Effective Vaccine Management (EVM) Bangladesh 2021

EVM

Setting a standard for the vaccine supply chain

World Health Organization

Gavi The Vaccine Alliance

unicef for every child

Assessment Report

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Secretary
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Message

Expanded Program on Immunization (EPI) is one of the successful health programs in Bangladesh that earns recognition from national and international communities for its remarkable achievements in preventing vaccine preventable diseases (VPDs) by providing immunization services both in terms of quality and quantity.

I am extremely happy for developing the report on Effective Vaccine Management Assessment (EVMA) and Continuous Improvement Plan (cIP). Effective Vaccine Management Assessment (EVMA) is globally recognized tool for assessing the status of immunization supply chain that includes cold chain management to keep the vaccine potent.

Cold Chain is one of the most crucial components of EPI program, as the potency of the vaccines depends on the Cold Chain system of the program. Giving the highest importance, EPI always tries to keep the vaccines potent at all levels by ensuring quality supply chain management system starting from storing to the administration of the vaccines. In this regard, a huge numbers of Cold Chain equipment and other materials are in place at respective levels based on the nature of service delivery.

To ensure the quality Cold Chain management system, a comprehensive, robust and in-depth assessment occurs every 4 years on Vaccine Management System of the country. To oversee the current status of the supply chain management system in the country and to find out the strengths and challenges, appropriate measures have been taken to overcome those challenges. I am personally happy to hear that EPI took the initiative under the guidance of Public Health Wing of HSD to undertake this huge challenge. I would like to congratulate Public Health Wing of HSD, Directorate General of Health Services, especially, EPI for leading and completing this gigantic activity within stipulated time and come up with a comprehensive report along with Continuous Improvement Plan. It is my strong believe that policy makers and program personnel at all levels would be benefited from this EVMA report and Continuous Improvement Plan for further improvement of EPI in the future.

Finally, I would like to express my gratitude to WHO, UNICEF Bangladesh, and UNICEF Regional Office of South Asia for providing financial and technical support in conducting the EVM assessment and developing the Continuous Improvement Plan (cIP).

11.12.23
Md. Jahangir Alam

Director General of Health Services
Directorate General of Health Services

Message

Expanded Programme on Immunization (EPI) is one of the symbols of success in Health sector in Bangladesh. With a view to reduce child mortality and morbidity from the vaccine preventable diseases, Bangladesh national immunization programme started its journey on 7th April 1979 with only 6 antigens. In course of time, EPI included more and more new and underutilized vaccines in the vaccination schedule targeting children and women. Immunization Supply Chain System is playing the most vital role through keeping the vaccines potent to ensure quality vaccination services to the target population under EPI, at right time and right place, with right quantities.

As a part of periodic assessment, EPI took the initiative to assess the effective supply chain management system in the country following standard EVM assessment tool at different implementation levels. The primary objective of EVM assessment is to know the country's current status of the supply chain management system and find out the areas that needs further improvement. The EVMA team has done a tremendous job to undertake this huge assessment works throughout the country, maintaining standard norms and protocol of EVM assessment guidelines.

I would like to congratulate the EPI team along with UNICEF and WHO officials for their hard work to carry out this hard job quite successfully. It is my strong believe, EPI would be benefited from this EVMA findings and would be able to improve further with the Continuous Improvement Plan (cIP) which has been developed based on the EVMA 2021. My sincere thanks to UNICEF for providing the technical and financial support and also to WHO for technical support to conduct this EVMA 2021.

Prof. Dr. Abul Bashar Mohammad Khurshid Alam

Chief, Health Section
UNICEF, Bangladesh

Message

Expanded Programme on Immunization (EPI) is one of the most successful health interventions in Bangladesh which is well acknowledged home and abroad. As a logistic dependent program, ensuring quality and effective supply chain management is the most important component of EPI.

UNICEF is committed to provide due support to the National Immunization Program, especially the Cold Chain management system since supporting National Immunization Program in Bangladesh is one of the priority areas of UNICEF. Recognizing the high importance of effective supply chain management system in EPI, UNICEF has been working closely with government to ensure quality supply chain management system in national immunization program in Bangladesh.

