Age 12 Months among 12-23 Months Old Children by Districts and City Corporation in Rangpur Division

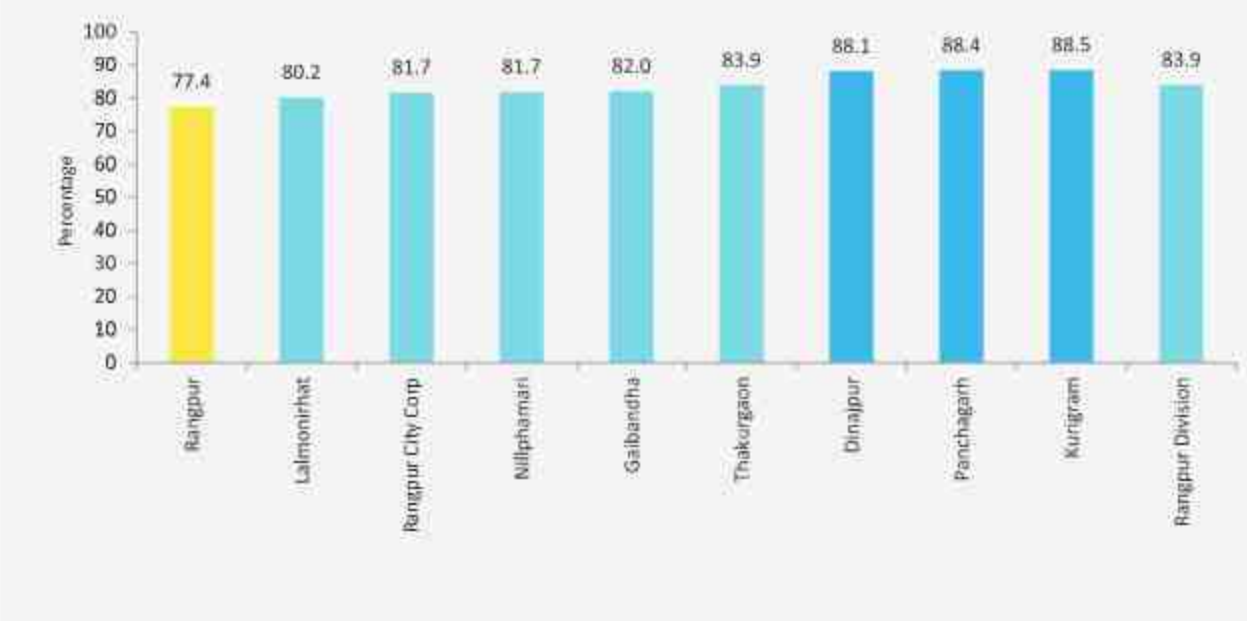
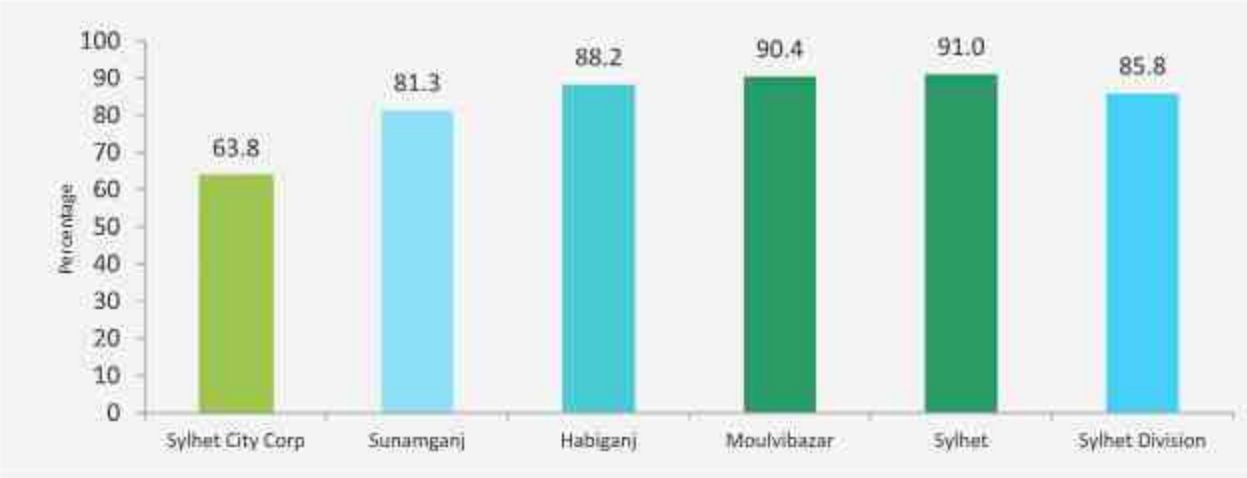


Figure 8. Valid Full Vaccination Coverage by Age 12 Months among 12-23 Months Old Children by Districts and City Corporation in Sylhet Division



APPENDIX B: Vaccination Coverage by Survey Units (in Tables)

Table 1: Crude Vaccination Coverage by Age of 23 Months[7] by District and City Corporation

District/City Corporation	BCG	Penta1	OPV1	PCV1	Penta2	OPV2	PCV2	Penta3	OPV3	PCV3	MR1	FVC
Barguna	99.5	99.5	99.5	99.5	99.4	99.4	99.4	99.1	99.1	99.1	96.5	96.5
Barishal	100	100	100	100	99.8	99.8	99.8	99.6	99.6	99.2	99.6	99.2
Barishal City Corporation	100	100	100	100	99.6	99.6	99.6	99.1	99.1	98.1	94.1	93.3
Bhola	100	100	100	100	100	100	100	99.8	99.8	99.8	99.7	99.5
Jhalokati	100	100	100	100	99.6	99.6	99.6	99.2	99.2	99	97.8	97.4
Patuakhali	100	100	100	100	100	100	100	99.7	99.7	99.5	98.4	98.3
Pirojpur	100	100	100	100	100	100	100	99.8	99.8	99.7	99.2	99.2
Barishal Division	**100**	**99.9**	**99.9**	**99.9**	**99.8**	**99.8**	**99.8**	**99.6**	**99.6**	**99.4**	**98.7**	**98.5**
Bandarban	100	96.9	96.9	96.9	95.9	95.9	95.9	95.7	95.7	94.9	89.1	88.7
Brahmanbaria	100	100	100	100	100	100	100	99.5	99.5	99.2	98.2	97.7
Chandpur	100	99.6	99.6	99.6	99.6	99.6	99.6	99.6	99.6	98.9	96.4	95.9
Chattogram	100	99.2	99.2	99.2	99	99	99	98.5	98.5	98.9	98.4	97.7
Chattogram City Corporation	99.5	99.2	99.2	99.2	98.5	98.5	98.5	96	96	96.2	90.1	89
Cumilla	99.8	98.7	98.7	98.7	98.7	98.7	98.7	98.7	98.7	98.4	97.2	96.8
Cumilla City Corporation	95.7	95.7	95.7	95.7	95.7	95.7	95.7	94.9	94.9	94.8	92.6	92.2
Cox's bazar	99.8	99.8	99.8	99.8	99	99	99	98.6	98.6	98.5	95.3	95.1
Feni	100	100	100	100	99.7	99.7	99.7	99.1	99.1	98.7	97.1	96.6
Khagrachari	100	100	100	100	99	99	99	97.5	97.5	97	91.7	91.2
Laksmipur	100	100	100	100	100	100	100	100	100	99.3	96	95.6
Rangamati	98.9	98.9	98.9	98.9	98.5	98.5	98.5	96.9	96.9	96.5	93.2	92
Noakhali	99.2	99.2	99.2	99.2	98.8	98.8	98.8	98	98	97.6	96.4	96.1
Chattogram Division	**99.1**	**99.1**	**99.1**	**99.1**	**98.9**	**98.9**	**98.9**	**98.3**	**98.3**	**98.1**	**96**	**95.5**
Dhaka	100	100	100	100	99.8	99.8	99.8	99.6	99.6	98.9	97.2	96.8
Dhaka North City Corporation	100	100	100	100	100	100	100	98.9	98.9	98.7	96.1	95.6
Dhaka South City Corporation	100	99.6	99.6	99.6	99.1	99.1	99.1	97.3	97.3	96.8	91.9	91.5
Faridpur	100	99.6	99.6	99.6	98.9	98.9	98.9	98.3	98.3	97.4	92.6	92
Gazipur	100	99.7	99.7	99.7	99.4	99.4	99.4	98.2	98.2	97.9	95.2	94.7
Gazipur City Corp	100	100	100	100	99.6	99.6	99.6	97.1	97.1	97.1	88.4	88.1
Gopalganj	100	100	100	100	99.8	99.8	99.8	99.3	99.3	97.8	96.2	94.8
Kishoreganj	100	100	100	100	99.4	99.4	99.4	97.8	97.8	97.4	97.2	96.1
Madaripur	100	100	100	100	99.5	99.5	99.5	98.9	98.9	98.9	97.3	97.1
Manikganj	100	100	100	100	100	100	100	99.3	99.3	98.9	95.6	95.2
Munshiganj	100	100	100	100	99.6	99.6	99.6	99.4	99.4	98.5	97.2	96.7
Narayanganj	100	100	100	100	99.8	99.8	99.8	98.2	98.2	97.5	94	93.3
Narayanganj City Corporation	100	99.7	99.7	99.7	97.8	97.8	97.8	96.9	96.9	96.3	93.3	92.9
Narsingdi	100	100	100	100	100	100	100	99.5	99.5	99.8	98.1	98
Rajbari	100	100	100	100	100	100	100	99.7	99.7	99.5	95.7	95.5
Shariatpur	100	100	100	100	100	100	100	99.7	99.7	99.3	98.6	98.3
Tangail	100	100	100	100	98.6	98.6	98.6	97.3	97.3	96.5	93.6	93
Dhaka Division	**100**	**99.9**	**99.9**	**99.9**	**99.5**	**99.5**	**99.5**	**98.5**	**98.5**	**98**	**95.2**	**94.7**

[7] Children born between May 1, 2017 and April 30, 2018

Table 1: Continued

District/City Corporation	BCG	Penta1	OPV1	PCV1	Penta2	OPV2	PCV2	Penta3	OPV3	PCV3	MR1	FVC
Bagerhat	99.8	99.8	99.8	99.8	98.3	98.3	98.3	97.5	97.5	97	94	93
Chaudanga	100	100	100	100	100	100	100	99.1	99.1	98.4	96.8	96.1
Jashore	100	100	100	100	99.5	99.5	99.5	98.9	98.9	97	96	94.3
Jhenaidah	100	100	100	100	100	100	100	99.3	99.3	98.7	97.4	96.6
Khulna	99.2	99.2	99.2	99.2	98.9	98.9	98.9	98.4	98.4	97.7	98.2	97.3
Khulna City Corporation	99.1	99.1	99.1	99.1	98.4	98.4	98.4	96.9	96.9	96.7	93.8	93.6
Kushtia	100	99.8	99.8	99.8	99.3	99.3	99.3	99	99	98.8	98.4	98.1
Magura	100	100	100	100	99.8	99.8	99.8	99.6	99.6	98.5	95	93.5
Meherpur	99.4	99.2	99.2	99.2	98.3	98.3	98.3	98.1	98.1	97.7	95.8	95.6
Narail	98.6	98.6	98.6	98.6	98.1	98.1	98.1	97.7	97.7	97	93.4	92.6
Satkhira	99.8	99.8	99.8	99.8	99.6	99.6	99.6	98.8	98.8	98.8	96.7	96.3
Khulna Division	**99.7**	**99.7**	**99.7**	**99.7**	**99.2**	**99.2**	**99.2**	**98.6**	**98.6**	**97.9**	**96.4**	**95.6**
Jamalapur	100	100	100	100	99	99	99	98.1	98.1	97.6	94.5	93.9
Mymensingh	100	100	100	100	99.9	99.9	99.9	98.6	98.6	97.6	91.9	91.1
Mymensingh City Corporation	100	100	100	100	99.5	99.5	99.5	98.7	98.7	99	96.3	96.1
Netrokona	100	99.6	99.6	99.6	98.8	98.8	98.8	98.1	98.1	98.1	94.9	94.5
Sherpur	100	99.8	99.8	99.8	99.4	99.4	99.4	99	99	98.3	95	94.1
Mymensingh Division	**100**	**99.9**	**99.9**	**99.9**	**99.4**	**99.4**	**99.4**	**98.4**	**98.4**	**97.8**	**93.6**	**92.9**
Bogura	100	100	100	100	99.6	99.6	99.6	99.6	99.6	99.4	97.9	97.7
Joypurhat	100	100	100	100	99.8	99.8	99.8	99.8	99.8	99.8	99.4	99.4
Natore	100	100	100	100	99.4	99.4	99.4	98.5	98.5	97.9	96.5	95.9
Naogaon	100	100	100	100	99.2	99.2	99.2	98.6	98.6	98.3	95.6	95.3
Chapai Nawabganj	100	100	100	100	100	100	100	99.3	99.3	98.9	95.5	95.1
Pabna	99.9	99.9	99.9	99.9	99.5	99.5	99.5	99.2	99.2	99	96.6	96.6
Rajshahi	100	100	100	100	100	100	100	99.5	99.5	98.4	95.9	94.9
Rajshahi City Corporation	100	100	100	100	100	100	100	99.8	99.8	99.8	99.8	99.8
Sirajganj	99.5	99.5	99.5	99.5	98.9	98.9	98.9	98.9	98.9	98.9	94.3	94.3
Rajshahi Division	**99.9**	**99.9**	**99.9**	**99.9**	**99.5**	**99.5**	**99.5**	**99.2**	**99.2**	**98.8**	**96.3**	**96**
Dinajpur	100	100	100	100	99.7	99.7	99.7	98.5	98.5	98.3	97.6	97.2
Gaibandha	100	100	100	100	99.6	99.6	99.6	98.1	98.1	98.1	93.4	93.4
Kurigram	100	100	100	100	99.4	99.4	99.4	99	99	98.2	95.8	95.3
Lalmonirhat	100	100	100	100	100	100	100	99.6	99.6	99.2	95.2	94.9
Nilphamari	100	100	100	100	100	100	100	99.8	99.8	97.6	96.2	94.3
Panchagarh	100	100	100	100	100	100	100	100	100	99.8	99.6	99.5
Rangpur	100	100	100	100	99	99	99	98.1	98.1	97.7	93	92.8
Rangpur City Corporation	100	99.8	99.8	99.8	99.8	99.8	99.8	98.8	98.8	98.4	93.3	92.7
Thakurgaon	100	100	100	100	99.6	99.6	99.6	98.4	98.4	98.3	97.4	96.8
Rangpur Division	**100**	**100**	**100**	**100**	**99.6**	**99.6**	**99.6**	**98.7**	**98.7**	**98.2**	**95.7**	**95.2**
Habiganj	98.9	98.9	98.9	98.9	98.5	98.5	98.5	98.2	98.2	97.8	95.9	95.5
Moulvibazar	100	100	100	100	100	100	100	99.8	99.8	99.6	99.2	98.8
Sunamganj	98.9	98.8	98.8	98.8	98.6	98.6	98.6	98	98	96.2	94.2	92.5
Sylhet	100	100	100	100	100	100	100	99.9	99.9	99.9	99.5	99.5
Sylhet City Corporation	97.9	97.9	97.9	97.9	96.7	96.7	96.7	94.8	94.8	94.4	88.3	87.6
Sylhet Division	**99.3**	**99.3**	**99.3**	**99.3**	**99.1**	**99.1**	**99.1**	**98.7**	**98.7**	**98**	**96.5**	**95.8**
National	99.7	99.7	99.7	99.7	99.3	99.3	99.3	98.7	98.7	98.2	95.9	95.3
Urban	99.8	99.4	99.4	99.4	98.8	98.8	98.8	97.7	97.7	97.2	93.9	93.3
Rural	99.8	99.8	99.8	99.8	99.5	99.5	99.5	98.9	98.9	98.5	96.4	95.9
Dhaka North City Corporation Slum	100	100	99.8	99.8	99.8	99.1	99.1	98.8	95.1	95.1	94.3	86.3
Dhaka South City Corporation Slum	99.7	99.7	99.1	99.1	99.1	97	97	96.8	94.3	94.3	94.3	88.2
Chattogram City Corporation Slum	100	100	100	100	100	99.2	99.2	98.9	97.4	97.4	97.6	92.5

Table 2: Crude Vaccination Coverage by Age of 12 Months[8] by District and City Corporation

District/City Corporation	BCG	Penta1	OPV1	PCV1	Penta2	OPV2	PCV2	Penta3	OPV3	PCV3	MR1	FVC
Barguna	99.5	99.5	99.5	99.5	99.4	99.4	99.4	99.1	99.1	99.1	96.5	96.5
Barishal	100	100	100	100	99.6	99.6	99.6	99.6	99.6	99.2	99.6	99.2
Barishal City Corporation	100	100	100	100	99.6	99.6	99.6	99.1	99.1	98.1	94.1	93.3
Bhola	100	100	100	100	100	100	100	99.8	99.8	99.8	99.7	99.5
Jhalokati	100	100	100	100	99.6	99.6	99.6	99.2	99.2	99	97.8	97.4
Patuakhali	100	100	100	100	100	100	100	99.7	99.7	99.5	98.4	98.3
Pirojpur	100	100	100	100	100	100	100	99.8	99.8	99.7	99.2	99.2
Barishal Division	**99.9**	**99.9**	**99.9**	**99.9**	**99.8**	**99.8**	**99.8**	**99.6**	**99.6**	**99.4**	**98.7**	**98.5**
Bandarban	96.9	96.9	96.9	96.9	95.9	95.9	95.9	95.9	95.9	95.4	89.1	88.7
Brahmanbaria	100	100	100	100	100	100	100	99.5	99.5	99.2	98.2	97.7
Chandpur	99.6	99.6	99.6	99.6	99.6	99.6	99.6	99.6	99.6	98.9	96.4	95.9
Chattogram	99.2	99.2	99.2	99.2	99	99	99	98.5	98.5	98.9	98.4	97.7
Chattogram City Corporation	99.5	99.2	99.2	99.2	98.5	98.5	98.5	96	96	96.2	90.1	89
Cumilla	98.7	98.7	98.7	98.7	98.7	98.7	98.7	98.7	98.7	98.4	97.2	96.8
Cumilla City Corporation	95.7	95.7	95.7	95.7	95.7	95.7	95.7	94.9	94.9	94.8	92.6	92.2
Cox's bazar	99.8	99.8	99.8	99.8	99	99	99	98.6	98.6	98.5	95.3	95.1
Feni	100	100	100	100	99.7	99.7	99.7	99.1	99.1	98.7	97.1	96.6
Khagrachari	100	100	100	100	99	99	99	97.5	97.5	97	91.7	91.2
Laksmipur	100	100	100	100	100	100	100	99.8	99.8	99.2	96	95.6
Rangamati	98.9	98.9	98.9	98.9	98.5	98.5	98.5	96.9	96.9	96.5	93.2	92
Noakhali	99.2	99.2	99.2	99.2	98.8	98.8	98.8	98	98	97.6	96.4	96.1
Chattogram Division	**99.1**	**99.1**	**99.1**	**99.1**	**98.9**	**98.9**	**98.9**	**98.3**	**98.3**	**98.1**	**96**	**95.5**
Dhaka	100	100	100	100	99.8	99.8	99.8	99.6	99.6	98.9	97.2	96.8
Dhaka North City Corporation	100	100	100	100	100	100	100	98.9	98.9	98.7	96.1	95.6
Dhaka South City Corporation	99.8	99.6	99.6	99.6	99.1	99.1	99.1	97.3	97.3	96.8	91.9	91.2
Faridpur	100	99.6	99.6	99.6	98.9	98.9	98.9	98.3	98.3	97.4	92.6	92
Gazipur	100	99.7	99.7	99.7	99.4	99.4	99.4	98.2	98.2	97.9	95.2	94.7
Gazipur City Corporation	100	100	100	100	99.6	99.6	99.6	97.1	97.1	96.6	88.4	88.1
Gopalganj	100	100	100	100	99.8	99.8	99.8	99.3	99.3	97.8	96.2	94.8
Kishoreganj	100	100	100	100	99.4	99.4	99.4	97.8	97.8	97.4	97.2	96.1
Madaripur	100	100	100	100	99.5	99.5	99.5	98.9	98.9	98.9	97.3	97.1
Manikganj	100	100	100	100	100	100	100	99.3	99.3	98.9	95.6	95.2
Munshiganj	100	100	100	100	99.6	99.6	99.6	99.4	99.4	98.5	97.2	96.7
Narayanganj	100	100	100	100	99.8	99.8	99.8	98.2	98.2	97.5	94	93.3
Narayanganj City Corporation	100	99.7	99.7	99.7	97.8	97.8	97.8	96.9	96.9	96.3	93.3	92.9
Narsingdi	100	100	100	100	100	100	100	99.5	99.5	99.8	98.1	98
Rajbari	100	100	100	100	100	100	100	99.5	99.5	99.5	95.7	95.5
Shariatpur	100	100	100	100	100	100	100	99.7	99.7	99.3	98.6	98.3
Tangail	100	100	100	100	98.6	98.6	98.6	97.3	97.3	96.5	93.6	93
Dhaka Division	**100**	**99.9**	**99.9**	**99.9**	**99.5**	**99.5**	**99.5**	**98.5**	**98.5**	**98**	**95.2**	**94.7**

[8] Children born between May 1, 2017 and April 30, 2018

Table 2: Continued

District/City Corporation	BCG	Penta1	OPV1	PCV1	Penta2	OPV2	PCV2	Penta3	OPV3	PCV3	MR1	FVC
Bagerhat	99.8	99.8	99.8	99.8	98.3	98.3	98.3	97.5	97.5	97	94	93
Chaudanga	100	100	100	100	99.8	99.8	99.8	99.1	99.1	98.4	96.8	96.1
Jashore	100	100	100	100	99.5	99.5	99.5	98.9	98.9	97	96	94.3
Jhenaidah	100	100	100	100	100	100	100	99.3	99.3	98.7	97.4	96.6
Khulna	99.2	99.2	99.2	99.2	98.9	98.9	98.9	98.4	98.4	97.7	98.2	97.3
Khulna City Corporation	99.1	99.1	99.1	99.1	98.4	98.4	98.4	96.9	96.9	96.7	93.8	93.6
Kushtia	100	99.8	99.8	99.8	99.3	99.3	99.3	99	99	98.8	98.4	98.1
Magura	100	100	100	100	99.8	99.8	99.8	99.6	99.6	98.5	95	93.5
Meherpur	99.4	99.2	99.2	99.2	98.3	98.3	98.3	98.1	98.1	97.7	95.8	95.4
Narail	98.6	98.6	98.6	98.6	98.1	98.1	98.1	97.7	97.7	97	93.4	92.6
Satkhira	99.8	99.8	99.8	99.8	99.6	99.6	99.6	98.8	98.8	98.8	96.7	96.3
Khulna Division	**99.7**	**99.7**	**99.7**	**99.7**	**99.2**	**99.2**	**99.2**	**98.6**	**98.6**	**97.9**	**96.4**	**95.6**
Jamalapur	100	100	100	100	99	99	99	98.1	98.1	97.6	94.5	93.9
Mymensingh	100	100	100	100	99.9	99.9	99.9	98.6	98.6	97.6	91.9	91.1
Mymensingh City Corporation	100	100	100	100	99.5	99.5	99.5	98.7	98.7	99	96.3	96.1
Netrokona	100	99.6	99.6	99.6	98.8	98.8	98.8	98.1	98.1	98.1	94.9	94.5
Sherpur	100	99.8	99.8	99.8	99.4	99.4	99.4	99	99	98.3	95	94.1
Mymensingh Division	**100**	**99.9**	**99.9**	**99.9**	**99.4**	**99.4**	**99.4**	**98.4**	**98.4**	**97.8**	**93.6**	**92.9**
Bogura	100	100	100	100	99.6	99.6	99.6	99.6	99.6	99.4	97.9	97.7
Joypurhat	100	100	100	100	99.8	99.8	99.8	99.8	99.8	99.6	99.4	99.4
Natore	100	100	100	100	99.4	99.4	99.4	98.5	98.5	97.9	96.5	95.9
Naogaon	100	100	100	100	99.2	99.2	99.2	98.6	98.6	98.3	95.6	95.3
Chapai Nawabganj	100	100	100	100	99.8	99.8	99.8	99.3	99.3	98.7	95.5	95.1
Pabna	99.9	99.9	99.9	99.9	99.5	99.5	99.5	99.2	99.2	99	96.6	96.6
Rajshahi	100	100	100	100	99.7	99.7	99.7	99.3	99.3	98.4	95.9	94.9
Rajshahi City Corporation	100	100	100	100	100	100	100	99.8	99.8	99.8	99.8	99.8
Sirajganj	99.5	99.5	99.5	99.5	98.9	98.9	98.9	98.9	98.9	98.9	94.3	94.3
Rajshahi Division	99.9	99.9	99.9	99.9	99.4	99.4	99.4	99.1	99.1	98.8	96.3	96
Dinajpur	100	100	100	100	99.7	99.7	99.7	98.5	98.5	98.3	97.6	97.2
Gaibandha	100	100	100	100	99.6	99.6	99.6	98.1	98.1	98.1	93.4	93.4
Kurigram	100	100	100	100	99.4	99.4	99.4	99	99	98.2	95.8	95.3
Lalmonirhat	100	100	100	100	100	100	100	99.6	99.6	99.2	95.2	94.9
Nilphamari	100	100	100	100	100	100	100	99.8	99.8	97.6	96.2	94.3
Panchagarh	100	100	100	100	100	100	100	99.8	99.8	99.8	99.6	99.5
Rangpur	100	100	100	100	99	99	99	98.1	98.1	97.7	93	92.8
Rangpur City Corporation	100	99.8	99.8	99.8	99.8	99.8	99.8	98.8	98.8	98.4	93.3	92.7
Thakurgaon	100	100	100	100	99.6	99.6	99.6	98.4	98.4	98.3	97.4	96.8
Rangpur Division	**100**	**100**	**100**	**100**	**99.6**	**99.6**	**99.6**	**98.7**	**98.7**	**98.2**	**95.7**	**95.2**
Habiganj	98.9	98.9	98.9	98.9	98.5	98.5	98.5	98.2	98.2	97.8	95.9	95.5
Moulvibazar	100	100	100	100	100	100	100	99.6	99.6	99.4	99.2	98.8
Sunamganj	98.9	98.8	98.8	98.8	98.6	98.6	98.6	98	98	96.2	94.2	92.5
Sylhet	100	100	100	100	99.9	99.9	99.9	99.7	99.7	99.6	99.5	99.5
Sylhet City Corporation	97.9	97.9	97.9	97.9	96.7	96.7	96.7	94.7	94.7	94.4	88.3	87.6
Sylhet Division	**99.3**	**99.3**	**99.3**	**99.3**	**99.1**	**99.1**	**99.1**	**98.6**	**98.6**	**97.9**	**96.5**	**95.8**
National	99.7	99.7	99.7	99.7	99.3	99.3	99.3	98.6	98.6	98.2	95.9	95.3
Urban	99.4	99.4	99.4	99.4	98.8	98.8	98.8	97.7	97.7	97.2	93.9	93.3
Rural	99.8	99.8	99.8	99.8	99.5	99.5	99.5	98.9	98.9	98.5	96.4	95.9

Table 3: Valid Vaccination Coverage by Age of 23 Months[9] by District and City Corporation