Effective Vaccine Management Assessment is a routine activity in EPI that identifies the strengths and gaps that need to be improved to ensure the quality immunization services in the country. UNICEF has been providing supports to conduct this type of assessment for a long time. I hope the EVMA-2021 would fulfil its objectives and has identified strengths and gaps that would be addressed through appropriate interventions highlighted in the cIP.

I would like to congratulate the Line Director, MNCAH, Program Manager, EPI and other concerned officials of DGHS, MOHFW, UNICEF, WHO and other development partners for conducting EVMA-2021 and coming up with a comprehensive report along with a rational Continuous Improvement Plan (cIP). I hope this EVMA-2021 report will facilitate the national immunization program to undertake appropriate strategy and activities for further strengthening immunization services in the country.

Maya Vendenant

Director and Line Director-MNC&AH
Directorate General of Health Services

Foreword

Bangladesh Government is committed to achieve Global Standard in Immunization Supply Chain (iSC) and has adopted the EVM version 2.0 tool for assessing the current performance of iSC system to prepare comprehensive improvement plan (cIP) for further strengthening of iSC. It is our great pleasure that the Effective Vaccine Management Assessment (EVMA 2021) report has been successfully produced in spite of the difficulties posed by the COVID-19 pandemic requiring regorous management of the vaccines and Cold Chain. The findings of this report illustrates a clear picture of the status of Bangladesh's vaccine management system.

The Central EPI Cold Chain and Vaccine Management store, located at National EPI HQ, Dhaka under the Directorate General of Health Services of Ministry of Health & Family Welfare (MoH&FW), is the Primary (PR) Store of Bangladesh. With the addition of a new 6-storied building with 10 WIC/WIFs, the central EPI store was expanded as a joint initiative of the Ministry of Health & Family Welfare (MoHFW), Gavi and UNICEF. Role of Effective Vaccine Management Assessments (EVMAs) have proved to very important for strengthening immunisation supply chain (iSC) of the country.

The current EVM assessment was carried out from October - December 2021 using WHO's EVM 2.0 tool to assess the supply chain functions at all three levels (PR, LD & SP) of the vaccine supply chain. These functions cover the three aspects: facility operations, facility management, and immunization program management. A total of 72 stores were thoroughly assessed across 3 different tires of the vaccine stores i.e. i). Central EPI store (PR), ii) District and Dhaka City Corporation Zone (LD), and iii) Upazila, Municipality and City Corporation ward (SP). The results of this wide-ranging assessment are presented in this report.

It is my pleasure to sincerely thank the group of experts and professionals for their dedication, extensive hard work and inputs in carrying out the EVM assessment and the production of this report and making this EVM Assessment a success. I express my sincere gratitude towards all the assessors and team leaders who committed themselves throughout the assessment, bringing this document to its final shape. Last but not the least, I thank the UNICEF Country Office Bangladesh and the WHO Country Office Bangladesh team who are acknowledged and appreciated for their financial and technical inputs, dedication, and continued support.

I am confident that the recommendations of National EVMA report will contribute in the strengthening the immunization supply chain & Cold Chain in Bangladesh and will guide concerned managers and planners for making decision at all levels of vaccine management.

Dr. Mohammed Nizam Uddin

Program Manager, EPI
DGHS, Mohakhali, Dhaka

Acknowledgement

The 2021 EVMA has been successfully accomplished with the contribution of dedicated experts and health professionals. This report has been prepared by the Independent Consultant for ROSA and a group of Consultants of UNICEF. We would like to extend our gratitude and appreciation to all the assessors, team leaders whose dedication and commitment led to the successful completion of the assessment and development of EVM Comprehensive Improvement Plan (cIP), based on the findings and recommendations of EVM Assessment. We also extend our appreciation for the dedication and support of the Ministry of Health and Family Welfare, Government of the Peoples Republic of Bangladesh, EPI HQ, WHO SEARO, WHO Bangladesh, UNICEF ROSA, and UNICEF Bangladesh.