District/City Corporation	BCG	Penta1	OPV1	PCV1	Penta2	OPV2	PCV2	Penta3	OPV3	PCV3	MR1	FVC
Barguna	99.5	99.5	99.5	99.5	99.4	99.4	99.4	94.8	94.8	94.5	91.2	88.7
Barishal	100	100	100	100	99.8	99.8	99.8	98.1	98.1	97.8	98.4	96.6
Barishal City Corporation	100	100	100	100	99.6	99.6	99.6	95.4	95.4	94	90.8	87.2
Bhola	100	100	100	100	100	100	100	98	98	98	98.8	97.1
Jhalokati	100	100	100	100	99.6	99.6	99.6	97	97	96.8	96.3	94.5
Patuakhali	100	100	100	100	100	100	100	96.7	96.7	96.3	96.6	93.5
Pirojpur	100	100	100	100	100	100	100	98.1	98.1	98	96.9	95.4
Barishal Division	**99.9**	**99.9**	**99.9**	**99.9**	**99.8**	**99.8**	**99.8**	**97.4**	**97.4**	**97.1**	**96.8**	**94.7**
Bandarban	96.9	96.9	96.9	96.9	95.9	95.9	95.9	87.8	87.8	86.8	85.7	78.8
Brahmanbaria	100	100	100	100	100	100	100	95.6	95.6	95.4	95.1	92.4
Chandpur	99.6	99.6	99.6	99.6	99.6	99.6	99.6	95.2	95.2	94.7	94.6	91
Chattogram	99.2	99.2	99.2	99.2	99	99	99	91.3	91.3	91.3	93.9	86.7
Chattogram City Corporation	99.5	99.2	99.2	99.2	98.5	98.5	98.5	79.5	79.5	79.8	86.7	73.1
Cumilla	98.7	98.7	98.7	98.7	98.7	98.7	98.7	94.7	94.7	94.1	94.8	90.4
Cumilla City Corporation	95.7	95.7	95.7	95.7	95.5	95.5	95.5	82.4	82.4	82.4	87	77.8
Cox's bazar	99.8	99.8	99.8	99.8	99	99	99	94	94	93.4	92.4	87.4
Feni	100	100	100	100	99.7	99.7	99.7	93.8	93.8	93.9	94.1	89.4
Khagrachari	100	100	100	100	99	99	99	87.8	87.8	88	84.9	77.3
Laksmipur	100	100	100	100	100	100	100	91.3	91.3	90.3	91.4	83.9
Rangamati	98.9	98.9	98.9	98.9	98.5	98.5	98.5	88.8	88.8	88.5	90.3	83
Noakhali	99.2	99.2	99.2	99.2	98.8	98.8	98.8	90.2	90.2	89.5	93	86.2
Chattogram Division	**99.1**	**99.1**	**99.1**	**99.1**	**98.8**	**98.8**	**98.8**	**91.6**	**91.6**	**91.3**	**92.7**	**86.7**
Dhaka	100	100	100	100	99.8	99.8	99.8	94.3	94.3	93.9	91.4	85.5
Dhaka North City Corporation	100	100	100	100	100	100	100	81.3	81.3	81.4	88.5	77
Dhaka South City Corporation	99.7	99.6	99.6	99.6	99.1	99.1	99.1	89.6	89.6	89	88.3	83.7
Faridpur	100	99.6	99.6	99.6	98.9	98.9	98.9	90.8	90.8	90	89.2	82.4
Gazipur	100	99.7	99.7	99.7	99.4	99.4	99.4	94.2	94.2	94	92.3	88.6
Gazipur City Corporation	100	100	100	100	99.6	99.6	99.6	92.4	92.4	91.9	83.9	80.6
Gopalganj	100	100	100	100	99.8	99.8	99.8	96.3	96.3	94.8	93	89.2
Kishoreganj	100	100	100	100	99.4	99.4	99.4	95.2	95.2	94.8	96.1	93.2
Madaripur	100	100	100	100	99.5	99.5	99.5	93.6	93.6	93.8	94.6	90
Manikganj	100	100	100	100	100	100	100	95	95	94.6	93	88.9
Munshiganj	100	100	100	100	99.6	99.6	99.6	95.6	95.6	94.7	95.1	91.6
Narayanganj	100	100	100	100	99.8	99.8	99.8	92.5	92.5	91.8	90	85
Narayanganj City Corporation	99.8	99.7	99.7	99.7	97.5	97.5	97.5	87.1	87.1	86.1	89.2	81.5
Narsingdi	100	100	100	100	100	100	100	94.4	94.4	94.8	95.7	90.9
Rajbari	100	100	100	100	100	100	100	93.7	93.7	93.9	93	87.1
Shariatpur	100	100	100	100	100	100	100	94.2	94.2	93.8	97.4	91.4
Tangail	100	100	100	100	98.6	98.6	98.6	92.7	92.7	91.7	90.5	86.4
Dhaka Division	**99.9**	**99.9**	**99.9**	**99.9**	**99.5**	**99.5**	**99.5**	**92.4**	**92.4**	**92**	**91.7**	**86.4**

[9] Children born between May 1, 2017 and April 30, 2018

Table 3: Continued

District/City Corporation	BCG	Penta1	OPV1	PCV1	Penta2	OPV2	PCV2	Penta3	OPV3	PCV3	MR1	FVC
Bagerhat	99.8	99.8	99.8	99.8	98.3	98.3	98.3	92.3	92.3	91.8	92.1	87
Chaudanga	100	100	100	100	99.3	99.3	99.3	90.5	90.5	90.6	94.2	86.5
Jashore	100	100	100	100	99.5	99.5	99.5	93.9	93.9	91.8	93.8	88
Jhenaidah	100	100	100	100	100	100	100	95.9	95.9	95	95	91.1
Khulna	99.2	99.2	99.2	99.2	98.9	98.9	98.9	94	94	93.5	95.3	90.9
Khulna City Corporation	99.1	99.1	99.1	99.1	98.4	98.4	98.4	91.7	91.7	90.8	91.1	86
Kushtia	100	99.8	99.8	99.8	99.3	99.3	99.3	96.5	96.5	96.3	95.8	93.3
Magura	100	100	100	100	99.8	99.8	99.8	94.6	94.6	92.7	92.6	86.2
Meherpur	99.4	99.2	99.2	99.2	98.3	98.3	98.3	94.3	94.3	93.5	92.6	88.6
Narail	98.6	98.6	98.6	98.6	98.1	98.1	98.1	93	93	92	90.5	86.2
Satkhira	99.8	99.8	99.8	99.8	99.6	99.6	99.6	90.5	90.5	90.5	92.4	85.8
Khulna Division	**99.7**	**99.7**	**99.7**	**99.7**	**99.2**	**99.2**	**99.2**	**93.6**	**93.6**	**92.8**	**93.7**	**88.8**
Jamalapur	100	100	100	100	99	99	99	91.7	91.7	91.2	90.2	85.5
Mymensingh	100	100	100	100	99.9	99.9	99.9	94.2	94.2	93.2	90.3	86.4
Mymensingh City Corporation	100	100	100	100	99.5	99.5	99.5	94.2	94.2	94.5	93.4	89.6
Netrokona	100	99.3	99.3	99.3	98.8	98.8	98.8	94.7	94.7	94.7	92.3	87.9
Sherpur	100	99.8	99.8	99.8	99.4	99.4	99.4	91.4	91.4	91.2	90.1	82.7
Mymensingh Division	**100**	**99.9**	**99.9**	**99.9**	**99.4**	**99.4**	**99.4**	**93.2**	**93.2**	**92.6**	**90.7**	**86.1**
Bogura	100	100	100	100	99.6	99.6	99.6	95.8	95.8	95.6	92.3	90
Joypurhat	100	100	100	100	99.8	99.8	99.8	97.1	97.1	97.1	97.8	95.5
Natore	100	99.8	99.8	99.8	99.1	99.1	99.1	92.5	92.5	91.8	91.8	86.5
Naogaon	100	100	100	100	99.2	99.2	99.2	95.6	95.6	95.5	94.2	90.9
Chapai Nawabganj	100	100	100	100	100	100	100	94	94	93.6	92.1	87.1
Pabna	99.9	99.6	99.6	99.6	99.5	99.5	99.5	94.4	94.4	94.1	95.6	91.1
Rajshahi	100	100	100	100	100	100	100	96.5	96.5	95.2	93.7	90.3
Rajshahi City Corporation	100	100	100	100	100	100	100	98.2	98.2	98.2	98	96.5
Sirajganj	99.5	99.5	99.5	99.5	98.9	98.9	98.9	94.4	94.4	94.4	90.5	86.4
Rajshahi Division	**99.9**	**99.8**	**99.8**	**99.8**	**99.5**	**99.5**	**99.5**	**95**	**95**	**94.5**	**93.3**	**89.6**
Dinajpur	100	100	100	100	99.7	99.7	99.7	93.9	93.9	94.1	95.8	91.3
Gaibandha	100	100	100	100	99.6	99.6	99.6	93.4	93.4	93.4	90.5	86.9
Kurigram	100	100	100	100	99.4	99.4	99.4	96.5	96.5	95.8	94.2	91.4
Lalmonirhat	100	100	100	100	100	100	100	91.9	91.9	91.5	91.2	85
Nilphamari	100	100	100	100	100	100	100	94.8	94.8	92.4	94	87.3
Panchagarh	100	100	100	100	100	100	100	95.8	95.8	96	97.6	93.4
Rangpur	100	100	100	100	99	99	99	88.7	88.7	88.5	88.2	80.5
Rangpur City Corporation	100	99.8	99.8	99.8	99.8	99.8	99.8	92.8	92.8	92.4	89.5	84.5
Thakurgaon	100	100	100	100	99.6	99.6	99.6	93.5	93.5	93.6	94.9	90.8
Rangpur Division	100	100	100	100	99.6	99.6	99.6	93.5	93.5	93.1	93	88.1
Habiganj	98.9	98.9	98.9	98.9	98.5	98.5	98.5	95.8	95.8	94.8	93.5	90.8
Moulvibazar	100	100	100	100	100	100	100	96.9	96.9	96.7	95.8	93.2
Sunamganj	98.9	98.8	98.8	98.8	98.6	98.6	98.6	92.8	92.8	91.4	90.9	85.8
Sylhet	100	100	100	100	99.8	99.8	99.8	95.9	95.9	95.6	97.2	93.7
Sylhet City Corporation	97.9	97.9	97.9	97.9	96.7	96.7	96.7	85.8	85.8	85.3	83.1	75.3
Sylhet Division	**99.3**	**99.3**	**99.3**	**99.3**	**99**	**99**	**99**	**94.5**	**94.5**	**93.7**	**93.6**	**89.6**
National	99.7	99.7	99.7	99.7	99.3	99.3	99.3	93.3	93.3	92.9	92.8	88
Urban	99.8	99.4	99.4	99.4	98.8	98.8	98.8	90.1	90.1	89.5	90.1	84.1
Rural	99.8	99.8	99.8	99.8	99.5	99.5	99.5	94.1	94.1	93.6	93.5	88.9

Table 3a: Valid Full Vaccination Coverage by Age of 23 Months[10] by District and City Corporation (Fully Vaccinated Arranged in Ascending Order by All Districts City Corporation)

District/City Corporation	BCG	Penta1	OPV 1	PCV1	Penta2	OPV2	PCV2	Penta3	OPV3	PCV3	MR1	FVC
Chattogram City Corporation	99.5	99.2	99.2	99.2	98.5	98.5	98.5	79.5	79.5	79.8	86.7	73.1
Sylhet City Corporation	97.9	97.9	97.9	97.9	96.7	96.7	96.7	85.8	85.8	85.3	83.1	75.3
Dhaka North City Corporation	100	100	100	100	100	100	100	81.3	81.3	81.4	88.5	77
Khagrachari	100	100	100	100	99	99	99	87.8	87.8	88	84.9	77.3
Cumilla City Corporation	95.7	95.7	95.7	95.7	95.5	95.5	95.5	82.4	82.4	82.4	87	77.8
Bandarban	96.9	96.9	96.9	96.9	95.9	95.9	95.9	87.8	87.8	86.8	85.7	78.8
Rangpur	100	100	100	100	99	99	99	88.7	88.7	88.5	88.2	80.5
Gazipur City Corporation	100	100	100	100	99.6	99.6	99.6	92.4	92.4	91.9	83.9	80.6
Narayanganj City Corporation	99.8	99.7	99.7	99.7	97.5	97.5	97.5	87.1	87.1	86.1	89.2	81.5
Faridpur	100	99.6	99.6	99.6	98.9	98.9	98.9	90.8	90.8	90	89.2	82.4
Sherpur	100	99.8	99.8	99.8	99.4	99.4	99.4	91.4	91.4	91.2	90.1	82.7
Rangamati	98.9	98.9	98.9	98.9	98.5	98.5	98.5	88.8	88.8	88.5	90.3	83
Dhaka South City Corporation	99.7	99.6	99.6	99.6	99.1	99.1	99.1	89.6	89.6	89	88.3	83.7
Laksmipur	100	100	100	100	100	100	100	91.3	91.3	90.3	91.4	83.9
Rangpur City Corporation	100	99.8	99.8	99.8	99.8	99.8	99.8	92.8	92.8	92.4	89.5	84.5
Narayanganj	100	100	100	100	99.8	99.8	99.8	92.5	92.5	91.8	90	85
Lalmonirhat	100	100	100	100	100	100	100	91.9	91.9	91.5	91.2	85
Dhaka	100	100	100	100	99.8	99.8	99.8	94.3	94.3	93.9	91.4	85.5
Jamalapur	100	100	100	100	99	99	99	91.7	91.7	91.2	90.2	85.5
Satkhira	99.8	99.8	99.8	99.8	99.6	99.6	99.6	90.5	90.5	90.5	92.4	85.8
Sunamganj	98.9	98.8	98.8	98.8	98.6	98.6	98.6	92.8	92.8	91.4	90.9	85.8
Khulna City Corporation	99.1	99.1	99.1	99.1	98.4	98.4	98.4	91.7	91.7	90.8	91.1	86
Noakhali	99.2	99.2	99.2	99.2	98.8	98.8	98.8	90.2	90.2	89.5	93	86.2
Magura	100	100	100	100	99.8	99.8	99.8	94.6	94.6	92.7	92.6	86.2
Narail	98.6	98.6	98.6	98.6	98.1	98.1	98.1	93	93	92	90.5	86.2
Tangail	100	100	100	100	98.6	98.6	98.6	92.7	92.7	91.7	90.5	86.4
Mymensingh	100	100	100	100	99.9	99.9	99.9	94.2	94.2	93.2	90.3	86.4
Sirajganj	99.5	99.5	99.5	99.5	98.9	98.9	98.9	94.4	94.4	94.4	90.5	86.4
Chaudanga	100	100	100	100	99.3	99.3	99.3	90.5	90.5	90.6	94.2	86.5
Nartore	100	99.8	99.8	99.8	99.1	99.1	99.1	92.5	92.5	91.8	91.8	86.5
Chattogram	99.2	99.2	99.2	99.2	99	99	99	91.3	91.3	91.3	93.9	86.7
Gaibandha	100	100	100	100	99.6	99.6	99.6	93.4	93.4	93.4	90.5	86.9
Bagerhat	99.8	99.8	99.8	99.8	98.3	98.3	98.3	92.3	92.3	91.8	92.1	87
Rajbari	100	100	100	100	100	100	100	93.7	93.7	93.9	93	87.1
Chapai Nawabganj	100	100	100	100	100	100	100	94	94	93.6	92.1	87.1
Barishal City Corporation	100	100	100	100	99.6	99.6	99.6	95.4	95.4	94	90.8	87.2
Nilphamari	100	100	100	100	100	100	100	94.8	94.8	92.4	94	87.3

[10] Children born between May 1, 2017 and April 30, 2018

Table 3a: Continued

District/City Corporation	BCG	Penta1	OPV 1	PCV1	Penta2	OPV2	PCV2	Penta3	OPV3	PCV3	MR1	FVC
Cox'sbazar	99.8	99.8	99.8	99.8	99	99	99	94	94	93.4	92.4	87.4
Netrokona	100	99.3	99.3	99.3	98.8	98.8	98.8	94.7	94.7	94.7	92.3	87.9
Jashore	100	100	100	100	99.5	99.5	99.5	93.9	93.9	91.8	93.8	88
Gazipur	100	99.7	99.7	99.7	99.4	99.4	99.4	94.2	94.2	94	92.3	88.6
Barguna	99.5	99.5	99.5	99.5	99.4	99.4	99.4	94.8	94.8	94.5	91.2	88.7
Meherpur	99.4	99.2	99.2	99.2	98.3	98.3	98.3	94.3	94.3	93.5	92.6	88.8
Manikganj	100	100	100	100	100	100	100	95	95	94.6	93	88.9
Gopalganj	100	100	100	100	99.8	99.8	99.8	96.3	96.3	94.8	93	89.2
Feni	100	100	100	100	99.7	99.7	99.7	93.8	93.8	93.9	94.1	89.4
Mymensingh City Corporation	100	100	100	100	99.5	99.5	99.5	94.2	94.2	94.5	93.4	89.6
Madaripur	100	100	100	100	99.5	99.5	99.5	93.6	93.6	93.8	94.8	90
Bogura	100	100	100	100	99.6	99.6	99.6	95.8	95.8	95.6	92.3	90
Rajshahi	100	100	100	100	100	100	100	96.5	96.5	95.2	93.7	90.3
Comilla	98.7	98.7	98.7	98.7	98.7	98.7	98.7	94.7	94.7	94.1	94.8	90.4
Thakurgaon	100	100	100	100	99.6	99.6	99.6	93.5	93.5	93.6	94.9	90.8
Habiganj	98.9	98.9	98.9	98.9	98.5	98.5	98.5	95.8	95.8	94.8	93.5	90.8
Narsingdi	100	100	100	100	100	100	100	94.4	94.4	94.8	95.7	90.9
Khulna	99.2	99.2	99.2	99.2	98.9	98.9	98.9	94	94	93.5	95.3	90.9
Naogaon	100	100	100	100	99.2	99.2	99.2	95.6	95.6	95.5	94.2	90.9
Chandpur	99.6	99.6	99.6	99.6	99.6	99.6	99.6	95.2	95.2	94.7	94.6	91
Jhenaidah	100	100	100	100	100	100	100	95.9	95.9	95	95	91.1
Pabna	99.9	99.6	99.6	99.6	99.5	99.5	99.5	94.4	94.4	94.1	95.6	91.1
Dinajpur	100	100	100	100	99.7	99.7	99.7	93.9	93.9	94.1	95.8	91.3
Shariatpur	100	100	100	100	100	100	100	94.2	94.2	93.8	97.4	91.4
Kurigram	100	100	100	100	99.4	99.4	99.4	96.5	96.5	95.8	94.2	91.4
Munshiganj	100	100	100	100	99.6	99.6	99.6	95.6	95.6	94.7	95.1	91.6
Brahmanbaria	100	100	100	100	100	100	100	95.6	95.6	95.4	95.1	92.4
Kishoreganj	100	100	100	100	99.4	99.4	99.4	95.2	95.2	94.8	96.1	93.2
Moulvibazar	100	100	100	100	100	100	100	96.9	96.9	96.7	95.8	93.2
Kushtia	100	99.8	99.8	99.8	99.3	99.3	99.3	96.5	96.5	96.3	95.8	93.3
Panchagarh	100	100	100	100	100	100	100	95.8	95.8	96	97.6	93.4
Patuakhali	100	100	100	100	100	100	100	96.7	96.7	96.3	96.6	93.5
Sylhet	100	100	100	100	99.8	99.8	99.8	95.9	95.9	95.6	97.2	93.7
Jhalokati	100	100	100	100	99.6	99.6	99.6	97	97	96.8	96.3	94.5
Pirojpur	100	100	100	100	100	100	100	98.1	98.1	98	96.9	95.4
Joypurhat	100	100	100	100	99.8	99.8	99.8	97.1	97.1	97.1	97.8	95.5
Rajshahi City Corporation	100	100	100	100	100	100	100	98.2	98.2	98.2	98	96.5
Barishal	100	100	100	100	99.8	99.8	99.8	98.1	98.1	97.8	98.4	96.6
Bhola	100	100	100	100	100	100	100	98	98	98	98.8	97.1

Table 4: Valid Vaccination Coverage by Age of 12 Months[11] by District and City Corporation

District/City Corporation	BCG	Penta1	OPV1	PCV1	Penta2	OPV2	PCV2	Penta3	OPV3	PCV3	MR1	FVC
Barguna	99.5	99.5	99.5	99.5	99.4	99.4	99.4	94.8	94.8	94.5	87.9	85.6
Barishal	100.0	100.0	100.0	100.0	99.6	99.6	99.6	98.1	98.1	97.8	95.8	94.0
Barishal City Corporation	99.9	100.0	100.0	100.0	99.5	99.5	99.5	95.4	95.4	94.0	88.0	83.9
Bhola	100.0	100.0	100.0	100.0	100.0	100.0	100.0	97.7	97.7	97.7	97.3	95.6
Jhalokati	100.0	100.0	100.0	100.0	99.6	99.6	99.6	97.0	97.0	96.8	93.0	91.2
Patuakhali	100.0	100.0	100.0	100.0	100.0	100.0	100.0	96.7	96.7	96.3	92.8	89.2
Pirojpur	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.1	98.1	97.8	94.0	92.0
Barishal Division	**99.9**	**99.9**	**99.9**	**99.9**	**99.8**	**99.8**	**99.8**	**97.4**	**97.4**	**97.1**	**94.1**	**91.8**
Bandarban	96.9	96.9	96.9	96.9	95.9	95.9	95.9	87.8	87.8	86.6	80.5	73.8
Brahmanbaria	100.0	100.0	100.0	100.0	100.0	100.0	100.0	95.6	95.6	95.4	91.5	88.1
Chandpur	99.6	99.6	99.6	99.6	99.6	99.6	99.6	95.2	95.2	94.6	91.3	87.2
Chattogram	99.2	99.2	99.2	99.2	99.0	99.0	99.0	91.3	91.3	91.3	91.2	84.6
Chattogram City Corporation	99.4	99.2	99.2	99.2	97.9	97.9	97.9	79.5	79.5	79.8	78.3	69.4
Cumilla	98.7	98.7	98.7	98.7	98.5	98.5	98.5	94.7	94.7	94.1	90.9	84.9
Cumilla City Corporation	95.6	95.7	95.7	95.7	95.5	95.5	95.5	82.4	82.4	82.4	72.4	65.6
Cox's bazar	99.8	99.8	99.8	99.8	99.0	99.0	99.0	94.0	94.0	93.4	88.5	83.0
Feni	100.0	100.0	100.0	100.0	99.5	99.5	99.5	93.8	93.8	93.5	91.7	87.2
Khagrachari	100.0	100.0	100.0	100.0	98.8	98.8	98.8	87.8	87.8	87.6	72.1	64.9
Laksmipur	100.0	100.0	100.0	100.0	99.6	99.6	99.6	91.3	91.3	90.3	89.4	80.8
Rangamati	98.8	98.9	98.9	98.9	97.8	97.8	97.8	88.8	88.8	88.5	84.4	78.9
Noakhali	99.2	99.2	99.2	99.2	98.4	98.4	98.4	90.2	90.2	89.5	89.3	81.4
Chattogram Division	**99.1**	**99.1**	**99.1**	**99.1**	**98.7**	**98.7**	**98.7**	**91.6**	**91.6**	**91.2**	**88.4**	**82.2**
Dhaka	100.0	100.0	100.0	100.0	99.8	99.8	99.8	93.9	93.9	93.5	86.8	82.1
Dhaka North City Corporation	100.0	100.0	100.0	100.0	99.3	99.3	99.3	81.3	81.3	81.4	83.6	74.2
Dhaka South City Corporation	99.7	99.6	99.6	99.6	99.1	99.1	99.1	89.6	89.6	89.0	85.0	79.3
Faridpur	100.0	99.6	99.6	99.6	98.4	98.4	98.4	90.6	90.6	89.6	81.6	75.4
Gazipur	99.9	99.7	99.7	99.7	99.4	99.4	99.4	94.2	94.2	94.0	91.4	87.6
Gazipur City Corporation	99.9	100.0	100.0	100.0	99.6	99.6	99.6	92.4	92.4	91.9	79.7	76.5
Gopalganj	100.0	100.0	100.0	100.0	99.8	99.8	99.8	96.3	96.3	94.8	85.7	82.2
Kishoreganj	100.0	100.0	100.0	100.0	98.9	98.9	98.9	95.2	95.2	94.8	89.8	86.6
Madaripur	100.0	100.0	100.0	100.0	99.5	99.5	99.5	93.6	93.6	93.5	90.0	84.5
Manikganj	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.7	94.7	94.3	89.2	85.1
Munshiganj	100.0	100.0	100.0	100.0	99.6	99.6	99.6	95.6	95.6	94.7	92.3	88.3
Narayanganj	100.0	100.0	100.0	100.0	99.8	99.8	99.8	92.3	92.3	91.6	88.2	83.2
Narayanganj City Corporation	99.8	99.7	99.7	99.7	97.5	97.5	97.5	87.1	87.1	86.1	84.2	77.0
Narsingdi	99.8	99.8	99.8	99.8	97.8	97.8	97.8	94.1	94.1	94.3	91.6	86.7
Rajbari	100.0	100.0	100.0	100.0	99.0	99.0	99.0	93.4	93.4	93.4	87.8	82.7
Shariatpur	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.2	94.2	93.6	92.9	87.7
Tangail	100.0	99.7	99.7	99.7	98.6	98.6	98.6	92.7	92.7	91.7	88.5	84.2
Dhaka Division	**99.9**	**99.9**	**99.9**	**99.9**	**99.3**	**99.3**	**99.3**	**92.3**	**92.3**	**91.8**	**87.4**	**82.4**

[11] Children born between May 1, 2017 and April 30, 2018

Table 4: Continued

District/City Corporation	BCG	Penta1	OPV1	PCV1	Penta2	OPV2	PCV2	Penta3	OPV3	PCV3	MR1	FVC
Bagerhat	99.8	99.8	99.8	99.8	98.3	98.3	98.3	92.3	92.3	91.6	86.9	82.4
Chaudanga	100.0	100.0	100.0	100.0	99.1	99.1	99.1	90.5	90.5	90.1	90.4	82.7
Jashore	100.0	100.0	100.0	100.0	99.5	99.5	99.5	93.8	93.8	91.8	90.1	84.4
Jhenaidah	100.0	100.0	100.0	100.0	100.0	100.0	100.0	95.3	95.3	94.1	85.9	83.2
Khulna	99.2	99.2	99.2	99.2	98.9	98.9	98.9	93.8	93.8	93.1	92.7	89.0
Khulna City Corporation	98.9	99.1	99.1	99.1	98.4	98.4	98.4	91.7	91.7	90.8	85.2	79.0
Kushtia	100.0	99.8	99.8	99.8	99.3	99.3	99.3	96.5	96.5	96.1	93.5	90.9
Magura	100.0	100.0	100.0	100.0	99.8	99.8	99.8	94.6	94.6	92.7	89.0	82.9
Meherpur	99.4	99.2	99.2	99.2	98.3	98.3	98.3	94.3	94.3	93.5	89.2	85.1
Narail	98.6	98.6	98.6	98.6	98.1	98.1	98.1	93.0	93.0	92.0	87.5	82.5
Satkhira	99.7	99.8	99.8	99.8	99.6	99.6	99.6	90.3	90.3	90.3	88.2	80.5
Khulna Division	**99.7**	**99.7**	**99.7**	**99.7**	**99.2**	**99.2**	**99.2**	**93.5**	**93.5**	**92.6**	**89.7**	**84.8**
Jamalapur	100.0	100.0	100.0	100.0	98.8	98.8	98.8	91.7	91.7	91.2	88.1	83.5
Mymensingh	100.0	100.0	100.0	100.0	99.4	99.4	99.4	94.0	94.0	93.1	84.6	80.7
Mymensingh City Corporation	99.9	100.0	100.0	100.0	99.0	99.0	99.0	94.2	94.2	94.5	86.3	82.3
Netrokona	100.0	99.3	99.3	99.3	98.8	98.8	98.8	94.7	94.7	94.7	85.3	81.2
Sherpur	100.0	99.8	99.8	99.8	99.4	99.4	99.4	91.2	91.2	90.5	77.4	72.2
Mymensingh Division	**100.0**	**99.9**	**99.9**	**99.9**	**99.1**	**99.1**	**99.1**	**93.2**	**93.2**	**92.6**	**84.7**	**80.4**
Bogura	100.0	100.0	100.0	100.0	99.6	99.6	99.6	95.8	95.8	95.6	86.4	84.4
Joypurhat	100.0	100.0	100.0	100.0	99.8	99.8	99.8	97.1	97.1	94.9	96.9	94.6
Natore	100.0	99.8	99.8	99.8	99.1	99.1	99.1	92.2	92.2	91.6	86.5	82.0
Naogaon	100.0	100.0	100.0	100.0	99.2	99.2	99.2	95.6	95.6	86.6	89.8	85.8
Chapai Nawabganj	100.0	100.0	100.0	100.0	99.8	99.8	99.8	93.8	93.8	85.8	89.8	84.9
Pabna	99.9	99.6	99.6	99.6	99.4	99.4	99.4	94.4	94.4	94.1	92.6	88.5
Rajshahi	100.0	99.7	99.7	99.7	99.7	99.7	99.7	96.5	96.5	95.2	91.9	88.9
Rajshahi City Corporation	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.2	98.2	98.2	93.9	92.4
Sirajganj	99.5	99.5	99.5	99.5	98.9	98.9	98.9	94.4	94.4	94.4	86.7	82.5
Rajshahi Division	**99.9**	**99.8**	**99.8**	**99.8**	**99.4**	**99.4**	**99.4**	**95.0**	**95.0**	**92.6**	**89.6**	**86.0**
Dinajpur	100.0	100.0	100.0	100.0	99.7	99.7	99.7	93.9	93.9	93.7	93.3	88.1
Gaibandha	100.0	100.0	100.0	100.0	99.4	99.4	99.4	93.4	93.4	93.4	85.4	82.0
Kurigram	100.0	100.0	100.0	100.0	99.4	99.4	99.4	96.5	96.5	95.8	91.4	88.5
Lalmonirhat	100.0	100.0	100.0	100.0	99.8	99.8	99.8	91.9	91.9	91.5	86.1	80.2
Nilphamari	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.5	94.5	91.8	88.0	81.7
Panchagarh	100.0	100.0	100.0	100.0	100.0	100.0	100.0	95.6	95.6	95.4	92.1	88.4
Rangpur	100.0	100.0	100.0	100.0	99.0	99.0	99.0	88.4	88.4	88.0	85.0	77.4
Rangpur City Corporation	100.0	99.8	99.8	99.8	99.6	99.6	99.6	92.8	92.8	92.4	86.0	81.7
Thakurgaon	100.0	100.0	100.0	100.0	99.6	99.6	99.6	93.5	93.5	93.3	87.3	83.9
Rangpur Division	**100.0**	**100.0**	**100.0**	**100.0**	**99.5**	**99.5**	**99.5**	**93.4**	**93.4**	**92.8**	**88.7**	**83.9**
Habiganj	98.9	98.9	98.9	98.9	98.5	98.5	98.5	95.8	95.8	94.8	90.9	88.2
Moulvibazar	99.9	100.0	100.0	100.0	100.0	100.0	100.0	96.7	96.7	96.5	92.8	90.4
Sunamganj	98.9	98.8	98.8	98.8	98.6	98.6	98.6	92.8	92.8	91.1	85.8	81.3
Sylhet	100.0	100.0	100.0	100.0	99.6	99.6	99.6	95.8	95.8	95.3	94.4	91.0
Sylhet City Corporation	97.7	97.5	97.5	97.5	95.9	95.9	95.9	85.8	85.8	85.0	70.0	63.8
Sylhet Division	**99.3**	**99.3**	**99.3**	**99.3**	**98.9**	**98.9**	**98.9**	**94.4**	**94.4**	**93.5**	**89.5**	**85.8**
National	99.7	99.7	99.7	99.7	99.2	99.2	99.2	93.3	93.3	92.5	88.6	83.9
Urban	99.4	99.4	99.4	99.4	98.6	98.6	98.6	90.1	90.1	89.4	84.6	79.2
Rural	99.8	99.8	99.8	99.8	99.4	99.4	99.4	94.0	94.0	93.2	89.5	85.0
Dhaka North City Corporation Slum	99.8	99.8	99.8	99.8	99.1	99.1	98.8	95.1	90.9	91.0	75.7	67.0
Dhaka South City Corporation Slum	99.5	95.0	95.0	95.0	94.6	94.6	94.6	91.7	91.7	91.9	74.0	67.1
Chattogram City Corporation Slum	100.0	99.3	99.3	99.3	97.9	97.9	97.7	85.4	85.4	85.6	79.3	70.7