We extend our sincere thanks to former Program Manager, EPI, Dr. Mowla Baksh Chowdhury as an EVMA 2021 Country Manager for overall guidance and excellent coordination in ensuring all out cooperation from every level. We would like to acknowledge Health Officer, UNICEF Country Office as an EVMA 2021 Lead Assessor for his great contributions for sampling and to accelerate the assessment. We also express our sincere gratitude to Deputy Program Manager, EPI for his all-out support for planning and team building during the entire assessment process, to Training Officer, EPI and Cold Chain Engineer, EPI for training support. We express our sincere gratitude to Deputy Director, EPI & Surveillance and her team for valuable support and directions, Assistant Director, EPI, DPM-(all) EPI, and Medical Officer (all), EPI, for their commitment and continued support.

We also appreciate the efforts of Civil Surgeons, District EPI Superintendent, Cold Chain Technicians, Assistant EPI storekeeper, Upazila Health & Family Planning Officer, Health Inspector, MT-EPI, Chief Health Officer, EPI supervisors, Municipal officials, EPI storekeeper, and partner agencies i.e. WHO, UNICEF, for providing the support in EVM assessment.

We are confident that all concerned decision makers and program managers at all level will use the assessment findings and will provide their full support for implementing the Comprehensive Improvement Plan (cIP) towards achieving a world class supply chain system for immunization in Bangladesh.

Dr. S M Abdullah Al Murad

Abbreviations

AD	Auto Disable
BCG	Bacillus Calmette Guerin
CCE	Cold Chain Equipment
CCEOP	Cold Chain Equipment Optimization Platform
CFC	Chloro fluoro carbons
CMSD	Central Medical Store Depot
cIP	Comprehensive Improvement Plan
CCT	Cold Chain Technician
DHIS2	District Health Information System2
30 DTR	30-day temperature records
EPI	Expanded Programme on Immunization
EVM	Effective Vaccine Management
EVMA	Effective Vaccine Management Assessment
FWA	Family Welfare Assistant
GAVI	Global Alliance for Vaccines and Immunizations
GoB	Government of Bangladesh
Hep B	Hepatitis B vaccine
Hib	Hemophilus influenza type b vaccine
HA/HW	Health Assistant / Health Worker
iSC	Immunization Supply Chain
ILR	Ice Lined Refrigerator
IPV	Inactivated poliovirus vaccine
KPI	Key Performance Indicators
LD	Lowest distribution level
VLMIS	Vaccine Logistic management information system
MDVP	Multi-dose Vial Policy
MLM	Mid Level Manager
MNC&AH	Maternal Neonatal Child & Adolescent Health
MOH&FW	Ministry of Health & Family Welfare
mOPV	monovalent Oral Polio Vaccine
MoU	Memorandum of Understanding

MR	Measles and rubella vaccine
MT-EPI	Medical Technologist- EPI
ODK	Open Data Kit
OP	Operational Plan
OPV	Oral Polio Vaccine
PR	Primary Store Level
PCV	Pneumococcal conjugate vaccine
Pentavalent vaccine	Diphtheria- tetanus, and pertussis-HepatitisB & Haemophilus influenza B
PQS	Product Quality and Safety
RTMD	Remote Temperature Monitoring Device
SP	Service delivery Point level
SOP	Standard Operating Procedure
SWOT	Strength, Weaknes, Opportunity & Threat
TB	Tuberculosis
Td	Tetanus-diphtheria
tOPV	trivalent oral polio vaccine
ToT	Training of Trainers
UHC	Upazila Health Comples
UH&FPO	Upazila Health & Family Planning Officer
UNICEF	United Nations Children's Fund
VAR	Vaccine Arrival Report
VVM	Vaccine Vial Monitor
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization
WIC	Walk in Cooler
WIF	Walk in Freezer

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1. Executive summary

The Effective Vaccine Management Assessment (EVMA) global tool was developed by the World Health Organization (WHO) and UNICEF to systematically assess and identify strengths and weaknesses in countries' immunization supply chains and to promote the high standard of storage and distribution of vaccines in order to maintain their potency. Country EVM assessment consists of three stages

1) assessing the in-country immunization supply chain using the standard tool,
2) developing improvement plans based on the assessment findings, and
3) monitoring the implementation of improvement plans.