Table 4a: Valid Vaccination Coverage by Age of 12 Months by District and City Corporation (Fully Vaccinated Arranged in Ascending Order by All Districts and City Corporation)

District/City Corporation	BCG	Penta1	OPV1	PCV1	Penta2	OPV2	PCV2	Penta3	OPV3	PCV3	MR1	FVC
Sylhet City Corporation	97.7	97.5	97.5	97.5	95.9	95.9	95.9	85.8	85.8	85.0	70.0	63.8
Khagrachari	100.0	100.0	100.0	100.0	98.8	98.8	98.8	87.8	87.8	87.6	72.1	64.9
Cumilla City Corporation	95.6	95.7	95.7	95.7	95.5	95.5	95.5	82.4	82.4	82.4	72.4	65.6
Chattogram City Corporation	99.4	99.2	99.2	99.2	97.9	97.9	97.9	79.5	79.5	79.8	78.3	69.4
Sherpur	100.0	99.8	99.8	99.8	99.4	99.4	99.4	91.2	91.2	90.5	77.4	72.2
Bandarban	96.9	96.9	96.9	96.9	95.9	95.9	95.9	87.8	87.8	86.6	80.5	73.8
Dhaka North City Corporation	100.0	100.0	100.0	100.0	99.3	99.3	99.3	81.3	81.3	81.4	83.6	74.2
Faridpur	100.0	99.6	99.6	99.6	98.4	98.4	98.4	90.6	90.6	89.6	81.6	75.4
Gazipur City Corporation	99.9	100.0	100.0	100.0	99.6	99.6	99.6	92.4	92.4	91.9	79.7	76.5
Narayanganj City Corporation	99.8	99.7	99.7	99.7	97.5	97.5	97.5	87.1	87.1	86.1	84.2	77.0
Rangpur	100.0	100.0	100.0	100.0	99.0	99.0	99.0	88.4	88.4	88.0	85.0	77.4
Rangamati	98.8	98.9	98.9	98.9	97.8	97.8	97.8	88.8	88.8	88.5	84.4	78.9
Khulna City Corporation	98.9	99.1	99.1	99.1	98.4	98.4	98.4	91.7	91.7	90.8	85.2	79.0
Dhaka South City Corporation	99.7	99.6	99.6	99.6	99.1	99.1	99.1	89.6	89.6	89.0	85.0	79.3
Lalmonirhat	100.0	100.0	100.0	100.0	99.8	99.8	99.8	91.9	91.9	91.5	86.1	80.2
Satkhira	99.7	99.8	99.8	99.8	99.6	99.6	99.6	90.3	90.3	90.3	88.2	80.5
Mymensingh	100.0	100.0	100.0	100.0	99.4	99.4	99.4	94.0	94.0	93.1	84.6	80.7
Laksmipur	100.0	100.0	100.0	100.0	99.6	99.6	99.6	91.3	91.3	90.3	89.4	80.8
Netrokona	100.0	99.3	99.3	99.3	98.8	98.8	98.8	94.7	94.7	94.7	85.3	81.2
Sunamganj	98.9	98.8	98.8	98.8	98.6	98.6	98.6	92.8	92.8	91.1	85.8	81.3
Noakhali	99.2	99.2	99.2	99.2	98.4	98.4	98.4	90.2	90.2	89.5	89.3	81.4
Nilphamari	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.5	94.5	91.8	88.0	81.7
Rangpur City Corporation	100.0	99.8	99.8	99.8	99.6	99.6	99.6	92.6	92.6	92.4	86.0	81.7
Nartore	100.0	99.8	99.8	99.8	99.1	99.1	99.1	92.2	92.2	91.6	86.5	82.0
Gaibandha	100.0	100.0	100.0	100.0	99.4	99.4	99.4	93.4	93.4	93.4	85.4	82.0
Dhaka	100.0	100.0	100.0	100.0	99.8	99.8	99.8	93.9	93.9	93.5	86.6	82.1
Gopalganj	100.0	100.0	100.0	100.0	99.8	99.8	99.8	96.3	96.3	94.8	85.7	82.2
Mymensingh City Corporation	99.9	100.0	100.0	100.0	99.0	99.0	99.0	94.2	94.2	94.5	86.3	82.3
Bagerhat	99.8	99.8	99.8	99.8	98.3	98.3	98.3	92.3	92.3	91.6	86.9	82.4
Narail	98.6	98.6	98.6	98.6	98.1	98.1	98.1	93.0	93.0	92.0	87.5	82.5
Sirajganj	99.5	99.5	99.5	99.5	98.9	98.9	98.9	94.4	94.4	94.4	86.7	82.5
Rajbari	100.0	100.0	100.0	100.0	99.0	99.0	99.0	93.4	93.4	93.4	87.8	82.7
Chaudanga	100.0	100.0	100.0	100.0	99.1	99.1	99.1	90.5	90.5	90.1	90.4	82.7
Magura	100.0	100.0	100.0	100.0	99.8	99.8	99.8	94.6	94.6	92.7	89.0	82.9
Cox'sbazar	99.8	99.8	99.8	99.8	99.0	99.0	99.0	94.0	94.0	93.4	88.5	83.0
Narayanganj	100.0	100.0	100.0	100.0	99.8	99.8	99.8	92.3	92.3	91.6	88.2	83.2
Jhenaidah	100.0	100.0	100.0	100.0	100.0	100.0	100.0	95.3	95.3	94.1	85.9	83.2
Jamalapur	100.0	100.0	100.0	100.0	98.8	98.8	98.8	91.7	91.7	91.2	88.1	83.5
Barishal City Corporation	99.9	100.0	100.0	100.0	99.5	99.5	99.5	95.4	95.4	94.0	88.0	83.9
Thakurgaon	100.0	100.0	100.0	100.0	99.6	99.6	99.6	93.5	93.5	93.3	87.3	83.9
Tangail	100.0	99.7	99.7	99.7	98.6	98.6	98.6	92.7	92.7	91.7	88.5	84.2
Jashore	100.0	100.0	100.0	100.0	99.5	99.5	99.5	93.8	93.8	91.8	90.1	84.4
Bogura	100.0	100.0	100.0	100.0	99.6	99.6	99.6	95.8	95.8	95.6	86.4	84.4
Madaripur	100.0	100.0	100.0	100.0	99.5	99.5	99.5	93.6	93.6	93.5	90.0	84.5
Chattogram	99.2	99.2	99.2	99.2	99.0	99.0	99.0	91.3	91.3	91.3	91.2	84.6
Cumilla	98.7	98.7	98.7	98.7	98.5	98.5	98.5	94.7	94.7	94.1	90.9	84.9
Chapai Nawabganj	100.0	100.0	100.0	100.0	99.8	99.8	99.8	93.8	93.8	85.8	89.8	84.9

Table 4a: Continued

District/City Corporation	BCG	Penta1	OPV1	PCV1	Penta2	OPV2	PCV2	Penta3	OPV3	PCV3	MR1	FVC
Manikganj	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.7	94.7	94.3	89.2	85.1
Meherpur	99.4	99.2	99.2	99.2	98.3	98.3	98.3	94.3	94.3	93.5	89.2	85.1
Barguna	99.5	99.5	99.5	99.5	99.4	99.4	99.4	94.8	94.8	94.5	87.9	85.6
Naogaon	100.0	100.0	100.0	100.0	99.2	99.2	99.2	95.6	95.6	86.6	89.8	85.8
Kishoreganj	100.0	100.0	100.0	100.0	98.9	98.9	98.9	95.2	95.2	94.8	89.8	86.6
Narsingdi	99.8	99.8	99.8	99.8	97.8	97.8	97.8	94.1	94.1	94.3	91.6	86.7
Chandpur	99.6	99.6	99.6	99.6	99.6	99.6	99.6	95.2	95.2	94.6	91.3	87.2
Feni	100.0	100.0	100.0	100.0	99.5	99.5	99.5	93.8	93.8	93.5	91.7	87.2
Gazipur	99.9	99.7	99.7	99.7	99.4	99.4	99.4	94.2	94.2	94.0	91.4	87.6
Shariatpur	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.2	94.2	93.6	92.9	87.7
Brahmanbaria	100.0	100.0	100.0	100.0	100.0	100.0	100.0	95.6	95.6	95.4	91.5	88.1
Dinajpur	100.0	100.0	100.0	100.0	99.7	99.7	99.7	93.9	93.9	93.7	93.3	88.1
Habiganj	98.9	98.9	98.9	98.9	98.5	98.5	98.5	95.8	95.8	94.8	90.9	88.2
Munshiganj	100.0	100.0	100.0	100.0	99.6	99.6	99.6	95.6	95.6	94.7	92.3	88.3
Panchagarh	100.0	100.0	100.0	100.0	100.0	100.0	100.0	95.6	95.6	95.4	92.1	88.4
Pabna	99.9	99.6	99.6	99.6	99.4	99.4	99.4	94.4	94.4	94.1	92.6	88.5
Kurigram	100.0	100.0	100.0	100.0	99.4	99.4	99.4	96.5	96.5	95.8	91.4	88.5
Rajshahi	100.0	99.7	99.7	99.7	99.7	99.7	99.7	96.5	96.5	95.2	91.9	88.9
Khulna	99.2	99.2	99.2	99.2	98.9	98.9	98.9	93.8	93.8	93.1	92.7	89.0
Patuakhali	100.0	100.0	100.0	100.0	100.0	100.0	100.0	96.7	96.7	96.3	92.8	89.2
Moulvibazar	99.9	100.0	100.0	100.0	100.0	100.0	100.0	96.7	96.7	96.5	92.8	90.4
Kushtia	100.0	99.8	99.8	99.8	99.3	99.3	99.3	96.5	96.5	96.1	93.5	90.9
Sylhet	100.0	100.0	100.0	100.0	99.6	99.6	99.6	95.8	95.8	95.3	94.4	91.0
Jhalokati	100.0	100.0	100.0	100.0	99.6	99.6	99.6	97.0	97.0	96.8	93.0	91.2
Pirojpur	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.1	98.1	97.8	94.0	92.0
Rajshahi City Corporation	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.2	98.2	98.2	93.9	92.4
Barishal	100.0	100.0	100.0	100.0	99.6	99.6	99.6	98.1	98.1	97.8	95.8	94.0
Joypurhat	100.0	100.0	100.0	100.0	99.8	99.8	99.8	97.1	97.1	94.9	96.9	94.6
Bhola	100.0	100.0	100.0	100.0	100.0	100.0	100.0	97.7	97.7	97.7	97.3	95.6

Table 4b: Valid Vaccination Coverage by Age of 12 Months by District and City Corporation (Fully Vaccinated Arranged in Ascending Order by All Districts and City Corporations within Division)

District/City Corporation	BCG	Penta1	OPV 1	PCV1	Penta2	OPV2	PCV2	Penta3	OPV3	PCV3	MR1	FVC
Barishal City Corporation	99.9	100.0	100.0	100.0	99.5	99.5	99.5	95.4	95.4	94.0	88.0	83.9
Barguna	99.5	99.5	99.5	99.5	99.4	99.4	99.4	94.8	94.8	94.5	87.9	85.6
Patuakhali	100.0	100.0	100.0	100.0	100.0	100.0	100.0	96.7	96.7	96.3	92.8	89.2
Jhalokati	100.0	100.0	100.0	100.0	99.6	99.6	99.6	97.0	97.0	96.8	93.0	91.2
Pirojpur	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.1	98.1	97.8	94.0	92.0
Barishal	100.0	100.0	100.0	100.0	99.6	99.6	99.6	98.1	98.1	97.8	95.8	94.0
Bhola	100.0	100.0	100.0	100.0	100.0	100.0	100.0	97.7	97.7	97.7	97.3	95.6
Barishal Division	**99.9**	**99.9**	**99.9**	**99.9**	**99.8**	**99.8**	**99.8**	**97.4**	**97.4**	**97.1**	**94.1**	**91.8**
Khagrachari	100.0	100.0	100.0	100.0	98.8	98.8	98.8	87.8	87.8	87.6	72.1	64.9
Cumilla City Corporation	95.6	95.7	95.7	95.7	95.5	95.5	95.5	82.4	82.4	82.4	72.4	65.6
Chattogram City Corporation	99.4	99.2	99.2	99.2	97.9	97.9	97.9	79.5	79.5	79.8	78.3	69.4
Bandarban	96.9	96.9	96.9	96.9	95.9	95.9	95.9	87.8	87.8	86.6	80.5	73.8
Rangamati	98.8	98.9	98.9	98.9	97.8	97.8	97.8	88.8	88.8	88.5	84.4	78.9
Laksmipur	100.0	100.0	100.0	100.0	99.6	99.6	99.6	91.3	91.3	90.3	89.4	80.8
Noakhali	99.2	99.2	99.2	99.2	98.4	98.4	98.4	90.2	90.2	89.5	89.3	81.4
Cox's bazar	99.8	99.8	99.8	99.8	99.0	99.0	99.0	94.0	94.0	93.4	88.5	83.0
Chattogram	99.2	99.2	99.2	99.2	99.0	99.0	99.0	91.3	91.3	91.3	91.2	84.6
Cumilla	98.7	98.7	98.7	98.7	98.5	98.5	98.5	94.7	94.7	94.1	90.9	84.9
Chandpur	99.6	99.6	99.6	99.6	99.6	99.6	99.6	95.2	95.2	94.6	91.3	87.2
Feni	100.0	100.0	100.0	100.0	99.5	99.5	99.5	93.8	93.8	93.5	91.7	87.2
Brahmanbaria	100.0	100.0	100.0	100.0	100.0	100.0	100.0	95.6	95.6	95.4	91.5	88.1
Chattogram Division	**99.1**	**99.1**	**99.1**	**99.1**	**98.7**	**98.7**	**98.7**	**91.6**	**91.6**	**91.2**	**88.4**	**82.2**
Dhaka North City Corporation	100.0	100.0	100.0	100.0	99.3	99.3	99.3	81.3	81.3	81.4	83.6	74.2
Faridpur	100.0	99.6	99.6	99.6	98.4	98.4	98.4	90.6	90.6	89.6	81.6	75.4
Gazipur City Corporation	99.9	100.0	100.0	100.0	99.6	99.6	99.6	92.4	92.4	91.9	79.7	76.5
Narayanganj City Corporation	99.8	99.7	99.7	99.7	97.5	97.5	97.5	87.1	87.1	86.1	84.2	77.0
Dhaka South City Corporation	99.7	99.6	99.6	99.6	99.1	99.1	99.1	89.6	89.6	89.0	85.0	79.3
Dhaka	100.0	100.0	100.0	100.0	99.8	99.8	99.8	93.9	93.9	93.5	86.8	82.1
Gopalganj	100.0	100.0	100.0	100.0	99.8	99.8	99.8	96.3	96.3	94.8	85.7	82.2
Rajbari	100.0	100.0	100.0	100.0	99.0	99.0	99.0	93.4	93.4	93.4	87.8	82.7
Narayanganj	100.0	100.0	100.0	100.0	99.8	99.8	99.8	92.3	92.3	91.6	88.2	83.2
Tangail	100.0	99.7	99.7	99.7	98.6	98.6	98.6	92.7	92.7	91.7	88.5	84.2
Madaripur	100.0	100.0	100.0	100.0	99.5	99.5	99.5	93.6	93.6	93.5	90.0	84.5
Manikganj	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.7	94.7	94.3	89.2	85.1
Kishoreganj	100.0	100.0	100.0	100.0	98.9	98.9	98.9	95.2	95.2	94.8	89.8	86.6
Narsingdi	99.8	99.8	99.8	99.8	97.8	97.8	97.8	94.1	94.1	94.3	91.6	86.7
Gazipur	99.9	99.7	99.7	99.7	99.4	99.4	99.4	94.2	94.2	94.0	91.4	87.6
Shariatpur	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.2	94.2	93.6	92.9	87.7
Munshiganj	100.0	100.0	100.0	100.0	99.6	99.6	99.6	95.6	95.6	94.7	92.3	88.3
Dhaka Division	**99.9**	**99.9**	**99.9**	**99.9**	**99.3**	**99.3**	**99.3**	**92.3**	**92.3**	**91.8**	**87.4**	**82.4**
Khulna City Corporation	98.9	99.1	99.1	99.1	98.4	98.4	98.4	91.7	91.7	90.8	85.2	79.0
Satkhira	99.7	99.8	99.8	99.8	99.6	99.6	99.6	90.3	90.3	90.3	88.2	80.5
Bagerhat	99.8	99.8	99.8	99.8	98.3	98.3	98.3	92.3	92.3	91.6	86.9	82.4
Narail	98.6	98.6	98.6	98.6	98.1	98.1	98.1	93.0	93.0	92.0	87.5	82.5
Chaudanga	100.0	100.0	100.0	100.0	99.1	99.1	99.1	90.5	90.5	90.1	90.4	82.7
Magura	100.0	100.0	100.0	100.0	99.8	99.8	99.8	94.6	94.6	92.7	89.0	82.9
Jhenaidah	100.0	100.0	100.0	100.0	100.0	100.0	100.0	95.3	95.3	94.1	85.9	83.2
Jashore	100.0	100.0	100.0	100.0	99.5	99.5	99.5	93.8	93.8	91.8	90.1	84.4
Meherpur	99.4	99.2	99.2	99.2	98.3	98.3	98.3	94.3	94.3	93.5	89.2	85.1
Khulna	99.2	99.2	99.2	99.2	98.9	98.9	98.9	93.8	93.8	93.1	92.7	89.0
Kushtia	100.0	99.8	99.8	99.8	99.3	99.3	99.3	96.5	96.5	96.1	93.5	90.9
Khulna Division	**99.7**	**99.7**	**99.7**	**99.7**	**99.2**	**99.2**	**99.2**	**93.5**	**93.5**	**92.6**	**89.7**	**84.8**

Table 4b: Continued

District/City Corporation	BCG	Penta1	OPV 1	PCV1	Penta2	OPV2	PCV2	Penta3	OPV3	PCV3	MR1	FVC
Jamalapur	100.0	100.0	100.0	100.0	98.8	98.8	98.8	91.7	91.7	91.2	88.1	83.5
Mymensingh	100.0	99.8	99.8	99.8	99.4	99.4	99.4	91.2	91.2	90.5	77.4	72.2
Mymensingh City Corporation	100.0	99.9	99.9	99.9	99.1	99.1	99.1	93.2	93.2	92.6	84.7	80.4
Netrokona	100.0	100.0	100.0	100.0	99.4	99.4	99.4	94.0	94.0	93.1	84.6	80.7
Sherpur	100.0	99.3	99.3	99.3	98.8	98.8	98.8	94.7	94.7	94.7	85.3	81.2
Mymensingh Division	**99.9**	**100.0**	**100.0**	**100.0**	**99.0**	**99.0**	**99.0**	**94.2**	**94.2**	**94.5**	**86.3**	**82.3**
Natore	100.0	99.8	99.8	99.8	99.1	99.1	99.1	92.2	92.2	91.6	86.5	82.0
Sirajganj	99.5	99.5	99.5	99.5	98.9	98.9	98.9	94.4	94.4	94.4	86.7	82.5
Bogura	100.0	100.0	100.0	100.0	99.8	99.8	99.8	93.8	93.8	85.8	89.8	84.9
Chapai Nawabganj	100.0	100.0	100.0	100.0	99.6	99.6	99.6	95.8	95.8	95.6	86.4	84.4
Naogaon	100.0	100.0	100.0	100.0	99.2	99.2	99.2	95.6	95.6	86.6	89.8	85.8
Pabna	99.9	99.6	99.6	99.6	99.4	99.4	99.4	94.4	94.4	94.1	92.6	88.5
Rajshahi	100.0	99.7	99.7	99.7	99.7	99.7	99.7	96.5	96.5	95.2	91.9	88.9
Rajshahi City Corporation	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.2	98.2	98.2	93.9	92.4
Joypurhat	100.0	100.0	100.0	100.0	99.8	99.8	99.8	97.1	97.1	94.9	96.9	94.6
Rajshahi Division	**99.9**	**99.8**	**99.8**	**99.8**	**99.4**	**99.4**	**99.4**	**95.0**	**95.0**	**92.6**	**89.6**	**86.0**
Rangpur	100.0	100.0	100.0	100.0	99.0	99.0	99.0	88.4	88.4	88.0	85.0	77.4
Lalmonirhat	100.0	100.0	100.0	100.0	99.8	99.8	99.8	91.9	91.9	91.5	86.1	80.2
Nilphamari	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.5	94.5	91.8	88.0	81.7
Rangpur City Corporation	100.0	99.8	99.8	99.8	99.6	99.6	99.6	92.8	92.8	92.4	86.0	81.7
Gaibandha	100.0	100.0	100.0	100.0	99.4	99.4	99.4	93.4	93.4	93.4	85.4	82.0
Thakurgaon	100.0	100.0	100.0	100.0	99.6	99.6	99.6	93.5	93.5	93.3	87.3	83.9
Dinajpur	100.0	100.0	100.0	100.0	99.7	99.7	99.7	93.9	93.9	93.7	93.3	88.1
Panchagarh	100.0	100.0	100.0	100.0	100.0	100.0	100.0	95.6	95.6	95.4	92.1	88.4
Kurigram	100.0	100.0	100.0	100.0	99.4	99.4	99.4	96.5	96.5	95.8	91.4	88.5
Rangpur Division	**100.0**	**100.0**	**100.0**	**100.0**	**99.5**	**99.5**	**99.5**	**93.4**	**93.4**	**92.8**	**88.7**	**83.9**
Sylhet City Corporation	97.7	97.5	97.5	97.5	95.9	95.9	95.9	85.8	85.8	85.0	70.0	63.8
Sunamganj	98.9	98.8	98.8	98.8	98.6	98.6	98.6	92.8	92.8	91.1	85.8	81.3
Habiganj	99.9	100.0	100.0	100.0	100.0	100.0	100.0	96.7	96.7	96.5	92.8	90.4
Moulvibazar	100.0	100.0	100.0	100.0	99.6	99.6	99.6	95.8	95.8	95.3	94.4	91.0
Sylhet	98.9	98.9	98.9	98.9	98.5	98.5	98.5	95.8	95.8	94.8	90.9	88.2
Sylhet Division	**99.3**	**99.3**	**99.3**	**99.3**	**98.9**	**98.9**	**98.9**	**94.4**	**94.4**	**93.5**	**89.5**	**85.8**
National	99.7	99.7	99.7	99.7	99.2	99.2	99.2	93.3	93.3	92.5	88.6	83.9
Urban	99.4	99.4	99.4	99.4	98.6	98.6	98.6	90.1	90.1	89.4	84.6	79.2
Rural	99.8	99.8	99.8	99.8	99.4	99.4	99.4	94.0	94.0	93.2	89.5	85.0

Tale 4c: Valid Vaccination Coverage by Age of 12 Months by District and City Corporation (Fully Vaccinated Arranged in Descending Order by All Districts and City Corporations)

District/City Corporation	BCG	Penta1	OPV 1	PCV1	Penta2	OPV2	PCV2	Penta3	OPV3	PCV3	MR1	FVC
Bhola	100.0	100.0	100.0	100.0	100.0	100.0	100.0	97.7	97.7	97.7	97.3	95.6
Joypurhat	100.0	100.0	100.0	100.0	99.8	99.8	99.8	97.1	97.1	94.9	96.9	94.6
Barishal	100.0	100.0	100.0	100.0	99.6	99.6	99.6	98.1	98.1	97.8	95.8	94.0
Rajshahi City Corporation	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.2	98.2	98.2	93.9	92.4
Pirojpur	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.1	98.1	97.8	94.0	92.0
Jhalokati	100.0	100.0	100.0	100.0	99.6	99.6	99.6	97.0	97.0	96.8	93.0	91.2
Sylhet	100.0	100.0	100.0	100.0	99.6	99.6	99.6	95.8	95.8	95.3	94.4	91.0
Kushtia	100.0	99.8	99.8	99.8	99.3	99.3	99.3	96.5	96.5	96.1	93.5	90.9
Moulvibazar	99.9	100.0	100.0	100.0	100.0	100.0	100.0	96.7	96.7	96.5	92.8	90.4
Patuakhali	100.0	100.0	100.0	100.0	100.0	100.0	100.0	96.7	96.7	96.3	92.8	89.2
Khulna	99.2	99.2	99.2	99.2	98.9	98.9	98.9	93.8	93.8	93.1	92.7	89.0
Rajshahi	100.0	99.7	99.7	99.7	99.7	99.7	99.7	96.5	96.5	95.2	91.9	88.9
Pabna	99.9	99.6	99.6	99.6	99.4	99.4	99.4	94.4	94.4	94.1	92.6	88.5
Kurigram	100.0	100.0	100.0	100.0	99.4	99.4	99.4	96.5	96.5	95.8	91.4	88.5
Panchagarh	100.0	100.0	100.0	100.0	100.0	100.0	100.0	95.6	95.6	95.4	92.1	88.4
Munshiganj	100.0	100.0	100.0	100.0	99.6	99.6	99.6	95.6	95.6	94.7	92.3	88.3
Habiganj	98.9	98.9	98.9	98.9	98.5	98.5	98.5	95.8	95.8	94.8	90.9	88.2
Brahmanbaria	100.0	100.0	100.0	100.0	100.0	100.0	100.0	95.6	95.6	95.4	91.5	88.1
Dinajpur	100.0	100.0	100.0	100.0	99.7	99.7	99.7	93.9	93.9	93.7	93.3	88.1
Shariatpur	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.2	94.2	93.6	92.9	87.7
Gazipur	99.9	99.7	99.7	99.7	99.4	99.4	99.4	94.2	94.2	94.0	91.4	87.6
Chandpur	99.6	99.6	99.6	99.6	99.6	99.6	99.6	95.2	95.2	94.6	91.3	87.2
Feni	100.0	100.0	100.0	100.0	99.5	99.5	99.5	93.8	93.8	93.5	91.7	87.2
Narsingdi	99.8	99.8	99.8	99.8	97.8	97.8	97.8	94.1	94.1	94.3	91.6	86.7
Kishoreganj	100.0	100.0	100.0	100.0	98.9	98.9	98.9	95.2	95.2	94.8	89.8	86.6
Naogaon	100.0	100.0	100.0	100.0	99.2	99.2	99.2	95.6	95.6	86.6	89.8	85.8
Barguna	99.5	99.5	99.5	99.5	99.4	99.4	99.4	94.8	94.8	94.5	87.9	85.6
Manikganj	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.7	94.7	94.3	89.2	85.1
Meherpur	99.4	99.2	99.2	99.2	98.3	98.3	98.3	94.3	94.3	93.5	89.2	85.1
Cumilla	98.7	98.7	98.7	98.7	98.5	98.5	98.5	94.7	94.7	94.1	90.9	84.9
Chapai Nawabganj	100.0	100.0	100.0	100.0	99.8	99.8	99.8	93.8	93.8	85.8	89.8	84.9
Chattogram	99.2	99.2	99.2	99.2	99.0	99.0	99.0	91.3	91.3	91.3	91.2	84.6
Madaripur	100.0	100.0	100.0	100.0	99.5	99.5	99.5	93.6	93.6	93.5	90.0	84.5
Jashore	100.0	100.0	100.0	100.0	99.5	99.5	99.5	93.8	93.8	91.8	90.1	84.4
Bogura	100.0	100.0	100.0	100.0	99.6	99.6	99.6	95.8	95.8	95.6	86.4	84.4
Tangail	100.0	99.7	99.7	99.7	98.6	98.6	98.6	92.7	92.7	91.7	88.5	84.2
Barishal City Corporation	99.9	100.0	100.0	100.0	99.5	99.5	99.5	95.4	95.4	94.0	88.0	83.9
Thakurgaon	100.0	100.0	100.0	100.0	99.6	99.6	99.6	93.5	93.5	93.3	87.3	83.9
Jamalapur	100.0	100.0	100.0	100.0	98.8	98.8	98.8	91.7	91.7	91.2	88.1	83.5
Narayanganj	100.0	100.0	100.0	100.0	99.8	99.8	99.8	92.3	92.3	91.6	88.2	83.2
Jhenaidah	100.0	100.0	100.0	100.0	100.0	100.0	100.0	95.3	95.3	94.1	85.9	83.2
Cox'sbazar	99.8	99.8	99.8	99.8	99.0	99.0	99.0	94.0	94.0	93.4	88.5	83.0
Magura	100.0	100.0	100.0	100.0	99.8	99.8	99.8	94.6	94.6	92.7	89.0	82.9
Rajbari	100.0	100.0	100.0	100.0	99.0	99.0	99.0	93.4	93.4	93.4	87.8	82.7
Chaudanga	100.0	100.0	100.0	100.0	99.1	99.1	99.1	90.5	90.5	90.1	90.4	82.7
Narail	98.6	98.6	98.6	98.6	98.1	98.1	98.1	93.0	93.0	92.0	87.5	82.5
Sirajganj	99.5	99.5	99.5	99.5	98.9	98.9	98.9	94.4	94.4	94.4	86.7	82.5
Bagerhat	99.8	99.8	99.8	99.8	98.3	98.3	98.3	92.3	92.3	91.6	86.9	82.4
Mymensingh City Corporation	99.9	100.0	100.0	100.0	99.0	99.0	99.0	94.2	94.2	94.5	86.3	82.3
Gopalganj	100.0	100.0	100.0	100.0	99.8	99.8	99.8	96.3	96.3	94.8	85.7	82.2
Dhaka	100.0	100.0	100.0	100.0	99.8	99.8	99.8	93.9	93.9	93.5	86.8	82.1
Nartore	100.0	99.8	99.8	99.8	99.1	99.1	99.1	92.2	92.2	91.6	86.5	82.0

Table 4C: Continued

District/City Corporation	BCG	Penta1	OPV 1	PCV1	Penta2	OPV2	PCV2	Penta3	OPV3	PCV3	MR1	FVC
Gaibandha	100.0	100.0	100.0	100.0	99.4	99.4	99.4	93.4	93.4	93.4	85.4	82.0
Nilphamari	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.5	94.5	91.8	88.0	81.7
Rangpur City Corporation	100.0	99.8	99.8	99.8	99.6	99.6	99.6	92.8	92.8	92.4	86.0	81.7
Noakhali	99.2	99.2	99.2	99.2	98.4	98.4	98.4	90.2	90.2	89.5	89.3	81.4
Sunamganj	98.9	98.8	98.8	98.8	98.6	98.6	98.6	92.8	92.8	91.1	85.8	81.3
Netrokona	100.0	99.3	99.3	99.3	98.8	98.8	98.8	94.7	94.7	94.7	85.3	81.2
Laksmipur	100.0	100.0	100.0	100.0	99.6	99.6	99.6	91.3	91.3	90.3	89.4	80.8
Mymensingh	100.0	100.0	100.0	100.0	99.4	99.4	99.4	94.0	94.0	93.1	84.6	80.7
Satkhira	99.7	99.8	99.8	99.8	99.6	99.6	99.6	90.3	90.3	90.3	88.2	80.5
Lalmonirhat	100.0	100.0	100.0	100.0	99.8	99.8	99.8	91.9	91.9	91.5	86.1	80.2
Dhaka South City Corporation	99.7	99.6	99.6	99.6	99.1	99.1	99.1	89.6	89.6	89.0	85.0	79.3
Khulna City Corporation	98.9	99.1	99.1	99.1	98.4	98.4	98.4	91.7	91.7	90.8	85.2	79.0
Rangamati	98.8	98.9	98.9	98.9	97.8	97.8	97.8	88.8	88.8	88.5	84.4	78.9
Rangpur	100.0	100.0	100.0	100.0	99.0	99.0	99.0	88.4	88.4	88.0	85.0	77.4
Narayanganj City Corporation	99.8	99.7	99.7	99.7	97.5	97.5	97.5	87.1	87.1	86.1	84.2	77.0
Gazipur City Corporation	99.9	100.0	100.0	100.0	99.6	99.6	99.6	92.4	92.4	91.9	79.7	76.5
Faridpur	100.0	99.6	99.6	99.6	98.4	98.4	98.4	90.6	90.6	89.6	81.6	75.4
Dhaka North City Corporation	100.0	100.0	100.0	100.0	99.3	99.3	99.3	81.3	81.3	81.4	83.6	74.2
Bandarban	96.9	96.9	96.9	96.9	95.9	95.9	95.9	87.8	87.8	86.6	80.5	73.8
Sherpur	100.0	99.8	99.8	99.8	99.4	99.4	99.4	91.2	91.2	90.5	77.4	72.2
Chattogram City Corporation	99.4	99.2	99.2	99.2	97.9	97.9	97.9	79.5	79.5	79.8	78.3	69.4
Cumilla City Corporation	95.6	95.7	95.7	95.7	95.5	95.5	95.5	82.4	82.4	82.4	72.4	65.6
Khagrachari	100.0	100.0	100.0	100.0	98.8	98.8	98.8	87.8	87.8	87.6	72.1	64.9
Sylhet City Corporation	97.7	97.5	97.5	97.5	95.9	95.9	95.9	85.8	85.8	85.0	70.0	63.8

Table 5: Crude and Valid IPV Vaccination Coverage by the Age 23 Months[12] among 12-23 Months[12] Old Children by District and City Corporation

District/City Corporation	Crude Coverage			Valid Coverage[13]		
	IPV1	IPV2	FVC	IPV1	IPV2	FVC
Barguna	67.4	29.4	29.4	66.1	28.3	28.3
Barishal	71.4	43.9	43.9	71.1	42.1	42.1
Barishal City Corporation	73.2	37.6	37.6	72.7	34.9	34.9
Bhola	69.5	34.2	34.2	68.2	33.3	33.3
Jhalokati	77.7	49.5	49.5	77.4	48.3	48.3
Patuakhali	54.0	30.5	30.5	53.6	28.7	28.7
Pirojpur	68.9	43.3	43.3	68.3	41.3	41.3
Barishal Division	**67.9**	**38.2**	**38.2**	**67.9**	**36.6**	**36.6**
Bandarban	49.5	35.6	35.6	49.1	32.0	32.0
Brahmanbaria	69.8	36.9	36.9	67.6	34.3	34.3
Chandpur	74.8	39.9	39.9	74.4	38.7	38.7
Chattogram	73.6	56.6	56.6	73.2	52.3	52.3
Chattogram City Corporation	84.9	72.4	72.4	82.8	49.2	49.2
Cumilla	78.2	52.6	52.6	76.5	49.9	49.9
Cumilla City Corporation	71.3	57.4	57.4	69.3	46.6	46.6
Cox's bazar	70.5	50.8	50.8	69.9	46.0	46.0
Feni	71.5	62.6	62.6	70.7	58.6	58.6
Khagrachari	83.0	71.8	71.8	82.2	61.9	61.9
Laksmipur	73.6	56.5	56.5	73.2	47.4	47.4
Rangamati	70.7	48.0	48.0	70.1	42.1	42.1
Noakhali	69.6	50.8	50.8	68.3	42.6	42.6
Chattogram Division	**67.9**	**38.2**	**38.2**	**67.9**	**36.6**	**36.6**
Dhaka	91.7	63.6	63.6	89.9	56.8	56.8
Dhaka North City Corporation	94.4	82.9	83.0	93.4	47.0	47.1
Dhaka South City Corporation	82.7	62.6	62.6	79.6	45.7	45.7
Faridpur	76.2	50.8	50.8	75.2	44.7	44.7
Gazipur	90.6	75.3	75.3	89.9	66.8	66.8
Gazipur City Corporation	91.8	75.1	75.1	89.4	68.1	68.1
Gopalganj	63.0	42.5	42.5	61.9	39.8	39.8
Kishoreganj	71.3	47.7	47.7	69.8	45.5	45.5
Madaripur	75.6	40.9	40.9	74.3	37.4	37.4
Manikganj	82.1	49.8	49.8	79.8	41.9	41.9
Munshiganj	69.4	38.8	38.8	67.7	34.7	34.7
Narayanganj	77.1	61.4	61.4	76.2	50.0	50.0
Narayanganj City Corporation	84.6	68.5	68.5	79.5	54.0	54.0
Narsingdi	68.1	45.1	45.1	68.1	42.5	42.5
Rajbari	85.6	61.5	61.5	83.8	50.9	50.9
Shariatpur	79.7	50.5	50.5	78.4	46.0	46.0
Tangail	66.5	56.5	56.5	64.2	52.6	52.6
Dhaka Division	**80.5**	**59.6**	**59.7**	**80.5**	**50.5**	**50.6**
Bagerhat	81.4	55.5	55.5	80.6	51.4	51.4
Chaudanga	87.1	56.4	56.4	86.0	52.2	52.2
Jashore	70.9	53.6	53.6	70.3	52.3	52.3
Jhenaidah	80.5	48.4	48.4	79.3	45.0	45.0
Khulna	71.6	47.9	47.9	71.6	46.2	46.2
Khulna City Corporation	74.7	51.1	51.1	72.6	45.7	45.7
Kushtia	71.7	44.3	44.3	71.1	42.3	42.3
Magura	79.4	58.8	58.8	78.2	49.6	49.6

[12] Children born between May 1, 2017 and April 30, 2018

[13] Valid IPV Vaccination Coverage by the Age of 12 Months

Table 5: Continued

District/City Corporation	Crude Coverage			Valid Coverage		
	IPV1	IPV2	FVC	IPV1	IPV2	FVC
Meherpur	75.3	63.2	63.2	74.3	59.3	59.3
Narail	78.8	52.4	52.4	76.8	47.8	47.8
Satkhira	75.6	44.0	44.0	74.7	32.1	32.1
Khulna Division	**80.5**	**59.6**	**59.7**	**80.5**	**50.5**	**50.6**
Jamalapur	58.1	37.9	37.9	56.8	36.1	36.1
Mymensingh	82.9	64.9	64.9	82.7	61.1	61.1
Mymensingh City Corporation	90.3	68.5	68.5	90.3	64.2	64.2
Netrokona	72.6	60.6	60.6	71.6	57.6	57.6
Sherpur	63.7	40.8	40.8	62.3	36.6	36.6
Mymensingh Division	**72.7**	**54.4**	**54.4**	**72.7**	**51.2**	**51.2**
Bogura	94.9	88.9	88.9	93.6	82.3	82.3
Joypurhat	78.3	45.9	45.9	77.7	43.8	43.8
Natore	67.5	36.7	36.7	66.5	32.1	32.1
Naogaon	75.3	51.3	50.9	74.9	47.7	47.2
Chapai Nawabganj	81.5	50.4	50.4	80.0	47.8	47.8
Pabna	64.6	42.5	42.5	64.4	39.8	39.8
Rajshahi	64.5	48.4	48.4	63.8	42.5	42.5
Rajshahi City Corporation	65.4	44.7	44.7	65.0	42.6	42.6
Sirajganj	72.7	49.7	49.7	71.4	47.3	47.3
Rajshahi Division	**75.1**	**53.9**	**53.8**	**75.1**	**49.9**	**49.9**
Dinajpur	72.5	37.7	37.7	71.6	35.7	35.7
Gaibandha	79.4	51.3	51.3	77.5	45.8	45.8
Kurigram	65.8	33.6	33.6	65.6	32.6	32.6
Lalmonirhat	78.2	47.1	47.1	76.9	41.0	41.0
Nilphamari	75.2	45.0	45.0	73.2	41.2	41.2
Panchagarh	71.4	40.2	40.2	70.6	37.7	37.7
Rangpur	72.6	48.4	48.4	72.0	44.2	44.2
Rangpur City Corporation	80.2	41.2	41.2	79.6	37.1	37.1
Thakurgaon	74.3	35.0	35.0	71.6	32.8	32.8
Rangpur Division	**73.6**	**42.4**	**42.4**	**73.6**	**39.1**	**39.1**
Habiganj	72.7	40.3	40.3	71.8	38.9	38.9
Moulvibazar	85.9	49.2	49.2	84.6	47.6	47.6
Sunamganj	84.7	52.4	52.4	82.4	48.2	48.2
Sylhet	89.6	68.6	68.6	89.6	64.7	64.7
Sylhet City Corporation	81.7	35.1	35.1	78.4	31.0	31.0
Sylhet Division	**83.7**	**53.2**	**53.2**	**83.7**	**49.9**	**49.9**
National	76.1	52.6	52.6	76.1	47.5	47.5
Urban	81.1	60.0	60.1	79.5	49.2	49.2
Rural	74.9	50.7	50.7	73.9	46.7	46.7
Dhaka North City Corporation Slum	89.6	65.4	65.4	87.8	56.6	56.6
Dhaka South City Corporation Slum	83.9	54.9	54.9	82.3	48.5	48.5
Chattogram City Corporation Slum	87.9	67.5	67.5	85.2	52.9	52.9

APPENDIX C: Valid Full Vaccination Coverage including MR2 by Survey Units (in figures). (Fully Immunized Arranged in Ascending Order by All Districts and City Corporation)

Figure 9: Valid Full Vaccination Coverage including MR2 by the Age of 23 Months among 24-35 Months Old Children by Districts and City Corporation in Barishal Division

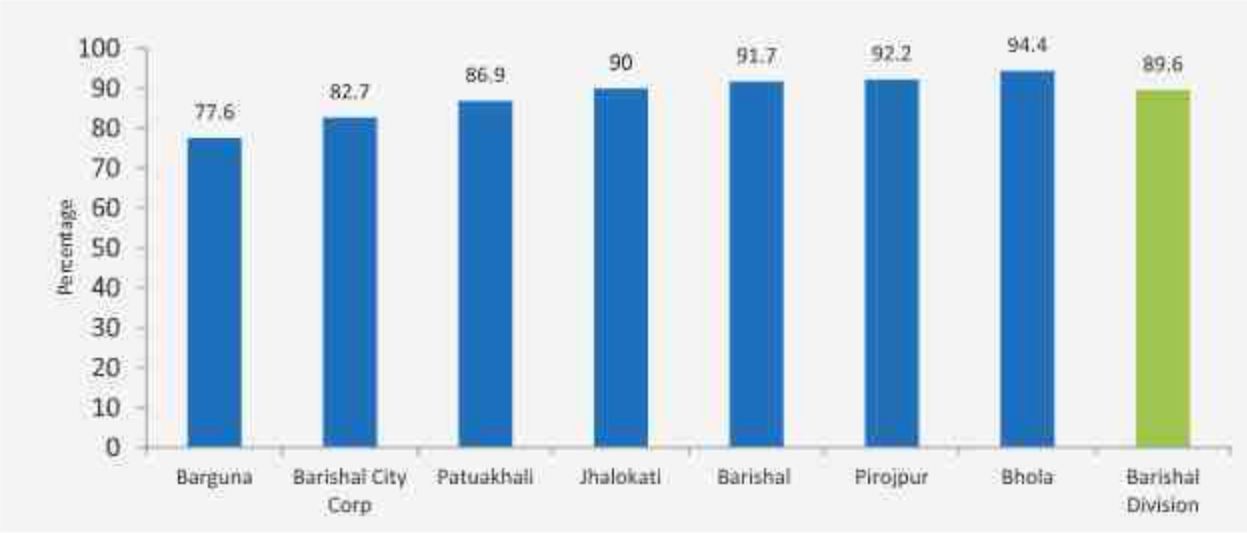


Figure 10: Valid Full Vaccination Coverage including MR2 by the Age of 23 Months among 24-35 Months Old Children by Districts and City Corporation in Chattogram Division

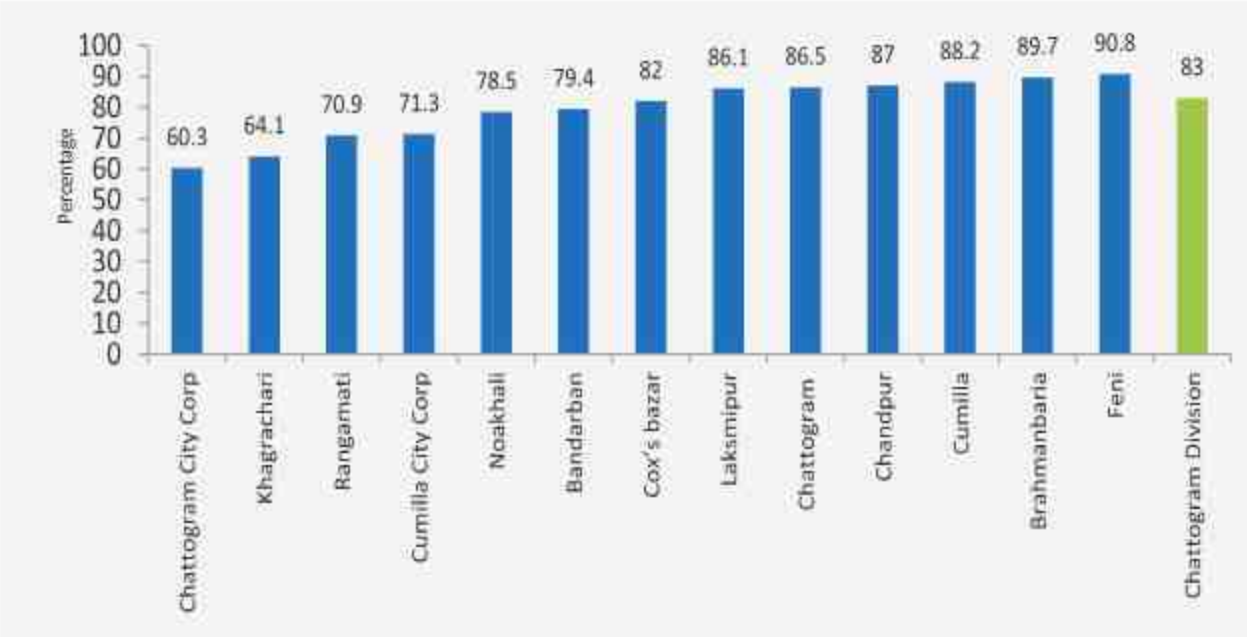


Figure 11: Valid Full Vaccination Coverage including MR2 by the Age of 23 Months among 24-35 Months Old Children by Districts and City Corporation in Dhaka Division

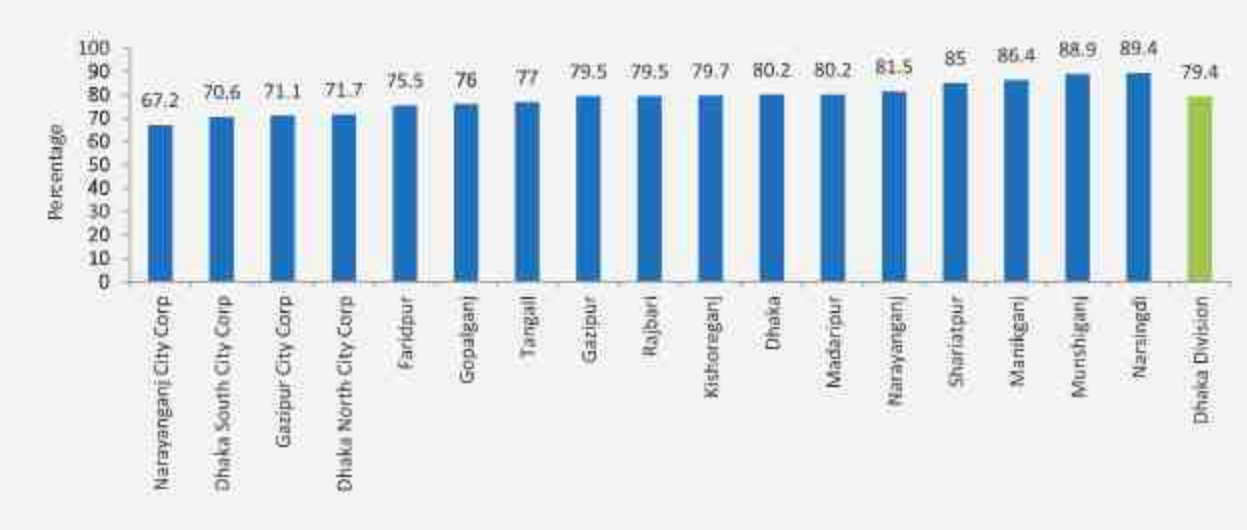


Figure 12: Valid Full Vaccination Coverage including MR2 by the Age of 23 Months among 24-35 Months Old Children by Districts and City Corporation in Khulna Division

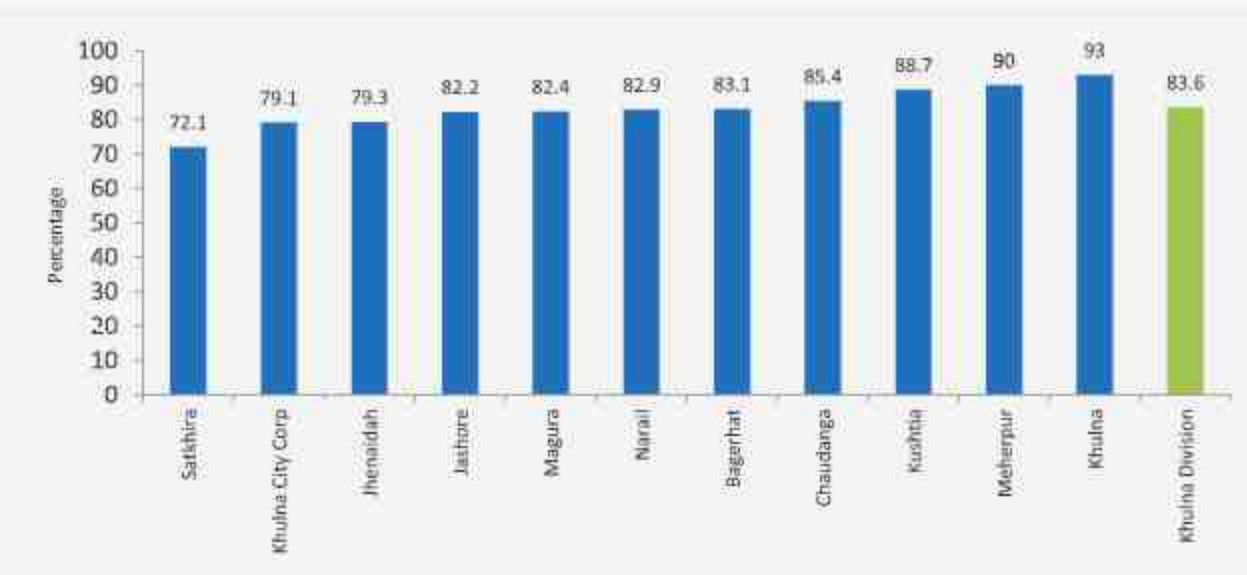


Figure 13: Valid Full Vaccination Coverage including MR2 by the Age of 23 Months among 24-35 Months Old Children by Districts and City Corporation in Mymensingh Division

Figure 14: Valid Full Vaccination Coverage including MR2 by the Age of 23 Months among 24-35 Months Old Children by Districts and City Corporation in Rajshahi Division

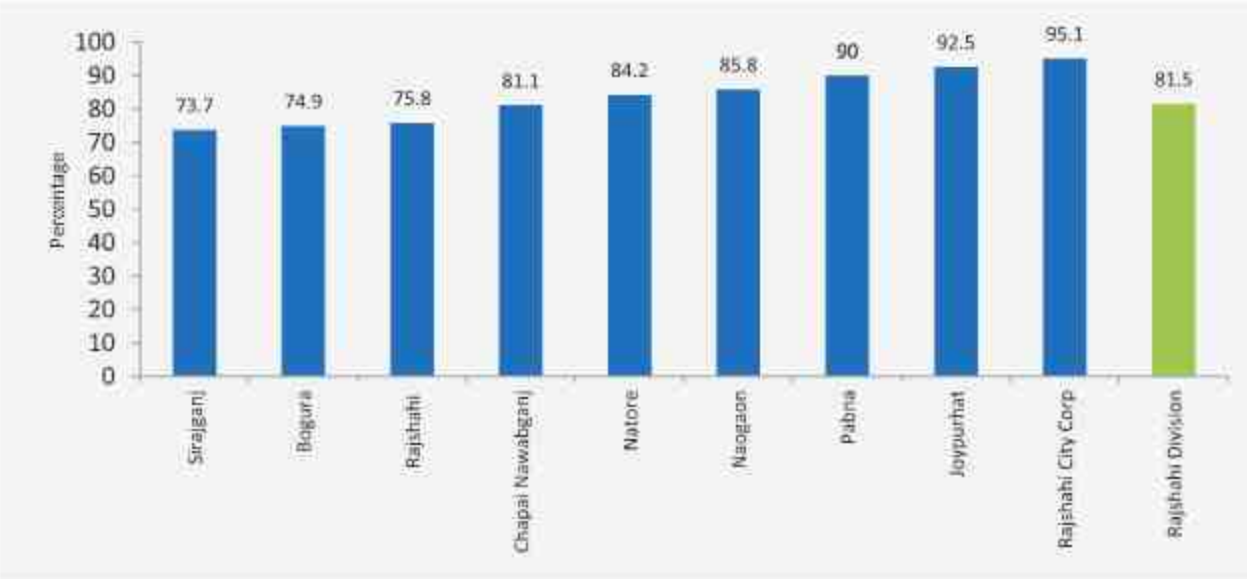


Figure 15: Valid Full Vaccination Coverage including MR2 by the Age of 23 Months among 24-35 Months Old Children by Districts and City Corporation in Rangpur Division

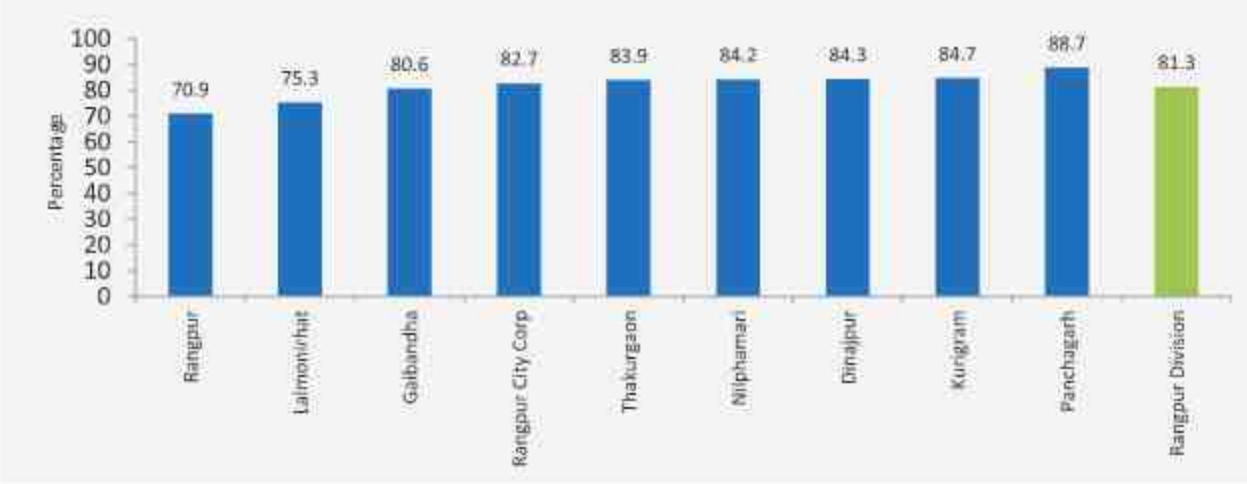
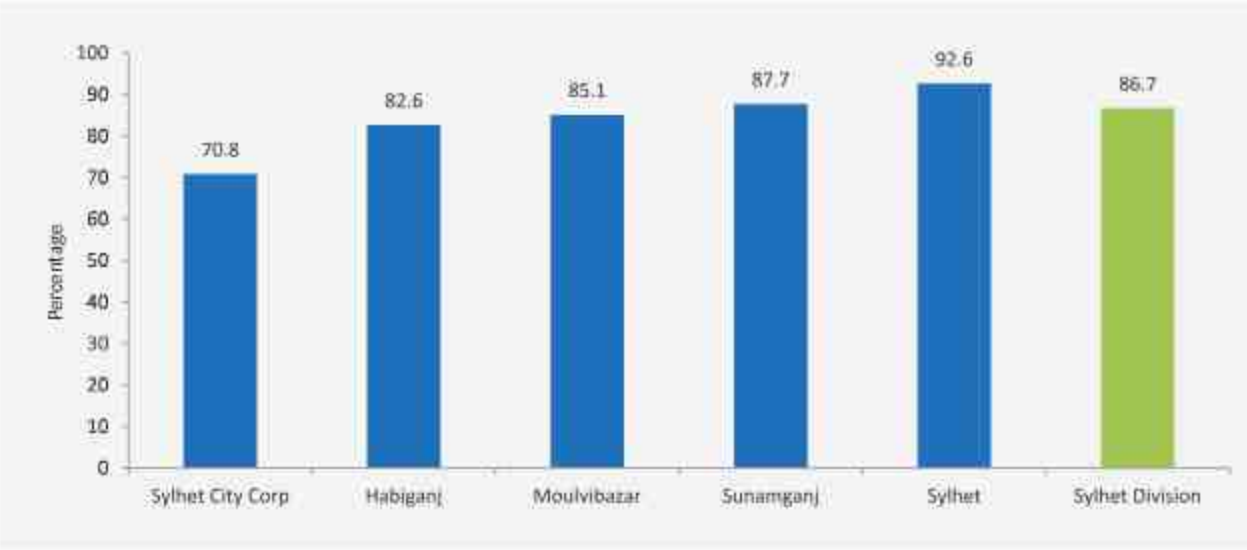


Figure 16: Valid Full Vaccination Coverage including MR2 by the Age of 23 Months among 24-35 Months Old Children by Districts and City Corporation in Sylhet Division



APPENDIX D: Vaccination Coverage including MR2 by Survey Units (in Tables)

Table 6: Crude Vaccination Coverage including MR2 by the Age of 23 Months[14] among 24-35 Months Old Children by Districts and City Corporations