EVMAs are used to systematically analyse the strengths and weaknesses across vaccine supply chains and as supervisory tools to monitor and support the long-term progress of individual facilities and stores.

With the rising cost of vaccines and the greater storage capacity now required at every level of the Cold Chain, countries must maintain lower stock levels, reduce wastage, accurately forecast vaccine requirements, and prevent equipment breakdowns. This requires a consistently high standard of supply chain management, which can only be achieved if all of the links in the supply chain comply with current good storage and distribution practices. The EVM initiative provides the materials needed to monitor and assess vaccine supply chains and to help countries to improve their supply chain performance.

Bangladesh has been conducting EVM assessments periodically for strengthening the iSC system. Previously two EVM assessments were conducted in 2011 and 2014 using the EVM 1.0 tool. The main recommendations for the 2014 assessment are listed below (Table-3), as described in the 2014 EVMA report. Noting that many of these were implemented, as described in the analysis of the findings of the EVMA during 2021.

Bangladesh has established an inherently efficient supply chain with only three tiers for supply, from the central store to the service delivery level for a population of 170 million. This approach minimizes the quantity of Cold Chain equipment, maintenance service infrastructure, and transport systems dedicated to EPI.

EPI-Bangladesh, with the support of WHO and UNICEF carried out the 2021 Effective Vaccine Management Assessment (EVMA) for Bangladesh by assessing 72 sites using the EVMA 2.0 tool. The assessment result of the Central Vaccine Store, all 23 LD (District) stores and 48 service delivery sites (health facilities) are presented in the heat map below.

The overall key strengths and weaknesses of the vaccine supply chain and vaccine management practices in Bangladesh are summarised in Annex-2. The performance of the nine operational criteria assessed is better than the WHO recommended minimum performance levels, despite some shortcomings of Vaccine Arrival practices at the central store, which are discussed in detail later.

Table 1: Heat map of the consolidated findings of the Bangladesh EVM Assessment 2021

		Infrastructure	Equipment	Information technology	Human resources	Policies & procedures	Financial resources			TOTAL
		C1	C2	C3	C4	C5	C6	OUTPUT	PERFORMANCE	
Vaccine arrivals	E1			100	50	92		100		88
Temperature management	E2			90	84	100		73	98	86
Storage and transportation capacity	E3	45	89		96	100	100	78	100	88
Facility infrastructure and equipment	E4	84	72	94			95	79		82
Maintenance and repair	E5			54	96	100	98	69	87	85
Stock management	E6			92	86	100		80	73	84
Distribution of vaccines and dry goods	E7		100	91	75	69	94	93	98	88
Vaccine management	E8				74	100		9		87
Waste management	E9		63		79	98	89	55	83	81
Annual needs forecasting	M1				97	99		98	100	98
Annual work planning	M2				70	44	99	79	76	77
Supportive supervision	M3	100	100	7	98	100	100	74		76
iSC performance monitoring	M4			94	84	94		67		77
TOTAL		83	81	85	83	92	99	78	89	84

The overall performance of Bangladesh `is summarised as shown in the EVM 2.0 (Annex-1)

On the other hand, of the four newly introduced Management categories, Bangladesh falls short of the WHO recommended standard in three areas, which have been discussed in the report, and ways to improve have been discussed.

The conclusion echoes the same finding as in EVMA 2014: "A very good overall performance" with an aggregate performance of 84% across all criteria and supply levels (Annex-2). The country is to be commended on this excellent performance and improvements made since the previous EVM assessment in 2011.

Criteria and Category Score

EVMA 2.0 has been carried out according to EVM criteria and category. The assessment scores by criteria and category are shown in the table below.

Code	Criterion	Score	Code	Category	Score
E1	Vaccine arrivals	88%	C1	Infrastructure	83%
E2	Temperature management	86%	C2	Equipment	81%
E3	Storage and transportation capacity	88%	C3	Information technology	85%
E4	Facility infrastructure and equipment	82%	C4	Human resources	83%
E5	Maintenance and repair	85%	C5	Policies & procedures	92%
E6	Stock management	84%	C6	Financial resources	99%
E7	Distribution of vaccines and dry goods	88%	O	Output	78%
E8	Vaccine management	87%	P	Performance	89%
E9	Waste management	81%			
M1	Annual needs forecasting	98%			
M2	Annual work planning	77%			
M3	Supportive supervision	76%			
M4	iSC performance monitoring	77%			

The categories and criteria are outlined in detail in Annex 3.

Below is the summary of the strengths, challenges, and recommendations identified at all levels during the 2021 EVMA of Bangladesh.

Strengths identified in the vaccine supply chain system by criteria:

- VAR was available for all the shipments with complete documentation.
- The central store and 47 LD stores had a computerized temperature monitoring system (CTMS) that meets all the minimum EVM requirements.
- Based on the vaccine receipt reports, vaccines were not exposed to damaging high or low temperatures during transportation at all levels.
- The central store had sufficient WIC and WIF capacity for storage of vaccines and transportation capacity

- All LD stores have designated space/buildings/offices for Vaccine stores. Out of 64 LD, 51 LD stores had the sufficient dry goods storage capacity
- WHO PQS Cold Chain equipment is in place at all levels
- LD and SP stores had enough cold storage capacity
- Forty-seven LD stores are equipped with backup generators, although full-time electricity is available
- The SOP for vaccine and Cold Chain management is in place
- Both DHIS2 and paper-based stock management forms had most of the required fields available
- Most of the staff had the appropriate knowledge of key principles and procedures of vaccine management.
- All sites used a standard method to forecast their vaccine needs and had accurate vaccine needs forecasts for all vaccines for the current year
- ICT equipment is available at all LD level
- All staff has communication devices (e.g. mobile, tab etc.)
- All store has a sufficient electric supply from the national grid. No power cut > 4 hours
- There were no CCE downtime incidents in the last 12 months
- EPI Session found well organized following injection safety and quality.

EPI Bangladesh faces the following challenges in its way forward. The issues raised were as follows:

1. The temperature mapping of any cold room and freezer room at the Central EPI Vaccine Store was not conducted at any time between 2014 and 2021. On the other hand, the records of the RTMD show that the temperature inside the cold room and freezer room was found to be within the acceptable range, and all the cold and freezer rooms were safe to store vaccines. Computerized RTMD real-time data were downloaded monthly and were preserved at the national store. Generated data were reviewed, and the results were kept secure for three years. Bangladesh used an online real-time dashboard for temperature monitoring of all WICs and WIFs at the central EPI store. Based on these findings, the overall score on temperature management at the primary level is 85%, and overall temperature management in storage is 86%.
2. An overall assessment score of 85% was achieved for maintenance and repair at the primary level store. It was noted that the maintenance and repair of vehicles needed improving.
3. The facility has shortage on iSC staff to carry out the routine vaccine and logistics management duties. Positions of Store manager, logistics officer, two storekeepers and MIS officer have been lying vacant.
4. According to the EVM assessment 2021, the central EPI store does not have the sufficient cold storage capacity to accommodate the expected maximum stock levels of vaccines and diluents. However, this shortage can be covered by newly procured WICs through COVAX facilities.

EPI Management's response and Recommendations:

- Temperature mapping should be done immediately for all the cold and freezer rooms at the central EPI stores.
- Freeze indicators should be used during vaccine transportation of any freeze sensitive vaccines
- EVM SOP should be revised to include job aid for iSC staff, temperature mapping, and freeze indicators with freeze-sensitive vaccine during transportation.
- At least two staff should be available to manage vaccine arrival inspection and documentation at the central EPI vaccine store
- Vacant posts should be filled at the earliest
- Develop physical inventory for the insulated container and generator
- Vaccine stock should be kept by lot and expiry date as per EVM SOP
- Train the newly recruited officers and staff of the vaccine stores on EVM SOP
- The facility should recruit staffs for all the vacant positions at the EPI central store.