District/City Corporation	BCG	Penta1	OPV1	PCV1	Penta2	OPV2	PCV2	Penta3	OPV3	PCV3	MR1	MR2	FVC
Barguna	99.2	99.2	99.2	99.2	98.8	98.8	98.8	98.8	98.8	98.7	97.2	91.2	91.2
Barishal	100	100	100	100	100	100	100	100	100	99.8	99.9	98.8	98.6
Barishal City Corporation	100	100	100	100	99.1	99.1	99.1	98.7	98.7	97.9	96.5	90.4	90.1
Bhola	100	100	100	100	100	100	100	100	100	100	99.8	98.7	98.7
Jhalokati	100	100	100	100	100	100	100	99.6	99.6	99.6	98.4	94.1	94.1
Patuakhali	100	100	100	100	99.6	99.6	99.6	99.5	99.5	99.2	98.6	96.4	96.4
Pirojpur	99.6	99.6	99.6	99.6	99.4	99.4	99.4	99.4	99.4	99.4	99	98.1	98.1
Barishal Division	**99.9**	**99.9**	**99.9**	**99.9**	**99.7**	**99.7**	**99.7**	**99.6**	**99.6**	**99.5**	**99**	**96.8**	**96.7**
Bandarban	99.8	99.8	99.8	99.8	99.3	99.3	99.3	99.1	99.1	98.3	96.4	87.7	87.4
Brahmanbaria	100	100	100	100	99.8	99.8	99.8	99.8	99.8	99.8	99.5	96.9	96.9
Chandpur	100	100	100	100	99.8	99.8	99.8	99.5	99.5	99.5	99.3	94.6	94.6
Chattogram	100	100	100	100	99.8	99.8	99.8	99.7	99.7	99.6	99.6	97.5	97.2
Chattogram City Corporation	99	99	99	99	98.7	98.7	98.7	96.1	96.1	94.6	91.5	83.7	83.5
Cumilla	100	100	100	100	99.8	99.8	99.8	99.8	99.8	99.6	99.8	98.9	98.9
Cumilla City Corporation	100	100	100	100	100	100	100	99.6	99.6	99.2	97	91.9	91.6
Cox's bazar	100	100	100	100	99.8	99.8	99.8	99.3	99.3	99.1	95.4	90.6	90.4
Feni	100	100	100	100	99.1	99.1	99.1	98.8	98.8	98.6	97	94.2	94.1
Khagrachari	99.7	99.7	99.7	99.7	99.5	99.5	99.5	98.6	98.6	98.2	95.4	83.7	83.7
Laksmipur	100	100	100	100	100	100	100	99.8	99.8	99.6	98.5	93.9	93.9
Rangamati	99.8	99.8	99.8	99.8	99.1	99.1	99.1	98.9	98.9	98.8	96.5	87.4	87.2
Noakhali	100	100	100	100	99.1	99.1	99.1	98.9	98.9	98.5	95.7	92.7	92.7
Chattogram Division	**99.9**	**99.9**	**99.9**	**99.9**	**99.6**	**99.6**	**99.6**	**99.3**	**99.3**	**99**	**97.8**	**94.3**	**94.2**
Dhaka	100	100	100	100	100	100	100	99.7	99.7	99.6	98	95.5	95.2
Dhaka North City Corporation	99.8	99.8	99.8	99.8	98.9	98.9	98.9	98.3	98.3	97.7	97.5	93.6	93
Dhaka South City Corporation	99.8	99.8	99.8	99.8	99.8	99.8	99.8	98.7	98.7	98.2	96.6	91.1	90.9
Faridpur	100	100	100	100	100	100	100	99.3	99.3	98.5	96.9	88.8	88.6
Gazipur	99.8	99.8	99.8	99.8	99.5	99.5	99.5	98.8	98.8	98.7	96.5	91	91
Gazipur City Corporation	99.8	99.4	99.4	99.4	98.3	98.3	98.3	96.6	96.6	95.2	93.4	87	86.8
Gopalganj	100	99.8	99.8	99.8	99.4	99.4	99.4	99	99	98.5	94.9	85.6	85.4
Kishoreganj	99.8	99.8	99.8	99.8	99	99	99	98	98	97.5	95.6	90.2	89.7
Madaripur	100	100	100	100	99.6	99.6	99.6	99	99	98.6	97.2	91.7	91.7
Manikganj	100	100	100	100	99.5	99.5	99.5	99.3	99.3	98.8	98	94.7	94.6
Munshiganj	100	100	100	100	100	100	100	99.8	99.8	99.7	99	95.6	95.6
Narayanganj	100	100	100	100	99.5	99.5	99.5	98.8	98.8	98.4	97.1	92.3	92.1
Narayanganj City Corporation	99.3	99.3	99.3	99.3	98.8	98.8	98.8	98.3	98.3	95.5	93.8	87.3	86.3
Narsingdi	100	100	100	100	100	100	100	99.8	99.8	99.8	99.4	96.3	96.3
Rajbari	100	100	100	100	99.8	99.8	99.8	99.8	99.8	99.8	99	94.8	94.8
Shariatpur	100	100	100	100	99.7	99.7	99.7	99.6	99.6	99.4	98.4	94.2	94.2
Tangail	100	100	100	100	99.5	99.5	99.5	98.3	98.3	98.3	95.7	86.2	86.2
Dhaka Division	**99.9**	**99.9**	**99.9**	**99.9**	**99.5**	**99.5**	**99.5**	**98.8**	**98.8**	**98.4**	**96.9**	**91.8**	**91.5**
Bagerhat	99.8	99.8	99.8	99.8	99.3	99.3	99.3	98.2	98.2	97.3	96.8	90.6	90.4
Chaudanga	100	100	100	100	99.8	99.8	99.8	99.7	99.7	99.5	98.5	94.4	94.4
Jashore	100	99.7	99.7	99.7	99.4	99.4	99.4	98.9	98.9	97.9	95.5	89.6	89.6
Jhenaidah	99.8	99.8	99.8	99.8	99.3	99.3	99.3	98.7	98.7	98.4	96.9	93.7	93.7
Khulna	100	100	100	100	99.8	99.8	99.8	99.7	99.7	99.6	98.7	97.4	97.4
Khulna City Corporation	99	98.9	98.9	98.9	97.6	97.6	97.6	95	95	95.3	93.9	87.6	87.6
Kushtia	100	100	100	100	99.3	99.3	99.3	98.9	98.9	98.6	97.3	94.6	94.6
Magura	100	100	100	100	100	100	100	99.7	99.7	97.6	99	92.6	92.1

[14] Children who born between May 1, 2016 and April 30, 2017

Table 6: Continued

District/City Corporation	BCG	Penta1	OPV1	PCV1	Penta2	OPV2	PCV2	Penta3	OPV3	PCV3	MR1	MR2	FVC
Meherpur	100	100	100	100	100	100	100	99.3	99.3	99.3	98.4	96.3	96.3
Narail	99.8	99.8	99.8	99.8	99.6	99.6	99.6	99	99	98.8	97.7	91.3	91.1
Satkhira	98.7	98.7	98.7	98.7	98.7	98.7	98.7	98.5	98.5	97.8	96.2	88.9	88.9
Khulna Division	**99.8**	**99.7**	**99.7**	**99.7**	**99.4**	**99.4**	**99.4**	**98.9**	**98.9**	**98.3**	**97.1**	**92.5**	**92.4**
Jamalapur	100	99.5	99.5	99.5	99.3	99.3	99.3	99.3	99.3	98.9	96.4	91.3	91.1
Mymensingh	100	99.6	99.6	99.6	99.6	99.6	99.6	98.5	98.5	98.1	95.8	90.7	90.5
Mymensingh City Corporation	100	100	100	100	99.3	99.3	99.3	97.3	97.3	97.1	96.3	88.4	88.4
Netrokona	100	99.8	99.8	99.8	99.3	99.3	99.3	98.8	98.8	98.1	97.2	91.9	91.9
Sherpur	99.8	99.8	99.8	99.8	99.6	99.6	99.6	99.6	99.6	99.3	95.7	90.2	90.2
Mymensingh Division	**100**	**99.7**	**99.7**	**99.7**	**99.5**	**99.5**	**99.5**	**98.8**	**98.8**	**98.4**	**96.2**	**90.9**	**90.8**
Bogura	100	100	100	100	100	100	100	100	100	99.8	97.9	94.7	94.7
Joypurhat	100	100	100	100	100	100	100	99.8	99.8	99.8	99.2	97.6	97.6
Natore	99.8	99.8	99.8	99.8	99.8	99.8	99.8	99.4	99.4	99.1	96.8	93.7	93.7
Naogaon	99.5	99.5	99.5	99.5	98.8	98.8	98.8	98.1	98.1	97.7	96.6	91.1	91.1
Chapai Nawabganj	100	100	100	100	99.8	99.8	99.8	98.8	98.8	98.8	96.3	89	88.9
Pabna	99.4	99.4	99.4	99.4	99	99	99	98.8	98.8	98.8	97.7	95.6	95.6
Rajshahi	100	100	100	100	99.8	99.8	99.8	99.5	99.5	99.3	96.8	89.3	89.1
Rajshahi City Corporation	100	100	100	100	100	100	100	100	100	100	100	99.6	99.6
Sirajganj	99.7	99.7	99.7	99.7	98.5	98.5	98.5	97.8	97.8	96.6	93.1	85.9	85.4
Rajshahi Division	**99.8**	**99.8**	**99.8**	**99.8**	**99.4**	**99.4**	**99.4**	**98.9**	**98.9**	**99.4**	**96.6**	**91.8**	**91.7**
Dinajpur	99.8	99.7	99.7	99.7	99.7	99.7	99.7	99.5	99.5	99.5	97.6	93.4	93.4
Gaibandha	99.8	99.6	99.6	99.6	98.6	98.6	98.6	97.7	97.7	97.3	93.5	87.8	87.8
Kurigram	100	100	100	100	99.8	99.8	99.8	99.6	99.6	99.6	98.3	93	92.7
Lalmonirhat	100	100	100	100	99.7	99.7	99.7	99.5	99.5	99.1	97.3	93.1	93.1
Nilphamari	100	99.8	99.8	99.8	99.3	99.3	99.3	98.8	98.8	98.6	98.1	91.1	91.1
Panchagarh	100	100	100	100	100	100	100	99.8	99.8	99.1	98.9	95.4	95.4
Rangpur	100	100	100	100	99.8	99.8	99.8	99	99	98.3	95.9	86.7	86.7
Rangpur City Corporation	99.7	99.4	99.4	99.4	99.2	99.2	99.2	99.2	99.2	98.1	97.1	93.7	93.7
Thakurgaon	100	100	100	100	99.5	99.5	99.5	99.3	99.3	98.6	96.7	91.7	91.7
Rangpur Division	**99.9**	**99.8**	**99.8**	**99.8**	**99.5**	**99.5**	**99.5**	**99.1**	**99.1**	**98.7**	**96.8**	**91.1**	**91**
Habiganj	95.5	95.5	95.5	95.5	94.2	94.2	94.2	94.1	94.1	94.1	92.8	88.1	87.7
Moulvibazar	100	100	100	100	99.5	99.5	99.5	99.3	99.3	99.3	97.5	90.6	90.6
Sunamganj	99.8	99.6	99.6	99.6	99.2	99.2	99.2	98.9	98.9	99	97.3	94.1	93.9
Sylhet	100	100	100	100	100	100	100	100	100	100	100	98.8	98.8
Sylhet City Corporation	98.9	98.5	98.5	98.5	98	98	98	96.1	96.1	95.4	91.7	85.1	85.1
Sylhet Division	**98.9**	**98.8**	**98.8**	**98.8**	**98.3**	**98.3**	**98.3**	**98.1**	**98.1**	**98.1**	**96.8**	**93**	**92.9**
National	99.8	99.8	99.8	99.8	99.4	99.4	99.4	99	99	98.6	97.1	92.6	92.5
Urban	99.9	99.7	99.7	99.7	99.2	99.2	99.2	98.5	98.5	97.9	96.1	91.1	90.8
Rural	100	99.8	99.8	99.8	99.5	99.5	99.5	99.1	99.1	98.8	97.4	93	92.9

Table 7: Valid Vaccination Coverage including MR2 by the Age of 23 Months[15] among 24-35 Months Old Children by Districts and City Corporations

District/City Corporation	BCG	Penta1	OPV1	PCV1	Penta2	OPV2	PCV2	Penta3	OPV3	PCV3	MR1	MR2	FVC
Barguna	99.2	99.2	99.2	99.2	97.2	97.2	97.2	95.2	95.2	95.2	89.8	85.2	77.6
Barishal	100	100	100	100	99.5	99.5	99.5	97.4	97.4	99.4	97	96.7	91.7
Barishal City Corporation	100	100	100	100	98.5	98.5	98.5	95.2	95.2	97.2	92.9	87.1	82.7
Bhola	100	100	100	100	99.1	99.1	99.1	99	99	99	98	97.8	94.4
Jhalokati	100	100	100	100	99.8	99.8	99.8	98.7	98.7	99.6	95	92.9	90
Patuakhali	100	100	100	100	98.5	98.5	98.5	96	96	96	94.9	94.1	86.9
Pirojpur	99.6	99.6	99.6	99.6	99	99	99	97.9	97.9	97.9	95.7	97	92.2
Barishal Division	**99.9**	**99.9**	**99.9**	**99.9**	**98.9**	**98.9**	**98.9**	**97.4**	**97.4**	**97.4**	**95.6**	**94.6**	**89.6**
Bandarban	99.8	99.4	99.4	99.4	98.6	98.6	98.6	94.3	94.3	98.1	92.6	84.8	79.4
Brahmanbaria	100	99.8	99.8	99.8	99.3	99.3	99.3	96.7	96.7	98.9	96.5	94.5	89.7
Chandpur	100	99.8	99.8	99.8	99.1	99.1	99.1	95.4	95.4	98.8	95	92.8	87
Chattogram	100	99.8	99.8	99.8	99.2	99.2	99.2	94.7	94.7	98.7	95.5	94.4	86.5
Chattogram City Corporation	99	97.5	97.5	97.5	95.7	95.7	95.7	74.9	74.9	93.8	78.9	73.4	60.3
Cumilla	100	100	100	100	99.6	99.6	99.6	96.7	96.7	98.9	94.9	94.7	88.2
Cumilla City Corporation	100	100	100	100	99.8	99.8	99.8	83.7	83.7	98.7	85.9	83.1	71.3
Cox's bazar	100	99.7	99.7	99.7	99.1	99.1	99.1	93.1	93.1	98.1	91	87.2	82
Feni	100	100	100	100	98.7	98.7	98.7	97.3	97.3	98.1	95.2	93.6	90.8
Khagrachari	99.7	99.7	99.7	99.7	97.4	97.4	97.4	89.6	89.6	95	84.4	77.5	64.1
Laksmipur	100	100	100	100	99.6	99.6	99.6	96.1	96.1	99.1	94.1	91.4	86.1
Rangamati	99.8	99.1	99.1	99.1	97.9	97.9	97.9	92.8	92.8	97.3	87.3	83.3	70.9
Noakhali	100	99.6	99.6	99.6	98.5	98.5	98.5	93.9	93.9	98	87.8	85.2	78.5
Chattogram Division	**99.9**	**99.7**	**99.7**	**99.7**	**99**	**99**	**99**	**93.7**	**93.7**	**98.2**	**92.2**	**90.1**	**83**
Dhaka	100	100	100	100	99.3	99.3	99.3	92.2	92.2	98.2	90.3	88.9	80.2
Dhaka North City Corporation	99.8	99.8	99.8	99.8	97.4	97.4	97.4	78.7	78.7	95.8	89.9	87.7	71.7
Dhaka South City Corporation	99.8	99.8	99.8	99.8	99.4	99.4	99.4	93.9	93.9	94.9	84.7	81.6	70.6
Faridpur	100	100	100	100	99.7	99.7	99.7	93.7	93.7	97.7	90.7	83.5	75.5
Gazipur	99.8	99.8	99.8	99.8	99.5	99.5	99.5	95.3	95.3	98.3	89.2	86.3	79.5
Gazipur City Corporation	99.8	99.4	99.4	99.4	97.8	97.8	97.8	84	84	95.2	86.4	79.6	71.1
Gopalganj	100	99.8	99.8	99.8	99	99	99	94.9	94.9	97.6	89	82.8	76
Kishoreganj	99.8	99.8	99.8	99.8	98	98	98	94.8	94.8	96.8	90.9	86.6	79.7
Madaripur	100	100	100	100	98.5	98.5	98.5	94.1	94.1	97.7	90.3	88.4	80.2
Manikganj	100	100	100	100	98.8	98.8	98.8	93.8	93.8	97.7	94.6	93	86.4
Munshiganj	100	100	100	100	98.9	98.9	98.9	97	97	97	96.2	94.2	88.9
Narayanganj	100	100	100	100	98.3	98.3	98.3	94.5	94.5	97.3	89.1	89.5	81.5
Narayanganj City Corporation	99	99	99	99	97.7	97.7	97.7	85.8	85.8	94.9	83.2	84.6	67.2
Narsingdi	100	100	100	100	99.2	99.2	99.2	97	97	99.2	96.5	94.7	89.4
Rajbari	100	100	100	100	99.5	99.5	99.5	93	93	99	90.6	90.4	79.5
Shariatpur	100	100	100	100	99.6	99.6	99.6	96.1	96.1	99	92.4	90.9	85
Tangail	100	100	100	100	99.5	99.5	99.5	94.4	94.4	98.1	90.1	82.5	77
Dhaka Division	**99.9**	**99.9**	**99.9**	**99.9**	**98.8**	**98.8**	**98.8**	**92.3**	**92.3**	**97.5**	**90.8**	**87.8**	**79.4**
Bagerhat	99.8	99.8	99.8	99.8	98.5	98.5	98.5	96.1	96.1	96.9	92.9	88.8	83.1
Chaudanga	100	99.3	99.3	99.3	98.8	98.8	98.8	92.6	92.6	98.1	95	92	85.4
Jashore	100	99.6	99.6	99.6	98.3	98.3	98.3	96.7	96.7	97.3	91.7	86.6	82.2
Jhenaidah	99.8	99.6	99.6	99.6	97.3	97.3	97.3	92.4	92.4	92.4	89.4	89.9	79.3
Khulna	100	100	100	100	99.6	99.6	99.6	97.8	97.8	99.2	96.6	96.1	93
Khulna City Corporation	99	98.9	98.9	98.9	97	97	97	92.5	92.5	94.7	87.5	85.5	79.1
Kushtia	100	100	100	100	98.7	98.7	98.7	95.2	95.2	97.3	95.6	93.3	88.7
Magura	100	100	100	100	98.2	98.2	98.2	96.1	96.1	96.9	91.4	89.1	82.4
Meherpur	100	100	100	100	99.5	99.5	99.5	98	98	99.2	96.7	93.2	90
Narail	99.8	99.8	99.8	99.8	99.6	99.6	99.6	96.3	96.3	98.6	91.8	88.5	82.9
Satkhira	98.7	98.5	98.5	98.5	97.3	97.3	97.3	89.8	89.8	95.3	88.6	81.7	72.1
Khulna Division	**99.8**	**99.6**	**99.6**	**99.6**	**98.4**	**98.4**	**98.4**	**94.9**	**94.9**	**97.4**	**92.7**	**89.6**	**83.6**
Jamalapur	100	99.5	99.5	99.5	98.4	98.4	98.4	96	96	97.5	90.7	88.4	81.9
Mymensingh	100	99.6	99.6	99.6	99.3	99.3	99.3	94.6	94.6	97.8	89.8	87.2	80.7
Mymensingh City Corporation	100	100	100	100	98.4	98.4	98.4	94.5	94.5	96.8	85.5	86.2	76.7

[15] Children who born between May 1, 2016 and April 30, 2017

Table 7: Continued

District/City Corporation	BCG	Penta1	OPV1	PCV1	Penta2	OPV2	PCV2	Penta3	OPV3	PCV3	MR1	MR2	FVC
Netrokona	100	99.6	99.6	99.6	98.3	98.3	98.3	92.7	92.7	96.7	91.9	88.1	82.3
Sherpur	99.8	99.8	99.8	99.8	97.9	97.9	97.9	95.5	95.5	95.5	89.6	87.1	82.2
Mymensingh Division	**100**	**99.6**	**99.6**	**99.6**	**98.7**	**98.7**	**98.7**	**94.8**	**94.8**	**97.6**	**90.2**	**87.6**	**81.3**
Bogura	100	100	100	100	99.8	99.8	99.8	94.9	94.9	99.8	86.2	82.2	74.9
Joypurhat	100	100	100	100	99.6	99.6	99.6	98.3	98.3	99	96.7	96.1	92.5
Natore	99.8	99.8	99.8	99.8	99.2	99.2	99.2	96.9	96.9	99.1	89.7	90.5	84.2
Naogaon	99.5	99.5	99.5	99.5	98.4	98.4	98.4	96.2	96.2	97.3	93.2	90.5	85.8
Chapai Nawabganj	100	100	100	100	98.6	98.6	98.6	96.8	96.8	98	90.8	86.7	81.1
Pabna	99.4	99.4	99.4	99.4	98.8	98.8	98.8	96.7	96.7	98.4	94.5	94.5	90
Rajshahi	100	100	100	100	97.4	97.4	97.4	95.6	95.5	95.5	90.8	85	75.8
Rajshahi City Corporation	100	100	100	100	99.8	99.8	99.8	98.5	98.5	99.8	97.3	98.9	95.1
Sirajganj	99.7	99.7	99.7	99.7	98.1	98.1	98.1	92.7	92.7	94.7	87.1	81.6	73.7
Rajshahi Division	**99.8**	**99.8**	**99.8**	**99.8**	**98.7**	**98.7**	**98.7**	**95.7**	**95.7**	**98**	**90.7**	**87.8**	**81.5**
Dinajpur	99.8	99.7	99.7	99.7	98.3	98.3	98.3	96.6	96.6	96.6	92.5	92.1	84.3
Gaibandha	99.8	99.6	99.6	99.6	97.9	97.9	97.9	95.7	95.7	96.8	89.7	86.2	80.6
Kurigram	100	100	100	100	99.2	99.2	99.2	96.3	96.3	98.7	93.1	90.9	84.7
Lalmonirhat	100	100	100	100	97.8	97.8	97.8	92.6	92.6	97	85.5	84.9	75.3
Nilphamari	100	99.8	99.8	99.8	98.5	98.5	98.5	96.8	96.8	98.4	94.5	89.1	84.2
Panchagarh	100	100	100	100	99.4	99.4	99.4	97.9	97.9	98.6	95.8	93.6	88.7
Rangpur	100	100	100	100	97.3	97.3	97.3	90.5	90.5	95.5	86	82	70.9
Rangpur City Corporation	99.7	99.4	99.4	99.4	97.6	97.6	97.6	94.9	94.9	97.1	92	89.2	82.7
Thakurgaon	100	100	100	100	98.9	98.9	98.9	95	95	97.1	92.8	90.6	83.9
Rangpur Division	**99.9**	**99.8**	**99.8**	**99.8**	**98.3**	**98.3**	**98.3**	**95.2**	**95.2**	**97.6**	**91**	**88.5**	**81.3**
Habiganj	95.5	95.5	95.5	95.5	92.9	92.9	92.9	92	92	92	89.5	87.8	82.6
Moulvibazar	100	100	100	100	99.3	99.3	99.3	97.9	97.9	99.1	93.4	89.6	85.1
Sunamganj	99.8	99.6	99.6	99.6	98.5	98.5	98.5	96.7	96.7	98.5	94	92.8	87.7
Sylhet	100	100	100	100	99.8	99.8	99.8	98.6	98.6	99.6	96.4	97.3	92.6
Sylhet City Corporation	98.9	98.5	98.5	98.5	96.8	96.8	96.8	91	91	94.6	80.7	82.7	70.8
Sylhet Division	**98.9**	**98.8**	**98.8**	**98.8**	**97.7**	**97.7**	**97.7**	**96.1**	**96.1**	**97.7**	**93**	**91.9**	**86.7**
National	99.8	99.7	99.7	99.7	98.6	98.6	98.6	94.5	94.5	97.8	91.7	89.1	82.4
Urban	99.9	99.5	99.5	99.5	98.2	98.2	98.2	89.3	89.3	96.8	87.8	85.7	75.6
Rural	100	99.7	99.7	99.7	98.7	98.7	98.7	95.4	95.4	98.1	92.5	89.9	83.7

Table 7a: Valid Vaccination Coverage by the Age of 23 Months[16] including MR2 among 24-35 Months Old Children by Districts and City Corporations (Full Vaccination Coverage Arranged in Asscending Order by the Age of 23 Months among 24-35 Months Old Children by All Districts and City Corporations)

District/City Corporation	BCG	Penta1	OPV1	PCV1	Penta2	OPV2	PCV2	Penta3	OPV3	PCV3	MR1	MR2	FVC
Chattogram City Corporation	99	97.5	97.5	97.5	95.7	95.7	95.7	74.9	74.9	93.8	78.9	73.4	60.3
Khagrachari	99.7	99.7	99.7	99.7	97.4	97.4	97.4	89.6	89.6	95	84.4	77.5	64.1
Narayanganj City Corporation	99	99	99	99	97.7	97.7	97.7	85.8	85.8	94.9	83.2	84.6	67.2
Dhaka South City Corporation	99.8	99.8	99.8	99.8	99.4	99.4	99.4	93.9	93.9	94.9	84.7	81.6	70.6
Sylhet City Corporation	98.9	98.5	98.5	98.5	96.8	96.8	96.8	91	91	94.6	80.7	82.7	70.8
Rangamati	99.6	99.1	99.1	99.1	97.9	97.9	97.9	92.8	92.8	97.3	87.3	83.3	70.9
Rangpur	100	100	100	100	97.3	97.3	97.3	90.5	90.5	95.5	86	82	70.9
Gazipur City Corporation	99.8	99.4	99.4	99.4	97.8	97.8	97.8	84	84	95.2	86.4	79.6	71.1
Cumilla City Corporation	100	100	100	100	99.8	99.8	99.8	83.7	83.7	98.7	85.9	83.1	71.3
Dhaka North City Corp	99.8	99.8	99.8	99.8	97.4	97.4	97.4	78.7	78.7	95.8	89.9	87.7	71.7
Satkhira	98.7	98.5	98.5	98.5	97.3	97.3	97.3	89.8	89.8	95.3	88.6	81.7	72.1
Sirajganj	99.7	99.7	99.7	99.7	98.1	98.1	98.1	92.7	92.7	94.7	87.1	81.6	73.7
Bogura	100	100	100	100	99.8	99.8	99.8	94.9	94.9	99.8	86.2	82.2	74.9
Lalmonirhat	100	100	100	100	97.8	97.8	97.8	92.6	92.6	97	85.5	84.9	75.3
Faridpur	100	100	100	100	99.7	99.7	99.7	93.7	93.7	97.7	90.7	83.5	75.5
Rajshahi	100	100	100	100	97.4	97.4	97.4	95.6	95.5	95.5	90.8	85	75.8
Gopalganj	100	99.8	99.8	99.8	99	99	99	94.9	94.9	97.6	89	82.8	76
Mymensingh City Corporation	100	100	100	100	98.4	98.4	98.4	94.5	94.5	96.8	85.5	86.2	76.7
Tangail	100	100	100	100	99.5	99.5	99.5	94.4	94.4	98.1	90.1	82.5	77
Barguna	99.2	99.2	99.2	99.2	97.2	97.2	97.2	95.2	95.2	95.2	89.8	85.2	77.6
Noakhali	100	99.6	99.6	99.6	98.5	98.5	98.5	93.9	93.9	98	87.8	85.2	78.5
Khulna City Corporation	99	98.9	98.9	98.9	97	97	97	92.5	92.5	94.7	87.5	85.5	79.1
Jhenaidah	99.8	99.6	99.6	99.6	97.3	97.3	97.3	92.4	92.4	92.4	89.4	89.9	79.3
Bandarban	99.6	99.4	99.4	99.4	98.6	98.6	98.6	94.3	94.3	98.1	92.6	84.8	79.4
Gazipur	99.8	99.8	99.8	99.8	99.5	99.5	99.5	95.3	95.3	98.3	89.2	86.3	79.5
Rajbari	100	100	100	100	99.5	99.5	99.5	93	93	99	90.6	90.4	79.5
Kishoreganj	99.8	99.8	99.8	99.8	98	98	98	94.8	94.8	96.8	90.9	86.6	79.7
Dhaka	100	100	100	100	99.3	99.3	99.3	92.2	92.2	98.2	90.3	88.9	80.2
Madaripur	100	100	100	100	98.5	98.5	98.5	94.1	94.1	97.7	90.3	88.4	80.2
Gaibandha	99.8	99.6	99.6	99.6	97.9	97.9	97.9	95.7	95.7	96.8	89.7	86.2	80.6
Mymensingh	100	99.6	99.6	99.6	99.3	99.3	99.3	94.6	94.6	97.8	89.8	87.2	80.7
Chapai Nawabganj	100	100	100	100	98.6	98.6	98.6	96.8	96.8	98	90.8	86.7	81.1
Narayanganj	100	100	100	100	98.3	98.3	98.3	94.5	94.5	97.3	89.1	89.5	81.5
Jamalapur	100	99.5	99.5	99.5	98.4	98.4	98.4	96	96	97.5	90.7	88.4	81.9
Cox's bazar	100	99.7	99.7	99.7	99.1	99.1	99.1	93.1	93.1	98.1	91	87.2	82
Jashore	100	99.6	99.6	99.6	98.3	98.3	98.3	96.7	96.7	97.3	91.7	86.6	82.2
Sherpur	99.8	99.8	99.8	99.8	97.9	97.9	97.9	95.5	95.5	95.5	89.6	87.1	82.2
Netrokona	100	99.6	99.6	99.6	98.3	98.3	98.3	92.7	92.7	96.7	91.9	88.1	82.3
Magura	100	100	100	100	98.2	98.2	98.2	96.1	96.1	96.9	91.4	89.1	82.4
Habiganj	95.5	95.5	95.5	95.5	92.9	92.9	92.9	92	92	92	89.5	87.8	82.6
Barishal City Corporation	100	100	100	100	98.5	98.5	98.5	95.2	95.2	97.2	92.9	87.1	82.7
Rangpur City Corporation	99.7	99.4	99.4	99.4	97.6	97.6	97.6	94.9	94.9	97.1	92	89.2	82.7
Narail	99.8	99.8	99.8	99.8	99.6	99.6	99.6	96.3	96.3	98.6	91.8	88.5	82.9
Bagerhat	99.8	99.8	99.8	99.8	98.5	98.5	98.5	96.1	96.1	96.9	92.9	88.8	83.1
Thakurgaon	100	100	100	100	98.9	98.9	98.9	95	95	97.1	92.8	90.6	83.9