2. Introduction and Background

Country Background

Bangladesh is situated in South Asia, bordered by the Bay of Bengal, Myanmar, and India. It is located within Geographic coordinates: 24 00 N, 90 00 E, with 147,570 sq. km.

Most of Bangladesh lies within the broad delta formed by the Ganges and Brahmaputra rivers. It is exceedingly flat, low-lying, and subject to annual flooding that often hampers access to affected communities and immunization service delivery.

The only significant area of hilly terrain, constituting less than one-tenth of the nation's territory, is the Chittagong Hill Tracts Districts in the narrow south-eastern panhandle of the country. Small, scattered hills lie along or near India's eastern and northern borders.

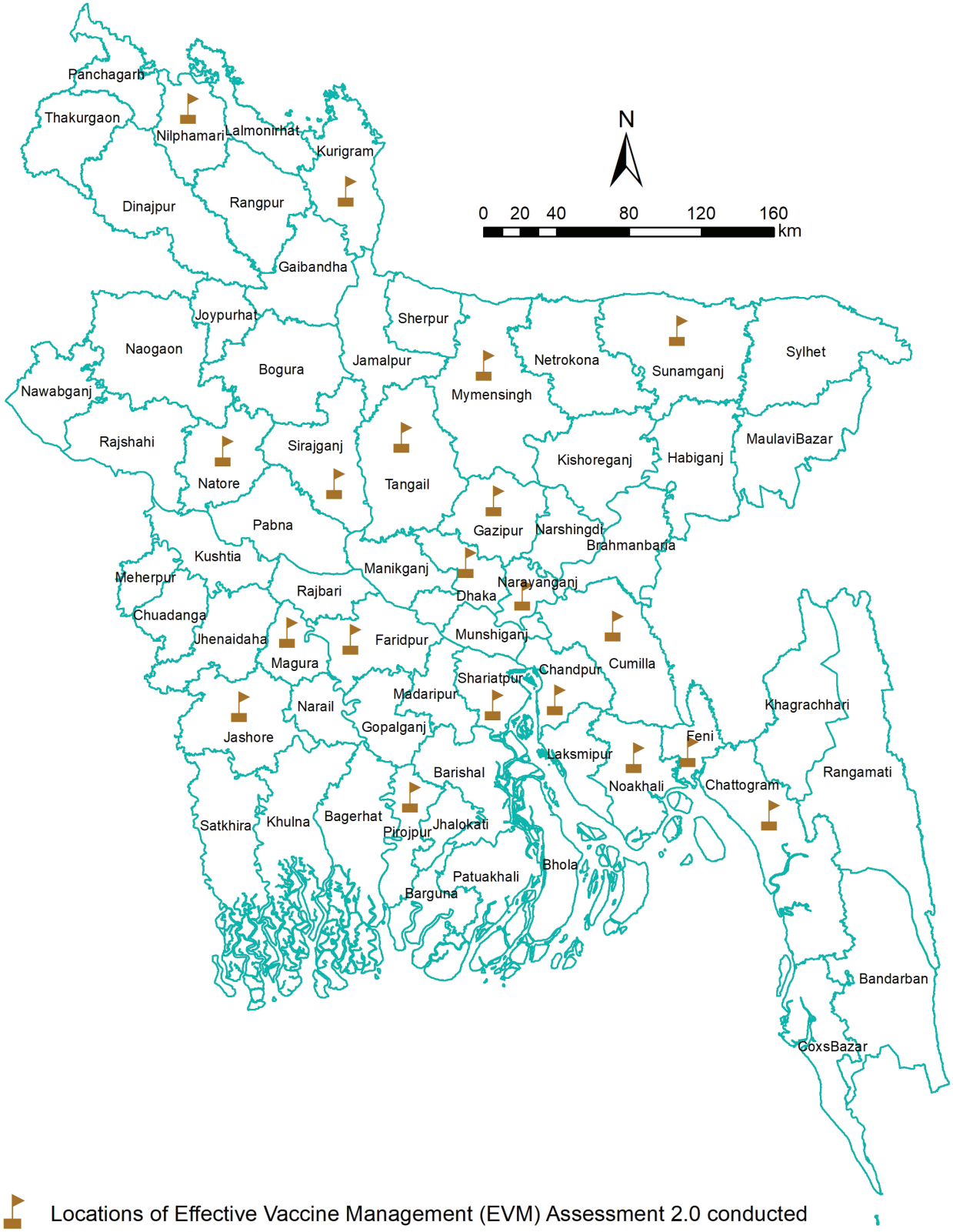
The country has been divided into eight administrative divisions (Dhaka, Chattogram, Rajshahi, Khulna, Barisal, Sylhet, Rangpur, and Mymensingh), comprising 64 districts. Districts are further divided into Upazilas (sub-districts), 488 in number. Each Upazila has several numbers of unions (average 10; range 5-27), and each union has three wards. Eleven city corporations and 110 major municipalities administratively represent the urban areas.