[16] Children who born between May 1, 2016 and April 30, 2017

Table 7a: Continued

District/City Corporation	BCG	Penta1	OPV1	PCV1	Penta2	OPV2	PCV2	Penta3	OPV3	PCV3	MR1	MR2	FVC
Natore	99.8	99.8	99.8	99.8	99.2	99.2	99.2	96.9	96.9	99.1	89.7	90.5	84.2
Nilphamari	100	99.8	99.8	99.8	98.5	98.5	98.5	96.8	96.8	98.4	94.5	89.1	84.2
Dinajpur	99.8	99.7	99.7	99.7	98.3	98.3	98.3	96.6	96.6	96.6	92.5	92.1	84.3
Kurigram	100	100	100	100	99.2	99.2	99.2	96.3	96.3	98.7	93.1	90.9	84.7
Shariatpur	100	100	100	100	99.6	99.6	99.6	96.1	96.1	99	92.4	90.9	85
Moulvibazar	100	100	100	100	99.3	99.3	99.3	97.9	97.9	99.1	93.4	89.6	85.1
Chaudanga	100	99.3	99.3	99.3	98.8	98.8	98.8	92.6	92.6	98.1	95	92	85.4
Naogaon	99.5	99.5	99.5	99.5	98.4	98.4	98.4	96.2	96.2	97.3	93.2	90.5	85.8
Laksmipur	100	100	100	100	99.6	99.6	99.6	96.1	96.1	99.1	94.1	91.4	86.1
Manikganj	100	100	100	100	98.8	98.8	98.8	93.8	93.8	97.7	94.6	93	86.4
Chattogram	100	99.8	99.8	99.8	99.2	99.2	99.2	94.7	94.7	98.7	95.5	94.4	86.5
Patuakhali	100	100	100	100	98.5	98.5	98.5	96	96	96	94.9	94.1	86.9
Chandpur	100	99.8	99.8	99.8	99.1	99.1	99.1	95.4	95.4	98.8	95	92.8	87
Sunamganj	99.6	99.6	99.6	99.6	98.5	98.5	98.5	96.7	96.7	98.5	94	92.8	87.7
Cumilla	100	100	100	100	99.6	99.6	99.6	96.7	96.7	98.9	94.9	94.7	88.2
Kushtia	100	100	100	100	98.7	98.7	98.7	95.2	95.2	97.3	95.6	93.3	88.7
Panchagarh	100	100	100	100	99.4	99.4	99.4	97.9	97.9	98.6	95.8	93.6	88.7
Munshiganj	100	100	100	100	98.9	98.9	98.9	97	97	97	96.2	94.2	88.9
Narsingdi	100	100	100	100	99.2	99.2	99.2	97	97	99.2	96.5	94.7	89.4
Brahmanbaria	100	99.8	99.8	99.8	99.3	99.3	99.3	96.7	96.7	98.9	96.5	94.5	89.7
Jhalokati	100	100	100	100	99.8	99.8	99.8	98.7	98.7	99.6	95	92.9	90
Meherpur	100	100	100	100	99.5	99.5	99.5	98	98	99.2	96.7	93.2	90
Pabna	99.4	99.4	99.4	99.4	98.8	98.8	98.8	96.7	96.7	98.4	94.5	94.5	90
Feni	100	100	100	100	98.7	98.7	98.7	97.3	97.3	98.1	95.2	93.6	90.8
Barishal	100	100	100	100	99.5	99.5	99.5	97.4	97.4	99.4	97	96.7	91.7
Pirojpur	99.6	99.6	99.6	99.6	99	99	99	97.9	97.9	97.9	95.7	97	92.2
Joypurhat	100	100	100	100	99.6	99.6	99.6	98.3	98.3	99	96.7	96.1	92.5
Sylhet	100	100	100	100	99.8	99.8	99.8	98.6	98.6	99.6	96.4	97.3	92.6
Khulna	100	100	100	100	99.6	99.6	99.6	97.8	97.8	99.2	96.6	96.1	93
Bhola	100	100	100	100	99.1	99.1	99.1	99	99	99	98	97.8	94.4
Rajshahi City Corporation	100	100	100	100	99.8	99.8	99.8	98.5	98.5	99.8	97.3	98.9	95.1
National	99.8	99.7	99.7	99.7	98.6	98.6	98.6	94.5	94.5	97.8	91.7	89.1	82.4
Urban	99.9	99.5	99.5	99.5	98.2	98.2	98.2	89.3	89.3	96.8	87.8	85.7	75.6
Rural	100	99.7	99.7	99.7	98.7	98.7	98.7	95.4	95.4	98.1	92.5	89.9	83.7

APPENDIX E: Programme Quality (Droup-out rate, Incidence of Invalid Dose, Card Retention Rate in Tables by District)

Table 8: Vaccination Drop-out Rate for Penta1-Penta3 and Penta1-MR1 by Age of 23 Months[17] by District and City Corporation

District/ City Corporation	Penta1-Penta3	Penta1-MR1
Barguna	0.4	3
Barishal	0.4	0.4
Barishal City Corporation	0.9	5.9
Bhola	0.2	0.3
Jhalokati	0.8	2.2
Patuakhali	0.3	1.6
Pirojpur	0.2	0.8
Barishal Division	**0.3**	**1.2**
Bandarban	1	7.8
Brahmanbaria	0.5	1.8
Chandpur	0	3.2
Chattogram	0.7	0.8
Chattogram City Corporation	3.2	9.1
Cumilla	0	1.5
Cumilla City Corporation	0.8	3.1
Cox's bazar	1.2	4.5
Feni	0.9	2.9
Khagrachari	2.5	8.3
Laksmipur	0	4
Rangamati	2	5.7
Noakhali	1.2	2.8
Chattogram Division	**0.8**	**3.1**
Dhaka	0.4	2.8
Dhaka North City Corporation	1.1	3.9
Dhaka South City Corporation	2.3	7.7
Faridpur	1.3	7
Gazipur	1.5	4.5
Gazipur City Corporation	2.9	11.6
Gopalganj	0.7	3.8
Kishoreganj	2.2	2.8
Madaripur	1.1	2.7
Manikganj	0.7	4.4
Munshiganj	0.6	2.8
Narayanganj	1.8	6
Narayanganj City Corporation	2.8	6.4
Narsingdi	0.5	1.9
Rajbari	0.3	4.3
Shariatpur	0.3	1.4
Tangail	2.7	6.4
Dhaka Division	**1.4**	**4.7**
Bagerhat	2.3	5.8
Chuadanga	0.9	3.2
Jashore	1.1	4
Jhenaidah	0.7	2.6

[17] Children born between May 1, 2017 and April 30, 2018

Table 8: Continued

District/ City Corporation	Penta1-Penta3	Penta1-MR1
Khulna	0.8	1
Khulna City Corporation	2.2	5.3
Kushtia	0.8	1.4
Magura	0.4	5
Meherpur	1.1	3.4
Narail	0.9	5.2
Satkhira	1	3.1
Khulna Division	**1.1**	**3.3**
Jamalapur	1.9	5.5
Mymensingh	1.4	8.1
Mymensingh City Corporation	1.3	3.7
Netrokona	1.5	4.7
Sherpur	0.8	4.8
Mymensingh Division	**1.5**	**6.3**
Bogura	0.4	2.1
Joypurhat	0.2	0.6
Natore	1.5	3.5
Naogaon	1.4	4.4
Chapai Nawabganj	0.7	4.5
Pabna	0.7	3.3
Rajshahi	0.5	4.1
Rajshahi City Corporation	0.2	0.2
Sirajganj	0.6	5.2
Rajshahi Division	**0.7**	**3.6**
Dinajpur	1.5	2.4
Gaibandha	1.9	6.6
Kurigram	1	4.2
Lalmonirhat	0.4	4.8
Nilphamari	0.2	3.8
Panchagarh	0	0.4
Rangpur	1.9	7
Rangpur City Corporation	1	6.5
Thakurgaon	1.6	2.6
Rangpur Division	**1.3**	**4.3**
Habiganj	0.7	3
Moulvibazar	0.2	0.8
Sunamganj	0.8	4.6
Sylhet	0.1	0.5
Sylhet City Corporation	3.1	9.6
Sylhet Division	**0.6**	**2.8**
National	1	3.8
Urban	1.7	5.5
Rural	0.9	3.4
Dhaka North City Corporation Slum	1.2	5.7
Dhaka South City Corporation Slum	2.9	5.4
Chattogram City Corporation Slum	1.1	2.4

Table 9: Incidence of Invalid Penta 1, Penta 2, Penta 3, MR 1 Doses by Age of 12 Months[18] by District and City Corporation

District/City Corporation	Invalid Penta1	Invalid Penta2	Invalid Penta3	Invalid MR1
Barguna	3.6	0.7	0.3	10.4
Barishal	0.6	0.0	0.3	4.1
Barishal City Corporation	1.7	0.9	0.8	7.0
Bhola	1.9	0.0	0.0	1.4
Jhalokati	1.4	0.5	0.3	5.4
Patuakhali	1.4	1.2	0.2	5.9
Pirojpur	1.2	0.2	0.2	6.2
Barishal Division	**1.7**	**0.3**	**0.3**	**4.8**
Bandarban	4.8	1.2	0.9	10.2
Brahmanbaria	1.9	0.7	0.4	7.8
Chandpur	1.9	1.4	0.8	6.7
Chattogram	5.9	0.5	0.8	6.3
Chattogram City Corporation	15.4	2.3	2.8	16.1
Cumilla	1.9	1.7	1.7	8.4
Cumilla City Corporation	9.6	1.3	1.9	21.7
Cox's bazar	2.3	1.1	2.0	8.5
Feni	4.3	0.8	0.1	5.4
Khagrachari	6.5	1.4	2.6	24.5
Laksmipur	7.1	0.1	0.9	8.3
Rangamati	4.8	1.2	1.4	7.4
Noakhali	5.7	1.1	1.0	8.6
Chattogram Division	**4.6**	**1.1**	**1.2**	**8.8**
Dhaka	3.4	1.7	0.3	10.6
Dhaka North City Corporation	16.5	2.6	0.7	13.3
Dhaka South City Corporation	4.1	2.1	0.9	10.3
Faridpur	6.6	0.4	2.8	13.6
Gazipur	2.6	0.0	2.3	5.0
Gazipur City Corporation	3.8	0.5	0.0	10.8
Gopalganj	2.6	0.0	0.5	10.7
Kishoreganj	1.3	0.1	0.4	6.6
Madaripur	2.8	0.1	1.3	8.8
Manikganj	3.1	1.0	0.9	8.4
Munshiganj	2.6	0.9	1.0	6.0
Narayanganj	4.5	1.4	0.6	7.1
Narayanganj City Corporation	7.6	1.7	0.6	9.9
Narsingdi	2.1	1.8	1.1	5.4
Rajbari	4.1	0.4	2.5	7.5
Shariatpur	2.7	0.8	1.4	5.1
Tangail	2.7	0.9	0.4	4.9
Dhaka Division	**4.4**	**1.1**	**0.8**	**8.5**
Bagerhat	2.0	1.2	2.2	7.3
Chaudanga	3.6	2.5	2.3	6.8
Jashore	2.1	0.8	1.7	6.0
Jhenaidah	4.0	0.0	0.8	11.7
Khulna	2.6	0.8	1.5	5.5
Khulna City Corporation	4.6	0.6	0.6	10.4
Kushtia	0.9	1.3	0.1	5.2
Magura	2.2	1.2	0.7	7.0
Meherpur	2.3	0.0	1.5	7.5

[18] Children born between May 1, 2017 and April 30, 2018

Table 9: Continued

District/City Corporation	Invalid Penta1	Invalid Penta2	Invalid Penta3	Invalid MR1
Narail	3.2	0.9	1.2	7.9
Satkhira	5.1	1.7	2.3	8.6
Khulna Division	**2.7**	**1.2**	**1.4**	**7.3**
Jamalapur	3.2	1.1	1.3	8.1
Mymensingh	1.7	0.5	1.0	8.4
Mymensingh City Corporation	2.6	1.9	0.4	9.8
Netrokona	2.2	0.7	0.7	12.4
Sherpur	2.9	1.5	2.0	16.5
Mymensingh Division	**2.7**	**1.1**	**1.1**	**9.6**
Bogura	3.9	0.3	0.0	12.4
Chapai Nawabganj	2.8	1.6	1.7	6.0
Joypurhat	1.3	0.6	0.9	2.4
Natore	3.1	2.4	0.9	9.3
Naogaon	0.8	0.6	1.6	7.3
Pabna	3.4	0.6	1.0	3.8
Rajshahi	2.3	1.1	0.2	3.6
Rajshahi City Corporation	1.5	0.4	0.0	5.5
Sirajganj	2.5	1.7	0.8	9.1
Rajshahi Division	**2.8**	**0.9**	**0.8**	**7.1**
Dinajpur	3.4	0.4	1.1	5.3
Gaibandha	2.6	1.6	1.1	7.8
Kurigram	2.3	0.0	0.7	5.1
Lalmonirhat	5.5	0.9	1.9	8.9
Nilphamari	3.6	1.0	1.2	9.8
Panchagarh	2.4	1.1	0.6	7.3
Rangpur	4.4	3.2	2.0	9.5
Rangpur City Corporation	2.5	3.0	0.4	6.6
Thakurgaon	3.5	0.2	1.0	9.9
Rangpur Division	**3.2**	**1.2**	**1.1**	**7.4**
Habiganj	1.6	0.1	0.6	4.2
Moulvibazar	1.7	0.8	0.7	6.2
Sunamganj	3.3	0.8	0.7	8.3
Sylhet	2.2	1.4	1.0	5.1
Sylhet City Corp	5.2	1.1	2.3	19.7
Sylhet Division	**2.4**	**0.8**	**0.8**	**7.0**
National	3.5	1.0	1.0	7.8
Urban	5.6	1.3	0.9	10.1
Rural	3.0	1.0	1.0	7.4

Table 10: Card Retention Rate[19] by National, Division, District and City Corporation

District/City Corporation	Vaccination card available	Vaccination card lost	Never given	Vaccination card issued	Vaccination card retained
Barguna	90	10		100	89.6
Barishal	98	2	0	100	98.2
Barishal City Corporation	93	7	0	100	92.9
Bhola	100	0	0	100	99.7
Jhalokati	95	5	0	100	95.0
Patuakhali	97	3	0	100	96.9
Pirojpur	95	5	0	100	94.7
Barisal Division	**96**	**4**	**0**	**100**	**96.4**
Bandarban	94	6	0	100	93.9
Brahmanbaria	96	4	0	100	96.0
Chandpur	79	19	2	98	81.1
Chattogram	88	11	1	99	89.2
Chattogram City Corporation	52	44	4	96	54.3
Cumilla	52	34	14	86	60.6
Cumilla City Corporation	65	34	2	98	65.7
Cox'sbazar	94	5	0	100	94.5
Feni	85	15	0	100	84.9
Khagrachari	94	5	1	99	95.1
Laksmipur	92	7	1	99	93.3
Noakhali	70	25	5	95	73.2
Rangamati	93	6	0	100	93.6
Chattogram Division	**75**	**21**	**5**	**95**	**78.4**
Dhaka	80	20	0	100	80.2
Dhaka North City Corporation	75	25	0	100	74.9
Dhaka South City Corporation	62	38	1	99	62.0
Faridpur	92	7	1	99	92.5
Gazipur	53	38	9	91	58.4
Gazipur City Corporation	56	42	2	98	57.2
Gopalganj	86	9	5	95	90.8
Kishoreganj	93	4	4	96	96.0
Madaripur	97	3	0	100	97.0
Manikganj	97	3	0	100	96.8
Munshiganj	96	3	1	99	97.1
Narayanganj	85	14	1	99	85.7
Narayanganj City Corporation	67	31	2	98	68.1
Narsingdi	98	2	1	99	98.3
Rajbari	95	5	0	100	95.4
Shariatpur	96	4	0	100	96.0
Tangail	84	10	6	94	89.7
Dhaka Division	**82**	**16**	**2**	**98**	**83.9**
Bagerhat	83	16	1	99	83.7
Chuadanga	100	0	0	100	100.0
Jashore	93	5	2	98	94.7
Jhenaidah	93	7	1	99	93.3
Khulna	86	14	0	100	85.8
Khulna City Corporation	75	25	0	100	74.6
Kushtia	97	2	1	99	97.8
Magura	93	7	0	100	93.4
Meherpur	93	7	0	100	93.1
Narail	96	3	1	99	96.7
Satkhira	82	16	2	98	83.8
Khulna Division	**90**	**9**	**1**	**99**	**91.0**
Jamalpur	86	10	3	97	89.3
Mymensingh	89	9	2	98	90.7

[19] Children who born between May 1,2017 and April 30, 2018

Table 10: Continued

District/City Corporation	Vaccination card available	Vaccination card lost	Never given	Vaccination card issued	Vaccination card retained
Mymensingh City Corporation	80	19	1	99	81.0
Netrokona	87	11	2	98	88.8
Sherpur	87	6	6	94	93.1
Mymensing Division	**87**	**10**	**3**	**97**	**90.0**
Bogura	75	25	0	100	75.4
Joypurhat	100	0	0	100	99.8
Nartore	91	8	1	99	91.8
Naogaon	85	14	1	99	85.5
Chapai Nawabganj	95	5	0	100	95.0
Pabna	92	6	2	98	93.8
Rajshahi	99	1	0	100	99.0
Rajshahi City Corporation	95	5	0	100	95.3
Sirajganj	91	5	4	96	94.8
Rajshahi Division	**89**	**10**	**1**	**99**	**90.3**
Dinajpur	98	2	0	100	98.1
Gaibandha	93	2	5	95	98.1
Kurigram	100	0	0	100	99.5
Lalmonirhat	98	2	0	100	97.9
Nilphamari	89	9	2	98	90.3
Panchagarh	91	8	1	99	92.2
Rangpur	91	7	2	98	92.8
Rangpur City Corporation	92	7	2	98	93.0
Thakurgaon	92	6	1	99	93.5
Rangpur Division	**94**	**4**	**2**	**98**	**95.8**
Habiganj	78	18	4	96	81.4
Moulvibazar	71	26	3	97	73.3
Sunamganj	87	10	3	97	89.5
Sylhet	91	9	0	100	91.2
Sylhet City Corporation	81	19	1	99	81.2
Sylhet Division	**83**	**14**	**2**	**98**	**85.4**
National	85	13	2	98	87.1
Urban	76	22	2	98	77.8
Rural	87	10	2	98	89.4
Dhaka North City Corporation Slum	78	20	2	98	80.0
Dhaka South City Corporation Slum	79	20	1	99	79.8
Chattogram City Corporation Slum	68	32	0	100	67.5

APPENDIX F: TT Vaccination Coverage by Survey Units (in Tables)

Table 11: Crude TT Vaccination Coverage among Mothers with Children 0-11 Months[20] Old by District and City Corporation

District/City Corporation	Crude TT1	Crude TT2	Crude TT3	Crude TT4	Crude TT5
Barguna	99.5	99	93.2	86.5	69.5
Barishal	100	98.9	93.7	80.3	63.7
Barishal City Corporation	100	99.6	98.5	93.8	71.1
Bhola	99.6	99.6	98.6	82.6	63.6
Jhalokati	98.3	96.5	88.1	80	62.7
Patuakhali	98.6	96.4	89.3	75.6	49.2
Pirojpur	99.4	97.1	90.4	77.8	62.8
Barishal Division	**99.5**	**98.3**	**93.5**	**80.9**	**62.3**
Bandarban	97.5	97.1	94.9	87.9	76.7
Brahmanbaria	100	95.6	90.3	82.5	69.1
Chandpur	97.9	97.9	93.4	81.2	69.4
Chattogram	99.6	99.6	97.8	88.5	77.9
Chattogram City Corporation	94.4	92.8	83.3	63.9	43.6
Cumilla	100	98.5	95.6	85.8	72.5
Cumilla City Corporation	99	98.2	82.6	75.7	60.4
Cox's bazar	99.3	97.4	93.3	83.3	72.8
Feni	98.5	96.9	94.9	84.8	67.6
Khagrachari	98.8	98.8	95	85.5	68
Laksmipur	99.3	97.3	89.7	80.9	63.8
Noakhali	100	98.5	91.6	81	64.3
Rangamati	91.3	89.1	83.3	69.9	57
Chattogram Division	**98.8**	**97.4**	**92.5**	**81.9**	**68**
Dhaka	96.5	95.1	84.3	78.2	58.9
Dhaka North City Corporation	97.5	96.4	85.5	70.9	62.2
Dhaka South City Corporation	97.5	95.1	84	70.6	60.2
Faridpur	94.4	93.1	80.5	69	54.4
Gazipur	99.6	95.6	86.2	77.1	70.5
Gazipur City Corporation	97.6	97.3	78.8	64.3	53.3
Gopalganj	98.2	94.8	80.6	68	48.8
Kishoreganj	98.8	98.1	92.2	82.3	72.3
Madaripur	98.5	96.5	89.3	73.4	56.4
Manikganj	99.5	99.2	97.5	89.9	81.9
Munshiganj	99.6	98.8	95.1	87.6	77.9
Narayanganj	92.9	90.5	84.7	66.7	41.9
Narayanganj City Corporation	97.3	95.6	82.4	73.4	53.4
Narsingdi	98.8	98.5	87.1	81.6	65.6
Rajbari	99.7	98.2	87.9	76.5	59.8
Shariatpur	96.1	92.9	89.6	81.6	66.3
Tangail	97.2	95.7	85.2	71.8	48.6
Dhaka Division	**97.4**	**95.9**	**86.4**	**74.9**	**60.2**
Bagerhat	96.4	93.1	83.1	64.3	50.4
Chuadanga	100	100	99.4	94.4	81.8
Jashore	97.6	96.3	88.7	81.3	69.2
Jhenaidah	99.1	98.7	94.5	83.6	70.6
Khulna	98.8	98.2	94.8	87.8	73.6
Khulna City Corporation	95.3	92.3	77	66.8	51.4

[20] Mothers who had a live or still birth between January 1, 2018 and December 31, 2018

Table 11: Continued

District/City Corporation	Crude TT1	Crude TT2	Crude TT3	Crude TT4	Crude TT5
Kushtia	100	97.2	92	84.4	68.7
Magura	99.4	98.2	92.7	81.5	64.2
Meherpur	99.3	97.5	88.8	74.4	53.7
Narail	96.8	91	80.4	64.4	48.7
Satkhira	99.3	97.6	76.4	54.3	36.6
Khulna Division	**98.6**	**96.8**	**88.6**	**77.2**	**62.4**
Jamalpur	98.7	98.3	95.9	82.4	67
Mymensingh	99.3	98.6	88.2	78.9	68.8
Mymensingh City Corporation	96.4	94.8	90.1	71.7	53.1
Netrokona	98.3	98.3	96.2	91.8	79.1
Sherpur	96.8	95.2	88.7	73.7	59.8
Mymensingh Division	**98.6**	**97.9**	**91.4**	**80.7**	**68.2**
Bogura	99.2	99.2	94.8	82.5	65.2
Joypurhat	100	100	99.4	92.1	79.4
Natore	100	99.7	95.8	84.2	70.9
Naogaon	99.4	99.4	96.9	87	71.9
Chapai Nawabganj	98.9	98.9	90.4	76.5	66.1
Pabna	99.4	98.6	88.5	77.8	56.6
Rajshahi	99.1	97.4	94.1	77.9	60.5
Rajshahi City Corporation	100	100	99.4	92.6	82.5
Sirajganj	99.2	98.4	84.8	68.1	55.8
Rajshahi Division	**99.4**	**98.9**	**92.1**	**79.5**	**64.1**
Dinajpur	99.8	97	87.5	69.5	51.2
Gaibandha	99.1	97.2	86.4	71.1	61.1
Kurigram	99.7	98.8	78.6	60.8	45
Lalmonirhat	100	99.7	98.7	96.6	89.3
Nilphamari	100	99.3	90.1	79.9	62.3
Panchagarh	98.6	98.6	94.5	85.3	71.7
Rangpur	99.2	94.1	86.9	83	76.2
Rangpur City Corporation	99.6	98.2	92	76.8	60.1
Thakurgaon	99.2	94.1	87.5	72.9	56.6
Rangpur Division	**99.5**	**97.2**	**87.5**	**75**	**61.7**
Habiganj	98.1	96	92.6	82.8	71.9
Moulvibazar	98.9	98.4	96.2	82	72.4
Sunamganj	98.3	96.5	89.1	78.1	68.6
Sylhet	97.6	97.2	90.3	79.6	72.4
Sylhet City Corp	95.4	95.1	88.5	83.1	73.6
Sylhet Division	**98**	**96.8**	**91.2**	**80.5**	**71.3**
National	98.6	97.2	89.8	78.3	64.2
Urban	97.8	96.5	86.8	74.3	61
Rural	98.8	97.4	90.6	79.3	65
Dhaka North City Corporation Slum	97	92.9	75.2	53.9	39.1
Dhaka South City Corporation Slum	98.8	97.3	83.6	66.7	49.8
Chattogram City Corporation Slum	99.3	98.7	92.5	79.6	54.2

Table 12: Valid TT Vaccination Coverage among Mothers[21] with Children 0-11 Months Old by District and City Corporation

District/City Corporation	Valid TT1	Valid TT2	Valid TT3	Valid TT4	Valid TT5
Barguna	99.5	98.6	92.9	77.1	53.3
Barishal	100	98.9	92.9	76.6	54.6
Barishal City Corporation	100	99.6	98.3	77.5	49.6
Bhola	99.6	99.6	98.6	81.6	60.8
Jhalokati	98.3	96.5	87.6	78.5	56.2
Patuakhali	98.6	96.4	87.3	63.7	39.5
Pirojpur	99.4	97.1	86.5	71.2	53.3
Barishal Division	**99.5**	**98.3**	**92.4**	**75.6**	**53.7**
Bandarban	97.5	97.1	94.2	86.9	71.7
Brahmanbaria	100	95.6	89.2	78.9	60.6
Chandpur	97.9	97.9	92.9	77.4	59.4
Chattogram	99.6	99.6	97.8	86.9	72.4
Chattogram City Corporation	94.4	92.8	82.8	57.9	36.1
Cumilla	100	98.5	92.4	78.5	54.9
Cumilla City Corporation	99	98.2	77.9	70.6	53.7
Cox's bazar	99.3	97.4	89.5	74	54.2
Feni	98.5	96.9	92.5	82.5	62.2
Khagrachari	98.8	98.8	94.3	79.5	59.2
Laksmipur	99.3	97.3	86.3	73.2	53
Noakhali	100	98.5	87.8	68.2	52.9
Rangamati	91.3	89.1	81.5	63.9	53.3
Chattogram Division	**98.8**	**97.4**	**90.4**	**76**	**57**
Dhaka	96.5	95.1	82	63.9	53.9
Dhaka North City Corporation	97.5	96.1	76	67.2	42.4
Dhaka South City Corporation	97.5	95.1	80.2	65.9	52
Faridpur	94.4	93.1	79.4	64.4	47.6
Gazipur	99.6	95.6	86.2	76.2	68.1
Gazipur City Corporation	97.6	97.3	69.6	57.3	45.2
Gopalganj	98.2	94.8	79.6	61.5	43.8
Kishoreganj	98.8	97.3	88.2	78.2	65
Madaripur	98.5	96.5	86.1	66.8	45.4
Manikganj	99.5	99.2	94.4	83.5	66.3
Munshiganj	99.6	98.8	95.1	86.1	76.1
Narayanganj	92.9	90.5	82.3	64.9	39.3
Narayanganj City Corporation	97.3	95.6	79.3	68	45.3
Narsingdi	98.8	98.5	86.4	71.6	48.5
Rajbari	99.7	97.5	84.6	69.5	49.3
Shariatpur	96.1	92.7	88.5	77.3	57.2
Tangail	97.2	95.7	82.8	64.4	41.7
Dhaka Division	**97.4**	**95.8**	**82.8**	**69**	**51.1**
Bagerhat	96.4	93.1	81.4	62.5	44.9
Chuadanga	100	100	99.4	93.1	68.6
Jashore	97.6	96.3	86.9	72.6	50.7
Jhenaidah	99.1	98.2	92	79.1	62.1
Khulna	98.8	98.2	93.9	85.5	71.6
Khulna City Corporation	95.3	92.3	75.6	64.5	49.6
Kushtia	100	97.2	90.9	81.3	59.8
Magura	99.4	98.2	91	77.9	51.9
Meherpur	99.3	97	85	58.8	40.3
Narail	96.8	91	76.8	55.3	42.8
Satkhira	99.3	97.6	69.9	35.3	19.6
Khulna Division	**98.6**	**96.8**	**86.3**	**70.6**	**51.7**
Jamalpur	98.7	98.3	92.8	77.7	63
Mymensingh	99.3	98.6	87.2	75.3	61.4

[21] Mothers who had a live or still birth between January 1, 2018 and December 31, 2018