Bangladesh is one of the most densely populated countries in the world, and the population is 172 million in 2021. According to the Population Census 2011, the total national census projected population of the country in 2021 is 172,809,384, of which about 37% live in urban areas and 63% in rural areas, with

- 41 million women of childbearing age (26.7% of the total population).
- 3,374,818 expected live births (1.95%).
- 3319225 under 1-year-olds (1.92%).
- At birth, the percentage of males and females is 104 male(s)/100 female is 104 male (s)/100 female.
- 16472873 children under five years of age (9.5%).

In 2021 the average life expectancy at birth was an estimated 73 years. And about 50% more deaths of all deaths are due to non-communicable diseases, with heart disease being the leading cause of death.

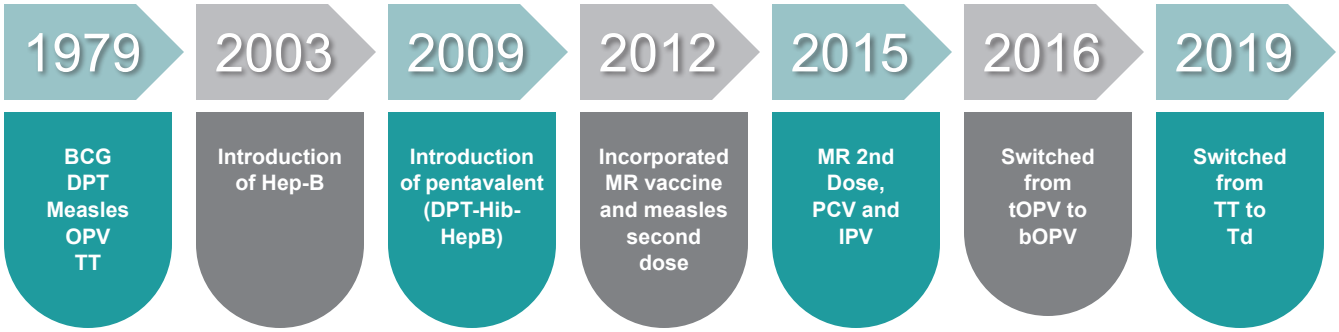
Figure 1: Map of Effective Vaccine Management (EVM) Assessment 2.0 of Bangladesh, 2021



History of the National Immunization Programme

With the support from partners, Bangladesh Government officially launched the national Expanded Programme on Immunization (EPI) on 7 April 1979. The EPI is a priority programme of the Government of Bangladesh since the date the government began providing the six traditional EPI vaccines. Initial coverage was limited to some health facilities in the country. By the end of 1989, EPI activities had been expanded to all districts, upazilas, city corporations, and municipalities. Immunization has been one of Bangladesh's greatest public health success stories. It has prevented an estimated 2 million deaths from 1987 to 2000 and continues to prevent approximately 200,000 deaths each year. A further five vaccines have been included in the programme since then. Therefore, ten vaccines are currently provided against 11 vaccine-preventable diseases (Table 1).