Table 12: Continued

District/City Corporation	Valid TT1	Valid TT2	Valid TT3	Valid TT4	Valid TT5
Mymensingh City Corporation	96.4	94.8	89.1	71.4	50.7
Netrokona	98.3	98.3	95.3	88.3	67.7
Sherpur	96.8	95.2	88.2	66.8	55.7
Mymensingh Division	**98.6**	**97.9**	**90**	**76.6**	**61.6**
Bogura	99.2	99.2	94.4	82.2	63.7
Joypurhat	100	100	99.4	89.6	74.2
Natore	100	99.7	92.2	76.1	59.8
Naogaon	99.4	99.4	96.1	82.4	63.4
Chapai Nawabganj	98.9	98.9	90.4	76	62.6
Pabna	99.4	98.3	88.2	68.5	44.1
Rajshahi	99.1	97.4	91.3	71.5	55.1
Rajshahi City Corporation	100	100	99.4	92.6	75.2
Sirajganj	99.2	97.3	83.4	62.2	41.7
Rajshahi Division	**99.4**	**98.6**	**91**	**74.5**	**55.6**
Dinajpur	99.8	97	86	65.2	47.4
Gaibandha	99.1	97.2	82.2	62.7	41.4
Kurigram	99.7	98.8	77	57.7	38.8
Lalmonirhat	100	99.7	97.8	89	69.3
Nilphamari	100	99.3	88.8	73.2	50
Panchagarh	98.6	98.6	93.9	83	63.1
Rangpur	99.2	93.5	84.8	77.3	70.9
Rangpur City Corporation	99.6	98.2	88.7	72.7	52.6
Thakurgaon	99.2	94.1	85.4	66.5	51.7
Rangpur Division	**99.5**	**97.1**	**85.4**	**69.3**	**51.8**
Habiganj	98.1	96	89	75.5	61.1
Moulvibazar	98.9	98.4	96.2	81.5	67.1
Sunamganj	98.3	96.1	87.2	72.6	58
Sylhet	97.6	97.2	89.5	77.6	66
Sylhet City Corporation	95.4	95.1	87.4	80.8	68.9
Sylhet Division	98	96.7	89.6	76.5	63
National	98.6	97.1	87.7	73	54.9
Urban	97.8	96.5	83.3	69.9	51.5
Rural	98.8	97.3	88.8	73.8	55.8
Dhaka North City Corporation Slum	97	92.9	64	46.9	29
Dhaka South City Corporation Slum	98.8	97.3	76.7	60.2	39.8
Chattogram City Corporation Slum	99.3	98.7	91.2	72.5	47.5

Table 13: Child[22] Protected at Birth against Tetanus among Mothers with 0-11 Months Old Children by District and City Corporation

District/City Corporation	Protected at birth
Barguna	98.2
Barishal	98.5
Barishal City Corporation	99.6
Bhola	99.6
Jhalokati	92.9
Patuakhali	90.6
Pirojpur	92.0
Barishal Division	**96.3**
Bandarban	98.8
Brahmanbaria	91.3
Chandpur	93.5
Chattogram	95.0
Chattogram City Corporation	94.6
Cumilla	97.8
Cumilla City Corporation	98.9
Cox's bazar	97.7
Feni	96.7
Khagrachari	97.9
Laksmipur	97.9
Noakhali	93.9
Rangamati	91.0
Chattogram Division	**95.6**
Dhaka	98.2
Dhaka North City Corporation	99.5
Dhaka South City Corporation	98.1
Faridpur	92.7
Gazipur	99.6
Gazipur City Corporation	94.8
Gopalganj	91.7
Kishoreganj	93.5
Madaripur	92.0
Manikganj	95.9
Munshiganj	98.5
Narayanganj	90.4
Narayanganj City Corporation	95.2
Narsingdi	98.7
Rajbari	90.9
Shariatpur	93.1
Tangail	89.3
Dhaka Division	**95.2**
Bagerhat	83.7
Chuadanga	96.4
Jashore	93.3
Jhenaidah	96.5
Khulna	96.5
Khulna City Corporation	85.6
Kushtia	91.4
Magura	87.2
Meherpur	73.6

[22] Who were born between January 1, 2018 and December 31, 2018

Table 13: Continued

District/City Corporation	Protected at birth
Narail	85.7
Satkhira	97.4
Khulna Division	**91.9**
Jamalpur	94.5
Mymensingh	94.4
Mymensingh City Corporation	91.3
Netrokona	98.7
Sherpur	93.6
Mymensingh Division	**94.9**
Bogura	97.7
Joypurhat	98.3
Natore	96.6
Naogaon	93.5
Chapai Nawabganj	94.9
Pabna	93.0
Rajshahi	94.7
Rajshahi City Corporation	98.9
Sirajganj	87.8
Rajshahi Division	**93.8**
Dinajpur	94.6
Gaibandha	86.0
Kurigram	90.3
Lalmonirhat	99.4
Nilphamari	93.2
Panchagarh	97.2
Rangpur	97.1
Rangpur City Corporation	90.8
Thakurgaon	93.3
Rangpur Division	**93.0**
Habiganj	90.6
Moulvibazar	96.3
Sunamganj	97.0
Sylhet	97.1
Sylhet City Corporation	94.4
Sylhet Division	**95.4**
National	94.6
Urban	96.2
Rural	94.1
Dhaka North City Corporation Slum	93.0
Dhaka South City Corporation Slum	93.4
Chattogram City Corporation Slum	98.0

Table 14: Crude TT Vaccination Coverage among Child Bearing Women[23] Age by District and City Corporation

District/City Corporation	Crude TT1	Crude TT2	Crude TT3	Crude TT4	Crude TT5
Barguna	98.7	98.0	89.9	82.5	61.3
Barishal	98.6	97.0	90.4	80.8	67.2
Barishal City Corporation	100.0	99.8	98.2	92.2	58.4
Bhola	99.8	99.8	97.3	91.4	78.9
Jhalokati	96.0	94.4	87.7	77.0	61.7
Patuakhali	96.4	93.9	83.6	69.2	49.0
Pirojpur	95.4	91.8	84.4	73.1	58.4
Barishal Division	**97.8**	**96.2**	**89.6**	**79.8**	**63.0**
Bandarban	97.9	97.0	93.3	86.4	79.4
Brahmanbaria	97.9	96.2	90.4	81.0	68.6
Chandpur	94.5	94.2	85.4	74.1	58.5
Chattogram	99.8	98.5	95.2	87.3	72.7
Chattogram City Corporation	77.3	76.8	71.9	63.5	48.0
Cumilla	98.7	98.0	95.8	88.2	71.9
Cumilla City Corporation	96.7	96.0	84.1	73.5	57.6
Cox's bazar	95.2	93.8	87.8	76.8	69.5
Feni	99.3	95.1	88.1	73.8	59.5
Khagrachari	99.5	99.3	94.4	84.1	69.7
Laksmipur	98.2	97.2	92.4	83.5	67.5
Noakhali	98.5	96.7	90.6	79.8	65.7
Rangamati	95.0	93.5	85.5	71.0	54.0
Chattogram Division	**96.2**	**95.0**	**89.8**	**80.3**	**65.7**
Dhaka	96.0	95.8	83.9	75.3	50.1
Dhaka North City Corporation	97.7	97.2	86.1	65.8	52.7
Dhaka South City Corporation	92.9	90.7	80.9	73.2	60.4
Faridpur	93.1	90.5	78.2	66.1	47.1
Gazipur	96.5	93.5	86.6	77.0	66.7
Gazipur City Corporation	81.9	78.6	64.6	49.6	36.1
Gopalganj	95.0	92.5	75.5	57.9	43.4
Kishoreganj	95.5	93.8	87.9	77.0	67.3
Madaripur	97.5	96.4	85.1	69.6	53.6
Manikganj	93.2	92.1	86.4	74.9	62.6
Munshiganj	97.0	96.8	93.1	85.3	74.9
Narayanganj	86.5	84.4	72.7	52.5	29.7
Narayanganj City Corporation	90.1	89.4	80.3	67.2	53.2
Narsingdi	97.6	97.1	88.3	81.0	60.5
Rajbari	98.7	96.9	87.7	76.0	61.4
Shariatpur	96.3	94.9	87.4	77.4	61.0
Tangail	93.1	89.1	79.0	61.1	45.0
Dhaka Division	**94.0**	**92.3**	**82.2**	**68.7**	**53.0**
Bagerhat	95.9	93.6	84.7	69.7	54.8
Chuadanga	100.0	100.0	98.7	92.5	74.3
Jashore	98.3	97.4	90.1	77.5	58.8
Jhenaidah	98.3	97.0	91.5	79.3	64.4
Khulna	98.2	96.3	92.6	82.3	73.8
Khulna City Corporation	76.1	73.0	56.4	47.5	37.0
Kushtia	98.0	96.8	89.0	78.1	67.6
Magura	97.9	96.3	89.5	75.3	60.0

[23] Women aged 18-49 years, irrespective of marital status

Table 14: Continued

District/City Corporation	Crude TT1	Crude TT2	Crude TT3	Crude TT4	Crude TT5
Meherpur	97.0	94.8	87.0	71.9	51.1
Narail	97.5	95.3	90.3	76.4	61.2
Satkhira	95.5	95.2	80.6	59.6	39.3
Khulna Division	**96.8**	**95.4**	**87.8**	**74.9**	**59.7**
Jamalpur	97.9	97.0	88.9	73.5	55.1
Mymensingh	95.3	93.5	82.8	67.3	50.2
Mymensingh City Corporation	94.8	91.2	83.3	65.1	46.5
Netrokona	98.3	96.5	92.9	87.3	71.9
Sherpur	95.6	93.1	81.5	61.1	44.2
Mymensingh Division	**96.5**	**94.8**	**85.9**	**71.6**	**54.4**
Bogura	96.5	96.2	89.9	74.6	57.5
Joypurhat	98.4	98.2	96.3	90.5	77.6
Natore	99.3	98.4	90.7	77.8	58.5
Naogaon	98.2	95.9	90.7	79.8	61.2
Chapai Nawabganj	95.0	93.7	88.2	75.4	62.7
Pabna	96.5	94.8	85.7	76.5	54.4
Rajshahi	98.4	97.7	88.6	73.2	57.1
Rajshahi City Corporation	100.0	100.0	98.9	97.8	92.2
Sirajganj	97.9	95.0	83.6	67.2	48.5
Rajshahi Division	**97.5**	**96.2**	**88.7**	**75.9**	**58.3**
Dinajpur	97.5	95.6	79.0	65.0	48.7
Gaibandha	94.2	91.3	79.0	68.1	54.8
Kurigram	97.6	96.3	84.0	70.0	47.4
Lalmonirhat	96.4	96.0	92.9	91.5	79.9
Nilphamari	95.4	92.6	86.9	73.9	60.3
Panchagarh	97.4	96.5	93.0	85.0	71.4
Rangpur	93.4	89.1	78.9	71.8	60.6
Rangpur City Corporation	95.7	93.9	82.9	66.3	50.0
Thakurgaon	94.9	91.1	79.9	66.1	54.6
Rangpur Division	**95.8**	**93.4**	**82.6**	**71.6**	**56.9**
Habiganj	91.9	86.6	82.1	71.3	61.1
Moulvibazar	97.9	97.4	95.4	90.7	79.0
Sunamganj	92.4	89.5	82.7	71.7	56.3
Sylhet	100.0	99.6	94.7	84.2	72.7
Sylhet City Corporation	92.3	91.6	85.8	76.9	65.8
Sylhet Division	**95.3**	**93.0**	**88.2**	**78.6**	**66.5**
National	95.9	94.3	86.3	74.3	58.7
Urban	93.5	92.1	82.7	69.9	55.0
Rural	96.6	94.9	87.3	75.6	59.8
Dhaka North City Corporation Slum	94.5	92.7	78.7	62.1	40.6
Dhaka South City Corporation Slum	97.9	96.7	82.0	64.0	48.0
Chattogram City Corporation Slum	90.1	89.7	85.1	70.5	48.4

Table 15: Valid TT Vaccination Coverage among Child Bearing Age Women by District and City Corporation

District/City Corporation	Valid TT1	Valid TT2	Valid TT3	Valid TT4	Valid TT5
Barguna	98.7	98.0	87.6	64.6	43.0
Barishal	98.6	97.0	89.3	73.5	48.4
Barishal City Corporation	100.0	99.8	97.6	67.1	40.6
Bhola	99.8	99.8	97.1	89.8	74.5
Jhalokati	96.0	94.4	87.0	67.7	50.6
Patuakhali	96.4	93.9	81.6	60.3	38.0
Pirojpur	95.4	90.7	80.4	64.4	43.1
Barisal Division	**97.8**	**96.1**	**88.0**	**70.8**	**49.8**
Bandarban	97.9	96.8	92.2	85.0	73.3
Brahmanbaria	97.9	96.2	89.8	76.4	55.1
Chandpur	94.5	93.9	79.9	62.7	42.1
Chattogram	99.8	98.5	94.3	83.8	66.3
Chattogram City Corporation	77.3	76.8	70.6	58.8	35.7
Cumilla	98.7	98.0	95.3	76.2	52.4
Cumilla City Corporation	96.7	96.0	81.9	67.0	47.5
Cox's bazar	95.2	93.2	83.6	64.9	42.2
Feni	99.3	94.9	85.3	69.9	51.2
Khagrachari	99.5	99.3	93.7	81.2	59.4
Laksmipur	98.2	97.2	91.4	76.2	53.0
Noakhali	98.5	96.4	87.1	66.9	50.1
Rangamati	95.0	93.0	84.3	67.0	47.1
Chattogram Division	**96.2**	**94.9**	**88.0**	**72.4**	**51.7**
Dhaka	96.0	95.5	81.8	60.7	44.0
Dhaka North City Corporation	97.7	96.4	79.0	61.6	43.6
Dhaka South City Corporation	92.9	90.7	79.2	65.4	50.3
Faridpur	93.1	90.5	76.6	59.1	38.4
Gazipur	96.5	93.5	84.6	74.3	62.2
Gazipur City Corporation	81.9	78.4	61.3	44.9	30.5
Gopalganj	95.0	92.2	64.9	45.6	31.1
Kishoreganj	95.5	93.7	84.9	70.8	55.8
Madaripur	97.5	96.0	78.7	58.3	36.4
Manikganj	93.2	92.1	83.5	60.2	44.7
Munshiganj	97.0	96.6	92.6	82.8	68.9
Narayanganj	86.5	83.0	68.0	46.3	24.4
Narayanganj City Corporation	90.1	89.4	76.2	62.0	46.5
Narsingdi	97.6	97.1	87.5	64.2	37.3
Rajbari	98.7	96.9	84.0	63.8	43.3
Shariatpur	96.3	94.4	84.4	68.2	48.9
Tangail	93.1	89.1	75.6	55.5	37.2
Dhaka Division	**94.0**	**92.0**	**78.5**	**60.8**	**43.1**
Bagerhat	95.9	93.1	82.7	62.9	46.3
Chuadanga	100.0	100.0	98.1	90.7	67.2
Jashore	98.3	97.4	87.1	65.7	37.2
Jhenaidah	98.3	96.7	88.0	71.5	50.3
Khulna	98.2	96.1	91.6	80.6	65.5
Khulna City Corporation	76.1	73.0	55.2	43.7	34.6
Kushtia	98.0	96.8	86.9	73.5	58.0
Magura	97.9	96.3	84.6	69.7	48.4
Meherpur	97.0	94.8	80.8	52.8	33.0
Narail	97.5	95.3	88.6	66.6	49.8
Satkhira	95.5	95.2	74.2	47.2	28.0
Khulna Division	**96.8**	**95.3**	**84.9**	**67.4**	**47.8**
Jamalpur	97.9	97.0	87.3	68.1	46.6
Mymensingh	95.3	93.5	72.4	53.9	39.3
Mymensingh City Corporation	94.8	91.2	81.6	63.1	43.6
Netrokona	98.3	96.5	91.8	82.2	60.7
Sherpur	95.6	93.1	78.5	56.3	36.5
Mymensingh Division	**96.5**	**94.8**	**80.5**	**63.0**	**44.7**

Table 15: Continued

District/City Corporation	Valid TT1	Valid TT2	Valid TT3	Valid TT4	Valid TT5
Bogura	96.5	96.2	89.9	73.4	56.1
Joypurhat	98.4	98.2	95.6	83.9	62.8
Natore	99.3	98.4	87.7	71.2	48.1
Naogaon	98.2	95.9	87.7	69.3	48.5
Chapai Nawabganj	95.0	93.7	87.3	73.2	58.7
Pabna	96.5	94.5	81.0	55.0	31.1
Rajshahi	98.4	97.2	83.3	64.2	46.2
Rajshahi City Corporation	100.0	100.0	98.7	97.2	85.9
Sirajganj	97.9	95.0	80.4	60.3	41.1
Rajshahi Division	**97.5**	**96.1**	**86.1**	**68.0**	**48.5**
Dinajpur	97.5	95.3	75.2	60.3	43.5
Gaibandha	94.2	90.8	74.5	51.6	31.7
Kurigram	97.6	96.3	82.1	63.9	42.1
Lalmonirhat	96.4	96.0	92.4	81.3	58.4
Nilphamari	95.4	92.6	80.9	60.0	40.4
Panchagarh	97.4	96.5	91.1	79.5	58.8
Rangpur	93.4	88.7	72.0	61.4	50.5
Rangpur City Corporation	95.7	93.9	78.9	59.2	41.5
Thakurgaon	94.9	91.1	76.8	56.8	44.7
Rangpur Division	**95.8**	**93.2**	**78.7**	**62.0**	**44.4**
Habiganj	91.9	86.6	78.1	62.8	44.3
Moulvibazar	97.9	97.4	95.0	88.4	74.1
Sunamganj	92.4	88.9	81.5	66.7	50.1
Sylhet	100.0	99.6	94.7	83.1	68.3
Sylhet City Corporation	92.3	91.6	83.9	69.0	56.5
Sylhet Division	**95.3**	**92.8**	**86.7**	**74.1**	**58.1**
National	95.9	94.1	83.2	66.3	47.4
Urban	93.5	91.9	79.2	63.6	45.3
Rural	96.6	94.7	84.4	67.1	48.1
Dhaka North City Corporation Slum	94.5	92.7	72.4	51.6	31.7
Dhaka South City Corporation Slum	97.9	96.7	76.9	55.1	36.8
Chattogram City Corporation Slum	90.1	89.7	83.1	62.4	40.0

APPENDIX G: Vitamin A Supplementation Coverage by Survey Units (in Tables)

Table 16: Vitamin A Supplementation Coverage among Infants Aged 06-11 Months Old Infant[24] and Children 12-59 Months[25] during National Vitamin A Plus Campaign, by Districts and City Corporations

District/City Corporation	06-11 Months Old Infant	12-59 Months Old Children
Barguna	72.5	96.0
Barishal	99.4	100.0
Barishal City Corporation	98.5	99.2
Bhola	99.6	99.7
Jhalokati	85.3	92.1
Patuakhali	92.7	94.1
Pirojpur	87.6	88.1
Barishal Division	**91.8**	**95.5**
Bandarban	95.8	97.0
Brahmanbaria	96.4	97.4
Chandpur	70.2	81.3
Chattogram	94.2	97.7
Chattogram City Corporation	94.2	93.8
Cumilla	98.6	99.2
Cumilla City Corporation	97.6	98.7
Cox's bazar	99.6	99.7
Feni	95.0	96.9
Khagrachari	96.8	99.2
Laksmipur	97.5	96.5
Noakhali	81.8	81.6
Rangamati	93.3	94.2
Chattogram Division	**93.3**	**94.9**
Dhaka	96.6	97.6
Dhaka North City Corporation	82.5	86.2
Dhaka South City Corporation	83.0	94.5
Faridpur	85.0	89.0
Gazipur	97.1	97.9
Gazipur City Corporation	92.2	93.0
Gopalganj	83.0	85.5
Kishoreganj	89.0	93.7
Madaripur	92.3	93.3
Manikganj	95.4	98.7
Munshiganj	96.1	98.1
Narayanganj	92.8	94.2
Narayanganj City Corporation	96.4	93.7
Narsingdi	98.8	99.2
Rajbari	89.3	90.7
Shariatpur	91.8	94.3
Tangail	90.8	95.7
Dhaka Division	**90.4**	**93.9**
Bagerhat	93.4	94.5
Chuadanga	95.9	99.7
Jashore	84.2	90.4
Jhenaidah	91.7	94.1
Khulna	99.5	99.7

[24] Children who born between February 14, 2018 and August 12, 2018
[25] Children who born between March 07, 2014 and February 13, 2018

Table 16: Continued

District/City Corporation	06-11 Months Old Infant	12-59 Months Old Children
Khulna City Corporation	88.8	96.9
Kushtia	97.1	98.7
Magura	95.2	95.9
Meherpur	97.1	99.4
Narail	92.7	95.5
Satkhira	96.8	99.5
Khulna Division	**93.7**	**96.7**
Jamalpur	92.2	94.1
Mymensingh	95.0	96.8
Mymensingh City Corporation	85.0	91.5
Netrokona	95.2	96.5
Sherpur	90.6	93.5
Mymensingh Division	**93.5**	**94.5**
Bogura	93.6	98.1
Joypurhat	95.6	97.9
Natore	87.5	93.4
Naogaon	81.0	96.3
Chapai Nawabganj	95.1	97.5
Pabna	78.7	83.3
Rajshahi	83.9	85.3
Rajshahi City Corporation	99.7	100.0
Sirajganj	79.0	87.3
Rajshahi Division	**85.5**	**93.2**
Dinajpur	92.2	95.5
Gaibandha	88.1	93.1
Kurigram	86.5	90.0
Lalmonirhat	90.9	97.9
Nilphamari	89.5	90.6
Panchagarh	98.0	98.4
Rangpur	93.8	93.9
Rangpur City Corporation	89.5	93.5
Thakurgaon	95.0	96.6
Rangpur Division	**91.1**	**94.3**
Habiganj	83.4	87.6
Moulvibazar	97.0	97.6
Sunamganj	95.7	96.8
Sylhet	95.4	99.8
Sylhet City Corporation	91.0	90.3
Sylhet Division	**92.9**	**94.4**
National	91.3	94.7
Urban	89.5	94.6
Rural	91.8	94.7
Dhaka North City Corporation Slum	74.7	80.7
Dhaka South City Corporation Slum	89.6	88.6
Chattogram City Corporation Slum	90.9	93.6

APPENDIX H:

Table B-1. Effective sample size (ESS) by expected coverage and desired precision for the 95% confidence interval (CI)

	Expected Coverage						
Precision for 95% CI		50-70%	0.75	0.8	0.85	0.9	0.95
	±3%	1097	892	788	663	518	354
	±4%	622	517	461	394	315	227
	±5%	401	340	306	265	216	162
	±6%	280	242	220	192	160	132
	±7%	207	182	167	147	125	110
	±8%	159	143	131	117	101	93
	±9%	126	115	106	96	83	81
	±10%	103	95	88	80	70	70

C1: Table of Confidence Interval

Crude Vaccination Coverage by age 23 months			95% CI	
	P	SE	Lower	Upper
BCG	99.7	0.0020	99.70	99.70
Penta1	99.7	0.0020	99.70	99.70
OPV1	99.7	0.0020	99.70	99.70
PCV1	99.7	0.0020	99.70	99.70
Penta2	99.3	0.0031	99.29	99.31
OPV2	99.3	0.0031	99.29	99.31
PCV2	99.3	0.0031	99.29	99.31
Penta3	98.6	0.0044	98.59	98.61
OPV3	98.6	0.0044	98.59	98.61
PCV3	98.2	0.0050	98.19	98.21
MR1	95.9	0.0074	95.89	95.91
FVC	95.3	0.0079	95.28	95.32
Crude Vaccination Coverage by Age of 12 Months				
BCG	99.7	0.0035	99.70	99.70
Penta1	99.7	0.0035	99.70	99.70
OPV1	99.7	0.0035	99.70	99.70
PCV1	99.7	0.0035	99.70	99.70
Penta2	99.3	0.0054	99.29	99.31
OPV2	99.3	0.0054	99.29	99.31
PCV2	99.3	0.0054	99.29	99.31
Penta3	98.7	0.0073	98.69	98.71
OPV3	98.7	0.0073	98.69	98.71
PCV3	98.3	0.0083	98.29	98.31
MR1	95.9	0.0127	95.89	95.91
FVC	95.3	0.0136	95.28	95.32
Valid Vaccination Coverage by Age of 12 Months				
BCG	99.7	0.0035	99.70	99.70
Penta1	99.7	0.0035	99.70	99.70
OPV1	99.7	0.0035	99.70	99.70
PCV1	99.7	0.0035	99.70	99.70
Penta2	99.2	0.0057	99.19	99.21
OPV2	99.2	0.0057	99.19	99.21
PCV2	99.2	0.0057	99.19	99.21
Penta3	93.3	0.0161	93.28	93.32
OPV3	93.3	0.0161	93.28	93.32
PCV3	92.2	0.0172	92.18	92.22
MR1	88.6	0.0204	88.58	88.62

C2: Wealth Quintile Procedure

Step 1: All Possible dichotomous variables were created from all indicators (Source of Drinking Water, Type of latrine, Household durables,Electricity,Materials of the floor, Materials of the Wall, Materials of the Roof).

Step 2: Factor Analysis Procedure was used to assign Weighting Values to Indicators (e.g. ".022" for owning a bicycle, ".041" for owning a motorcycle and ".892" for owning a car/Truck etc).

Step 3: Based on the Factor Score Quintiles were created.

C3. SAMPLING WEIGHT[26]

Due to the non-proportional allocation of sample to different divisions and to their urban and rural areas and the possible differences in response rates, sampling weight was required to ensure the actual representative of the survey results at national level and as well as at district level. Since the CES sample is a two-stage stratified cluster sample, sampling weight is calculated based on sampling probabilities separately for each sampling stage and for each cluster. We use the following notations:

P1hi: first-stage sampling probability of the i^{th} cluster in stratum *h*

P2hi: second -stage sampling probability within the i^{th} cluster (households)

Let ah be the number of EAs selected in stratum *h*, M_{hi} the number of households according to the sampling frame in the i^{th} EA, and $\sum MhiA_i$ the total number of households in the stratum. The probability of selecting

the i^{th} EA in the CES sample is calculated as follows:

$$\frac{a_h M_{hi}}{\sum M_{hi}}$$

Let b_{hi} be the proportion of households in the selected cluster compared to the total number of households

in EA *i* in stratum *h* if the EA is segmented, otherwise $b_{hi} = 1$. Then the probability of selecting cluster *i* in the sample is:

$$P1hi=\frac{a_h M_{hi}}{\sum M_{hi}} \times b_{hi}$$

Let L_{hi} be the number of households listed in the household listing operation in cluster *i* in stratum *h*, let

g_{hi} be the number of households selected in the cluster. The second stage's selection probability for each household in the cluster is calculated as follows:

$$P2hi=\frac{g_{hi}}{L_{hi}}$$

The overall selection probability of each household in cluster *i* of stratum *h* is therefore the production of the two stages selection probabilities:

$$Phi=P_{1hi} \times P_{2hi}$$

The sampling weight for each household in cluster *i* of stratum *h* is the inverse of its overall selection probability:

$$Whi=1/P_{hi}$$

[26] Formula used from Bangladesh Demographic and Health Survey 2014

APPENDIX I

ENGLISH QUESTIONNAIRE

People's Republic of Bangladesh
Expanded Programme on Immunization (EPI)
Coverage Evaluation Survey, 2019

PROJECT	EPI Coverage Evaluation Survey -2019					CENTRE: *Name of Dist:*					
Cluster No		Type of Cluster	Urban = 1 Rural = 2			Name of Upazila/CC/Municipality					
Hard-to-reach area	Yes = 1 No = 2					Time required to reach the cluster from Upazila HQ. (Min.)[1]					
Mobile number of HA/FWA/ Vaccination		Sub-Block/ Zone									
Area	Village/Para: Mouza/Mohallah:					INTERVIEW TIME					
	Ward no. Union:					START			END		
LANDMARKS											
GPS Location	Latitude:		Longitude:								
NAME OF INTERVIEWER			Code								
CHECK DETAILS		Code	Accompany			Back Check			Scrutiny		
			Code	Sign	Date	Code	Sign	Date	Code	Sign	Date
NAME OF FS			1			2			3		
NAME OF FC			1			2			3		
NAME OF OTHER OFFICIAL			1			2			3		

I hereby ---------- that all the information of this interview true and correct. I followed the survey methodology and did not take any unfair means while collecting data of this questionnaire.

Signature of Interviewer

Introduction

Salam/Adab. My name is ----. I am from Center for Social and Market Research (CSMR) Bangladesh a research firm of Bangladesh on behalf of EPI. Currently we are conducting a survey on mother and child vaccination. I would be grateful to you if you help me in this regard. Your information will be kept confidential and will be used for the development of EPI programme.

CHILD FORM 1

Applicable for those children who born in between 01-05-2016 and 30-04-2017	
1. Cluster No	
2. Date	
3. Survey Area	

		Skip to	1	2	3	4	5	6	7	8	9	10
4. Sl no. of sample (to be filled in by office)												
5. Sl no. of children in this cluster												
6. Household number/ G R number and name of house head												
7. Name of the child												
8. Sex of the child :Male –1 Female—2												
9. Name of the mother of the child												
10. Name of the father of the child												
11. Date of the birth of the child (Day/Month/Year)												
11.1 Where was the child born?	Health care center : 1											
	Home : 2											
12. Academic qualification of the mother: Illiterate -1, Primary-2, Secondary-3, SSC/Dhakil/ O level-4, HSC/Alim/ A level-5, Degree/Fazil-6, Masters/Kamil-7												
13. Academic qualification of the father of the child: Illiterate -1, Primary-2, Secondary-3, SSC/Dhakil/ O level-4, HSC/Alim/ A level-5, Degree/Fazil-6, Masters/Kamil-7												
14. Occupation of the mother: Housewife-01, Government employee-02, Non-government employee-03, Household works/day labour-04, Small business-05, Large business-06, Professional -07, others (Specify)												
15. Occupation of the father: Agriculture-01, Government employee-02, Non-government employee-03, Day labor/rickshaw/van puller-04, Small business-05, Large business-06, Professional -07, driver (truck/bus/car)-08,others (Specify)												
16. Number of family members												
17. Has the baby ever received vaccine?	Yes: 1	17.1										
	No: 2	17.5										
17.1. BCG Scar (notice the upper side of the left arm)	Yes: 1											
	No: 2											
17.2 Does the child has card for vaccination?	Yes: 1	17.5										
	No: 2	17.3										
17.3. If s/he doesn't have card, then ask, Were you ever given a card?	Yes: 1	17.4										
	No: 2	17.5										
17.4. If the answer for the question 17.3 is yes, then ask Why didn't you preserve the card? (please mention)												
17.5. Does the child has birth registration card?	Yes: 1											
	No: 2											

Name of vaccine			Skip to	1	2	3	4	5	6	7	8	9	10
18 BCG	(Date/9/0)												
18.1. BCG - Source(from where BCG has taken)	GOB Outreach	1											
	NGO	2											
	All GOB Hospital	3											
	Private	4											
19. pentavalent 1	(Date/9/0)												
19. 1. pentavalent 1 Source	GOB Outreach	1											
	NGO	2											
	All GOB Hospital	3											
	Private	4											
20. pentavalent 2	(Date/9/0)												
21. pentavalent 3	(Date/9/0)												
22. OPV 1	(Date/9/0)												
23. OPV 2	(Date/9/0)												
24. OPV 3	(Date/9/0)												
25. PCV1	(Date/9/0)												
26. PCV 2	(Date/9/0)												
27. PCV 3	(Date/9/0)												
28. MR1	(Date/9/0)												
29. MR2	(Date/9/0)												
29.1 Observe the date of vaccination card and the date with register	Yes: 1 No: 2												
29.2 Source of vaccination	Vaccination Card : 1 Health Registrar : 2 History : 3												
30. Would you please tell me, at least how many times the child should be taken to the vaccination center to complete all the vaccines? (write the number or 'don't know')													
31. How many times did the worker come to you to remind about completing vaccination?													
32. What are the side effects may occur if the child is vaccinated? [Multiple response possible]	Fever : 01 Swollen : 02 Don't know : 99 Redness at Vaccination Site :03 Pain :04 Others (specify) :												
33. After giving vaccine to your child, has there been any abscess at the place of vaccine?	Yes : 1		33.1										
	No : 2		34										
33.1 If the answer is yes in Q33, then ask, Where did he has the abscess? (multiple answers can be recorded) (please code)	Right thigh : 1 Left thigh : 2 Left arm : 3 Others (specify):												
33.2 Did you feel discourage to give his/her rest of the vaccines due to abscess or any other problem?	Yes : 1 No : 2												
33.3 Did the health worker give you advice about abscess?	Yes : 1 No : 2												
34. Have you ever given money for vaccination of your child? (please code)	Yes : 1		34.1										
	No : 2		36										

34.1 If yes, how much money did you pay?												
35 (If yes, then ask) As you given money, did you abstain yourself from giving rest vaccine to your child?	Yes : 1 No : 2											
36. Is it toke more tha half an hour to reach to the nearest vaccination center from your home on foot?	Yes :1 No :2											

Vaccination Code Date - Record date from vaccination card	Source codes:	
9 - History that the child was vaccinated	GOB Outreach = Community household, Satellite clinic, Community Clinic, Club	NGO = Hospital, Clinic, Outreach
0 - The child was not vaccinated	All GOB Hospital = District, UHC etc.	Private = Chamber, clinic and hospital

Reasons for Vaccination Failure

37. The children who never/partially vaccinated ask the mothers or guardians "Why was the child not vaccinated or why the child was not fully vaccinated?" (Accept most important answer and circle the appropriate code)

Sl. no. of the baby in this cluster	1	2	3	4	5	6	7	8	9	10
i. Didn't know that my child should be given vaccine	1	1	1	1	1	1	1	1	1	1
ii .Didn't know when to go for the second/third dose	2	2	2	2	2	2	2	2	2	2
iii. Didn't know when to go for vaccine of measles	3	3	3	3	3	3	3	3	3	3
iv. Didn't know where to go for vaccine	4	4	4	4	4	4	4	4	4	4
V. Fearing side effects	5	5	5	5	5	5	5	5	5	5
vi. Rumor (Please mention)	6	6	6	6	6	6	6	6	6	6
vii. Don't believe in vaccination	21	21	21	21	21	21	21	21	21	21
viii. Was busy and so couldn't give vaccine to child	22	22	22	22	22	22	22	22	22	22
ix. Will give vaccine in future	23	23	23	23	23	23	23	23	23	23
x. There was a long queue in the vaccination centre	24	24	24	24	24	24	24	24	24	24
xi. Don't remember	25	25	25	25	25	25	25	25	25	25
xii. There was no vaccine in the center	40	40	40	40	40	40	40	40	40	40
xiii. There was no vaccinator in the center	41	41	41	41	41	41	41	41	41	41
xiv. Vaccine centre was too far	42	42	42	42	42	42	42	42	42	42
xv. Injection was too painful for the child	43	43	43	43	43	43	43	43	43	43
xvi. Was abscess at the place of vaccine	44	44	44	44	44	44	44	44	44	44
xvii. Faced problem after vaccination	45	45	45	45	45	45	45	45	45	45
xviii. Vaccinator was not friendly	46	46	46	46	46	46	46	46	46	46
xix. The child was sick, so was not taken to the vaccination center	47	47	47	47	47	47	47	47	47	47
xx. The child was sick, so the vaccinator didn't give vaccine	48	48	48	48	48	48	48	48	48	48
xxi. Mother was sick	49	49	49	49	49	49	49	49	49	49
xxii. I thought the vaccinator would come home	50	50	50	50	50	50	50	50	50	50
xxiii. They charge money to take vaccine	51	51	51	51	51	51	51	51	51	51
xxiv. The session time was inconvenient	52	52	52	52	52	52	52	52	52	52
4. Others (please specify)										
Mobile Number of the Respondents										

	Sl. no. of the baby in this cluster		Skip to	1	2	3	4	5	6	7	8	9	10
38.	Source of drinking water? Pipe water inside the house- 01 Pipe water outside the house -02, Tube well-03 Deep Tube well - 04, Sallow well - 05, Well- 06, Pond/canal/lake -07, River/Fountain - 08, Tara Pump -09, Rain water -10												
39.	Type of latrine? Sanitary latrine/ septic tank - 1, Water seal/ slub latrine- 2, Pit latrine - 3, Open latrine - 4, Hanging latrine - 5, No latrine/ open place – 6												
40.	Household durables?												
40.1	Almirah/Wardrobe	Yes-1 No – 2											
40.2	Table	Yes-1 No – 2											
40.3	Chair/bench	Yes-1 No- 2											
40.4	Clock	Yes-1 No- 2											
40.5	Khat/Bed	Yes-1 No 2											
40.6	Radio	Yes-1 No- 2											
40.7	Television	Yes-1 No- 2											
40.8	Bicycle	Yes-1 No- 2											
40.9	Motor Cycle	Yes-1 No- 2											
40.10	Sewing Machine	Yes-1 No- 2											
40.11	Telephone	Yes-1 No- 2											
40.12	Mobile phone	Yes-1 No- 2											
40.13	Refrigerator	Yes-1 No- 2											
40.14	Car/Truck	Yes-1 No- 2											
40.15	Boat	Yes-1 No- 2											
40.16	Rickshaw/Van/Auto Rickshaw	Yes-1 No- 2											
40.17	Electricity	Yes-1 No- 2											
41.	Observe materials of the floor concrete -1, soil-2, Bamboo-3, wood-4												
41.1	Observe materiasl of the wall concrete -1, soil-2, Bamboo-3, wood-4, Ply wood-5 Tin-6, Brick-7												
41.2	Observe materials of the roof Concrete-1, Tin-2, Bamboo/wood-3, straw-4, Tally-5, No roof-6												
42	What is the monthly income of your family? (include all sources)												
GPS Location	Latitude												
	Longitude												

End Interview with Thanks

CHILD FORM 2

Applicable for those children who born in between *01-05-2017* and *30-04-18*												
1. Cluster No												
2. Date												
3. Survey Area												
		Skip to	1	2	3	4	5	6	7	8	9	10
4. Sl no. of sample (to be filled in by office)												
5. Sl no. of children in this cluster												
6. *Household number/ G R number and name of house head*												
7. Name of the child												
he child :Male –1 Female—2												
9. Name of the mother of the child												
10. Name of the father of the child												
11. Date of the birth of the child (Day/Month/Year)												
11.1 Where was the child born?	Health care center : 1											
	Home : 2											
12. Academic qualification of the mother: Illiterate -1, Primary-2, Secondary-3, SSC/Dhakil/ O level-4, HSC/Alim/ A level-5, Degree/Fazil-6, Masters/Kamil-7												
13. Academic qualification of the father of the child: Illiterate -1, Primary-2, Secondary-3, SSC/Dhakil/ O level-4, HSC/Alim/ A level-5, Degree/Fazil-6, Masters/Kamil-7												
14. Occupation of the mother: Housewife-01, Government employee-02, Non-government employee-03, Household works/day labour-04, Small business-05, Large business-06, Professional -07, others (Please Specify)												
15. Occupation of the father: Agriculture-01, Government employee-02, Non-government employee-03, Day labor/rickshaw/van puller-04, Small business-05, Large business-06, Professional -07, driver (truck/bus/car)-08, others (Please Specify)												
16. Number of family members												
17. Has the baby ever received vaccine?	Yes: 1	17.1										
	No: 2	17.5										
17.1. BCG Scar (notice the upper side of the left arm)	Yes: 1											
	No: 2											
17.2 Does the child has card for vaccination?	Yes: 1	17.5										
	No: 2	17.3										
17.3. If s/he doesn't have card, then ask, Were you ever given a card?	Yes: 1	17.4										
	No: 2	17.5										
17.4. If the answer for the question 17.3 is yes, then ask Why didn't you preserve the card? (please mention)												
17.5. Does the child has birth registration card?	Yes: 1											
	No: 2											

[28] Formula used from Bangladesh Demographic and Health Survey 2014

				1	2	3	4	5	6	7	8	9	10
18 BCG		(Date/9/0)											
18.1. BCG - Source(from where BCG has taken)	GOB Outreach	1											
	NGO	2											
	All GOB Hospital	3											
	Private	4											
19. pentavalent 1	(Date/9/0)												
19. 1. pentavalent 1 Source	GOB Outreach	1											
	NGO	2											
	All GOB Hospital	3											
	Private	4											
20. pentavalent 2	(Date/9/0)												
21. pentavalent 3	(Date/9/0)												
22. OPV 1	(Date/9/0)												
23. OPV 2	(Date/9/0)												
24. OPV 3	(Date/9/0)												
25. PCV1	(Date/9/0)												
26. PCV 2	(Date/9/0)												
27. PCV 3	(Date/9/0)												
28. IPV 1	(Date/9/0)												
29. IPV 2	(Date/9/0)												
30. MR1	(Date/9/0)												
30.1Observed the date of vaccination card and the date with register	Yes: 1 No: 2												
30.2 Source of vaccination	Card: 1, Registrar:2 History: 3												
31. Would you please tell me, at least how many times the child should be taken to the vaccination center to complete all the vaccines? (write the number or 'don't know')													
32. How many times did the worker come to you to remind about completing vaccination?													
33. What are the side effects may occur if the child is vaccinated? [Multiple response possible]	Fever : 01												
	Swollen:02												
	Redness at vaccination site:03												
	Pain:04												
	Don't know : 99												
	Others (specify):												
34. Is it take more tha half an hour to reach to the nearest vaccination center from your home on foot? Yes 1, No 2													

Vaccination Code Date - Record date from vaccination card	Source codes:	
9 - History that the child was vaccinated	GOB Outreach = Community household, Satellite clinic, Community Clinic, Club	NGO = Hospital, Clinic, Outreach
0 - The child was not vaccinated	All GOB Hospital = District, UHC etc.	Private = Chamber, clinic and hospital

Reasons for Vaccination Failure

35. The children who never/partially vaccinated ask the mothers or guardians "Why was the child not vaccinated or why the child was not fully vaccinated?" (Accept most important answer and circle the appropriate code)

Sl. no. of the baby in this cluster	1	2	3	4	5	6	7	8	9	10
i. Didn't know that my child should be given vaccine	1	1	1	1	1	1	1	1	1	1
ii .Didn't know when to go for the second/third dose	2	2	2	2	2	2	2	2	2	2
iii. Didn't know when to go for vaccine of measles	3	3	3	3	3	3	3	3	3	3
iv. Didn't know where to go for vaccine	4	4	4	4	4	4	4	4	4	4
V. Fearing side effects	5	5	5	5	5	5	5	5	5	5
vi. Rumor (Please mention)	6	6	6	6	6	6	6	6	6	6
vii. Don't believe in vaccination	21	21	21	21	21	21	21	21	21	21
viii. Was busy and so couldn't give vaccine to child	22	22	22	22	22	22	22	22	22	22
ix. Will give vaccine in future	23	23	23	23	23	23	23	23	23	23
x. There was a long queue in the vaccination centre	24	24	24	24	24	24	24	24	24	24
xi. Don't remember	25	25	25	25	25	25	25	25	25	25
xii. There was no vaccine in the center	40	40	40	40	40	40	40	40	40	40
xiii. There was no vaccinator in the center	41	41	41	41	41	41	41	41	41	41
xiv. Vaccine centre was too far	42	42	42	42	42	42	42	42	42	42
xv. Injection was too painful for the child	43	43	43	43	43	43	43	43	43	43
xvi. Was abscess at the place of vaccine	44	44	44	44	44	44	44	44	44	44
Xvii Faced problem after vaccinating	45	45	45	45	45	45	45	45	45	45
xviii. Vaccinator was not friendly	46	46	46	46	46	46	46	46	46	46
xix. The child was sick, so was not taken to the vaccination center	47	47	47	47	47	47	47	47	47	47
xx. The child was sick, so the vaccinator didn't give vaccine	48	48	48	48	48	48	48	48	48	48
xxi. Mother was sick	49	49	49	49	49	49	49	49	49	49
xxii.I thought the vaccinator would come home	50	50	50	50	50	50	50	50	50	50
xxiii. They charge money to take vaccine	51	51	51	51	51	51	51	51	51	51
xxiv. The session time was inconvenient	52	52	52	52	52	52	52	52	52	52
4. Others (please specify)										
Mobile Number of the Respondents										

	Sl. no. of the baby in this cluster		Skip to	1	2	3	4	5	6	7	8	9	10
36.	Source of drinking water? Pipe water inside the house- 01 Pipe water outside the house -02, Tube well-03 Deep Tube well - 04, Sallow well - 05, Well- 06, Pond/canal/lake -07, River/Fountain - 08, Tara Pump -09, Rain water -10												
37	Type of latrine? Sanitary latrine/ septic tank - 1, Water seal/ slub latrine- 2, Pit latrine - 3, Open latrine - 4, Hanging latrine - 5, No latrine/ open place – 6												
38	Household durables?												
38.1	Almirah/Wardrobe	Yes-1 No – 2											
38.2	Table	Yes-1 No – 2											
38.3	Chair/bench	Yes-1 No- 2											
38.4	Clock	Yes-1 No- 2											
38.5	Khat/Bed	Yes-1 No 2											
38.6	Radio	Yes-1 No- 2											
38.7	Television	Yes-1 No- 2											
38.8	Bicycle	Yes-1 No- 2											
38.9	Motor Cycle	Yes-1 No- 2											
38.10	Sewing Machine	Yes-1 No- 2											
38.11	Telephone	Yes-1 No- 2											
38.12	Mobile phone	Yes-1 No- 2											
38.13	Refrigerator	Yes-1 No- 2											
38.14	Car/Truck	Yes-1 No- 2											
38.15	Boat	Yes-1 No- 2											
38.16	Rickshaw/Van	Yes-1 No- 2											
38.17	Electricity	Yes-1 No- 2											
39	Observe materials of the floor concrete -1, soil-2, Bamboo-3, wood-4												
39.1	Observe materiasl of the wall concrete -1, soil-2, Bamboo-3, wood-4, Ply wood-5 Tin-6, Brick-7												
39.2	Observe materials of the roof Concrete-1, Tin-2, Bamboo/wood-3, straw-4, Tally-5, No roof-6												
40	What is the monthly income of your family? (include all sources)												
GPS Location	Latitude												
	Longitude												

End Interview with Thanks

TT Form

Applicable for those women who gave birth to live or dead child

1. Cluster no	
2. Date	
3. Survey area	

between 01-01-2018 and 31-12-2018

		Skip to	1	2	3	4	5
4. Sl number of sample (to be filled in by office)							
5. Sl number of woman in this cluster							
6. Household number/GR number/Name of the house head							
7. Name of the respondent							
8. Name of the husband							
9. Date of birth of the child born at the latest (Dead or live)							
10. Age of the respondent (write in year)							
10.1 Birth date of the women							
11.Academic qualification of the respondent Illiterate -1, Primary-2, Secondary-3, SSC/Dhakil/ O level-4, HSC/Alim/ A level-5, Degree/Fazil-6, Masters/Kamil-7							
12. Academic qualification of the husband Illiterate -1, Primary-2, Secondary-3, SSC/Dhakil/ O level-4, HSC/Alim/ A level-5, Degree/Fazil-6, Masters/Kamil-7							
13. Occupation of the respondent Housewife-1, Government employee-2, Non-government employee-3, Household works/day labour-4, Small business-5, Big business-6, Teacher-7, Professional -8, others							
14. Occupation of the husband Agriculture-1, Government employee-2, Non-government employee-3, Day labor/rickshaw/van puller-4, Small business-5, Big business-6, Teacher-7, professional -8, driver (truck/bus/car)-9,others							
15 Number of family members of the family							
16. How many times have you given birth to child? (live and dead)	Live						
	Dead						
	Total						
16.1 Was the last born baby live or dead?	live : 1	17					
	Died : 2	16.2					
	Still birth : 3	17					
16.2. (If the child was dead) Within how many days after birth, did the child die?							

Tetanus Toxoid Vaccination

			Skip
17. Have you ever received any TT vaccination?	Yes :1	: 1	
	No :2	: 2	33
19. Do you have card for TT vaccination?	Yes :1	: 1	20
	No :2	: 2	
19.1. (If the respondent does not have any card then ask) were you ever given a card for TT vaccination?	Yes :1	: 1	19.2
	No :2	: 2	20
19.2 If the answer for 19.1 is yes, then ask - Why didn't you preserve the card?			

Instruction: Record the answers for Q 20-30.2 from a card or history							
		Skip	1	2	3	4	5
20 TT1	(Date/9/0)						
20. 1. What is the source of TT1 vaccination?	GOB Outreach -1						
	NGO – 2						
	All GOB Hospital-3						
	Private- 4						
21. TT2	(Date/9/0)						
21. 1.From where did you receive TT2 vaccine?	GOB Outreach -1						
	NGO – 2						
	All GOB Hospital-3						
	Private- 4						
21.2 Interval between TT-1 and TT-2	(write in weeks)						
22. TT3	(Date/9/0)						
22. 1 Interval between TT-2 and TT-3	(write in month)		--Month	--Month	--Month	--Month	--Month
23. TT4	(Date/9/0)						
23.1 Interval between TT-3 and TT-4	(write in month)		--Month	--Month	--Month	--Month	--Month
24. TT5	(Date/9/0)						
24. 1. Interval between TT-4 and TT-5	(write in month)		--Month	--Month	--Month	--Month	--Month
25. TT6	(Date/9/0)						
25. 1. Interval between TT-5 and TT-6	(write in month)		--Month	--Month	--Month	--Month	--Month
26. TT7	(Date/9/0)						
26. 1. Interval between TT-6 and TT-7	(write in month)		--Month	--Month	--Month	--Month	--Month
27. TT8	(Date/9/0)						
27.1 Interval between TT 7 and TT8	(write in month)		--Month	--Month	--Month	--Month	--Month
28. TT9	(Date/9/0)						
28.1 Interval between T8 and T9	(write in month)		--Month	--Month	--Month	--Month	--Month
29. TT10	(Date/9 0)						
29.1 Interval between TT9 and TT10	(write in month)		--Month	--Month	--Month	--Month	--Month
30. Last TT vaccination	(Date/9/0)						
30.1. Interval between TT 10 and last TT injection	(write in month)		--Month	--Month	--Month	--Month	--Month
31. Interval between latest TT injection and date of birth of the last child	(write in Weeks)		--Month	--Month	--Month	--Month	--Month
32. Question numbers of TT vaccination received in the last pregnancy							
33. Was the child protected at birth?	Yes-1, No-2						

Vaccination Code:
Date- Record date from vaccination card
9 History that the child was vaccinated
0 Was not vaccinated

Sources Code:
1.Gob Outreach: Community Hospital, Community Clinic, Satellite clinic, club
2. All GoB Hospital= District, UHC etc
3.NGO= Hospital, Clinic, Outreach, 4. Private= Chamber, Clinic and hospital

Adverse Events of TT Vaccination

		Skip to	1	2	3	4	5
34. Have you ever had an abscess after receiving a TT vaccine?	Yes : 1						
	No : 2						
	Don't know/Can't remember :9	36					
34.1 Were you discouraged to take the next TT vaccine due to abscess or any other problem?	Yes :1						
	No :2						
35. (Check Q17: Those who did not receive TT injection ask them) Why didn't you receive TT vaccine? [single response]	Feel Fear :01						
	Did not aware of TT :02						
	Didn't give it importance :03						
36. Did the health worker ask you about TT vaccine When you took your child for vaccination?	Yes :1						
	No :2						
	Not applicable : 3						
	Don't know : 9						
37. How many doses a woman should receive TT vaccination to be protected against for the rest of her reproductive life? (write number or 'don't know')							
38. Did you take vitamin A capsule within six weeks/42 days of your last delivery?	Yes :1 : 1						
	No :2 : 2						

Water, Sanitation and Household Items,

			Skip to	1	2	3	4	5
39	Source of drinking water? Pipe water inside the house- 01 Pipe water outside the house -02, Tube well-03 Deep Tube well - 04, Sallow well - 05, Well- 06, Pond/canal/lake -07, River/Fountain - 08, Tara Pump -09, Rain water -10							
40	Type of latrine? Sanitary latrine- 1, Water seal/ slub latrine- 2, Pit latrine - 3, Open latrine - 4, Hanging latrine - 5, No latrine – 6							
41	Household durables?							
41.1	Almirah	Yes-1 No - 2						
41.2	Table	Yes-1 No - 2						
41.3	Chair/bench	Yes-1 No- 2						
41.4	Clock	Yes-1 No- 2						
41.5	Khat/Bed	Yes-1 No 2						
41.6	Radio	Yes-1 No- 2						
41.7	Television	Yes-1 No- 2						
41.8	Bicycle	Yes-1 No- 2						
41.9	Motor Cycle	Yes-1 No- 2						
41.10	Sewing Machine	Yes-1 No- 2						
41.11	Telephone	Yes-1 No- 2						
41.12	Mobile phone	Yes-1 No- 2						
41.13	Refrigerator	Yes-1 No- 2						
41.14	Car/Truck	Yes-1 No- 2						
41.15	Boat	Yes-1 No- 2						
41.16	Rickshaw/Van	Yes-1 No- 2						
41.17	Electricity	Yes-1 No- 2						
42	Materials of the floor concrete -1, soil-2, Bamboo-3, wood-4							
42.1	Materials of the wall concrete -1, soil-2, Bamboo-3, wood-4, Ply wood-5 Tin-6, Brick-7							
42.2	Materials of the roof Concrete-1, Tin-2, Bamboo/wood-3, straw-4, Tally-5, No roof-6							
43	Is it take more tha half an hour to reach to the nearest vaccination center from your home on foot? Yes-1, No-2							
86	What is your monthly family income?							

Thank You

National Vitamin A Campaign Form

1. Applicable for those children aged 6-11 Months who born in between 14/02/2018 and 12/08/2018
2. Applicable for those children aged 12-59 months who born in between 07/3/2014 and 13/02/2018

1.Cluster number	
2. Date	
3. Survey area	

			6-11 months							12-59 Months						
4. Sl. no. of the child in this cluster		Skip to	1	2	3	4	5	6	7	8	9	10	11	12	13	14
5. Name of the child																
6.Name of the child's mother																
7. Name of the child's father																
8. Sex: Male –1 Female–2																
9. Date of birth of the child (Day/Month/Year)																
9a. Age in Month																
10. **Ask mother/guardian**: Was your child (6-59 months) fed vitamin A during the Vitamin A Plus Campaign held on February 9 , 2019	Yes:1	11														
	No:2	10.1														

			6-11 months							12-59 Months						
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
10.1 If the child (6-59 months) was not fed Vitamin A during the Vitamin A Plus Campaign held February 9 , 2019 then ask, Why the child wasn't fed Vitamin A during the Vitamin A Plus Campaign held on February 9 , 2019 (If there come multiple answers, ask which one is more important and code accordingly)	Didn't know	99														
	Was very busy	01														
	Went on traveling	02														
	Don't believe in Vitamin A	03														
	The child was fed in the previous time	04														
	The child was sick, so didn't take him to the vaccination centre	05														
	The child was sick , so the health worker didn't give vaccine	06														
	Vitamin A was not available	07														
	Health worker was not available :08	08														
	There was a long queue	09														
	The centre was too far	10														
	The session time was inconvenient	11														
	Was afraid of side effects	12														
	Was waiting to come back home with vitamin A	13														
	Religious/Social obstacles	14														
	Was not at home	15														
	Others (specify)															

			1	2	3	4	5	6	7	8	9	10	11	12	13	14
111. How did you learn about the Vitamin A Plus Campaign held on February 9 , 2019 (Multiple answer)	GOB/ City corporations FW visit	01														
	City Corporation's Health Worker:	02														
	NGO worker Visit	03														
	Teacher visit	04														
	Other volunteers Visit	05														
	Family/neighbor/friends	06														
	Television	07														
	Radio	08														
	Poster	09														
	Newspaper	10														
	Mobile Miking	11														
	Mosque Miking	12														
	Health Workers' home visit	13														
	Mobile SMS	14														
	Others (specify)															
GPS Location	Latitude															
	Longitude															

Thank You

TT 5 Form

Applicable for 18-49 years old women

1. Cluster No.												
2. Household Number/GR number and name of house head												
3. Date												
4. Survey Area												
5. Sl number of woman in this cluster		Skip to	1	2	3	4	5	6	7	8	9	10
6. Name of respondent												
7. Father's Name/Husband's Name												
8. Serial number of women in this Cluster (By Office)												
9. Birth date of the women												
9a. Age of the respondent? (in years)												
10.Marital Status of respondent	Married - 1											
	divorce/ separated - 2											
	Unmarried -3											
11. Educational Qualification of the respondents: Illiterate -1, Primary-2, Secondary-3, SSC/Dhakil/ O level-4, HSC/Alim/ A level-5, Degree/Fazil-6, Masters/Kamil-7												
12. Occupation of the respondents: Housewife-01, Government employee-02, Non-government employee-03,Household works-04, Small business-05, Large business-06, Student-07, Professional -08, Others (Please Mention)												
13. Total family member												
14. Have you ever received TT vaccine?	Yes : 1	15										
	No : 2	28										
15. Do you have card for TT vaccination?	Yes : 1	16										
	No : 2	15.1										
15.1 (If the respondent does not have any card) were you ever given a card for TT vaccination?	Yes : 1	15.2										
	No : 2	16										
15.2 (if yes in Q.15.1) Why did you not preserve the card? (Please Specify)												

SL Number of Women in this Cluster		Skip to	1	2	3	4	5	6	7	8
16. TT 1	(Date/9/0)									
16.1 Source of TT1?	(O/H/N/P)									
17. TT2	Date/9/0									
17.1 Source of TT2?	(O/H/N/P)									
17.2 Interval between TT-1 and TT-2?	(write in weeks)		..... Weeks	..... Weeks	..... Weeks	..... Weeks	..... Weeks	..... Weeks	..... Weeks	..... Weeks
18. TT 3	(Date/9/0)									
18.1 Interval between TT2 and TT3	(Write in months)		..... months	..... months	..... months	..... months	..... months	..... months	..... months	..... months
19. TT4	(Date/9/0)									
19.1 Interval between TT3 and TT4	(Write in months)		..... months	..... months	..... months	..... months	..... months	..... months	..... months	..... months
20. TT5	(Date/9/0)									
20.1 Interval between TT 4 and TT5	(Write in months)		..... months	..... months	..... months	..... months	..... months	..... months	..... months	..... months
21. TT6	(Date/9/0)								.	.
21.1 Interval between TT5 and TT6	(Write in months)		..... months	..... months	..... months	..... months	..... months	..... months	..... months	..... months
22. TT 7	(Date/9/0)									
22.1 Interval between TT 6 and TT7	(Write in months)		..... months	..... months	..... months	..... months	..... months	..... months	..... months	..... months
23. TT8	(Date/9/0)									
23.1 Interval between TT 7 and TT8	(Write in months)		..... months	..... months	..... months	..... months	..... months	..... months	..... months	..... months
24. TT9	(Date/9/0)									
24.1 Interval between T8 and T9	(write in months)		..... months	..... months	..... months	..... months	..... months	..... months	..... months	..... months
25. TT10	(Date/9/0)									
25.1 Interval between TT9 and TT10	(write in months)		..... months	..... months	..... months	..... months	..... months	..... months	..... months	..... months
26. Last TT vaccine	(Date/9/0)									
26.1 Interval between TT 10 and last TT injection	(write in months)		..... months	..... months	..... months	..... months	..... months	..... months	..... months	..... months

27. Have you ever had an abscess after receiving a Tetanus vaccine?	Yes : 1 No : 2	27.1 29									
27.1 Are you discouraged to take the rest TT injection due to abscess or any other problem?	Yes : 1 No : 2										
28. Why did you not take any TT vaccine? (ask those who have never taken any TT injection)											
29. How many doses a woman should receive TT vaccine to be protected for the rest of her reproductive life? (write number or 'don't know')											
30. What was your monthly family income?											
Mobile number of the respondents											
GPS Location	Latitude										
	Longitude										

Vaccination Code:
Date- Record date from vaccination card

History that the child was vaccinated
government hospital
0 Was not vaccinated

Sources Code:
1.Gob Outreach: Community Hospital, Community Clinic, Satellite clinic, club
2. NGO= Hospital, Clinic, Outreach,
3. All GoB Hospital= Government Medical College Hospital, District Hospital, UHC or any other
4. Private= Chamber, Clinic and hospital

Thank you

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