Figure 2: History of vaccine introduction in EPI



Bangladesh initiated polio eradication and MNT elimination activities in 1995, and the last case of indigenous Poliomyelitis was detected in Bangladesh in August 2000. In 2006, Bangladesh was further infected with imported poliovirus from India, and the last case of Poliomyelitis was detected on 22 November 2006. Measles elimination activities began with a nationwide measles campaign in 2006. Subsequent measles campaigns were conducted in 2010, followed by measles/rubella vaccine campaigns in 2014 and 2020.

- 1997 - AFP, Measles and NT Surveillance started
- 2004 - Introduction of AD Syringes and safety boxes
- 2008 - Case based measles surveillance introduced
- 2008 - Maintain neonatal tetanus elimination status
- 2014 - The country was certified by WHO as polio-free.
- 2014 - CRS surveillance initiated from 2012 initially from 19 sentinel sites & integrated with AFP & VPDs surveillance
- 2014 - Bangladesh received Polio Free Certificate along with 11 other countries of Southeast Asia
- 2015 - Introduced inactivated polio vaccine (IPV)

- 2017 - HPV demonstration round-2 completed
- 2018 - Achieve control goal of rubella and congenital rubella syndrome.

iSC detail of Bangladesh

The service delivery mechanism for providing EPI services in rural Bangladesh relies on a system of 488 Upazilas, 64 district hospitals, 53 medical college hospitals, specialized hospitals, several private hospitals, 4599 Unions, 13797 Wards, and 110376 sub-blocks within the wards. Each sub-block has an EPI outreach site where routine EPI services are provided monthly for catchments of approximately 1,000 populations. Local health facilities implement the programme under the guidance of the Ministry of Health and Family welfare (MOH&FW). Each sub-block has an EPI outreach site where routine EPI services are provided monthly for a catchment population of approximately 1000-1200 populations. Vaccination in rural wards is provided primarily by the Health Assistant (HA), an employee of the health wing of MOH&FW and is usually assisted by the Family Welfare Assistant (FWA), an employee of the family planning wing of MOH&FW.

The responsibility for providing EPI services in urban areas has been assigned to the Ministry of Local Government and Rural Development (LGRD) in collaboration with NGOs and the private sectors. The large City Corporations have been divided into several zones, which are again subdivided into smaller wards. Other city corporations and municipalities are divided into wards where vaccinations take place according to a pre-planned schedule.

Immunization Schedule

The Expanded Programme on Immunization includes ten vaccines given for two groups: children and women, summarized in table 2 and table 3 below.

Table 1: Routine immunization schedule for children 2021

Vaccines	No of doses	Age of vaccination
Bacillus Calmette Guerin (BCG)	1	After birth
Pentavalent Vaccine (diphtheria, pertussis, tetanus, hepatitis B and haemophilus influenza B)	3	W6, W10, W14
Pneumococcal conjugated vaccine (PCV)	3	W6, W10, W14
Oral polio vaccine (OPV)	3	W6, W10, W14
Inactivated polio vaccine (IPV)	2	W6, W14
Measles-Rubella (MR)	2	9 months & 15 months

Table 2. Immunization schedule for Childbearing Age Women (15-49 years)

Name of Vaccine	No. of Doses	Doses schedule
Tetanus and diphtheria (Td)	Td 1	From 15 years old
	Td 2	At least 1 month after Td 1
	Td 3	At least 6 months after Td 2
	Td 4	At least 1 year after Td 3
	Td 5	At least 1 year after Td 4

These EPI vaccines are delivered through fixed sessions based on an annual EPI micro-plan in 2021 throughout the country's 486 Upazila's Health Complex, 64 district hospitals, 53 medical college hospitals, specialized hospitals, and several private hospitals. Apart from fixed sites, vaccines are delivered through 110376 outreach sessions within the rural wards and 12000 outreach sessions in urban wards and primary health care (PHC) centres, urban health clinics, NGOs, and social organizations per month.

Immunization supply chain management

The vaccines and logistics for the National Expanded Programme on Immunization (EPI) are procured through the government procurement mechanism from manufacturers through the UNICEF supply division. The Government of Bangladesh is responsible for procuring AD syringes and other logistics from local manufacturers through the government procurement mechanism. The MNC&AH programme manages the Expanded Programme on Immunization (EPI) under the Directorate General of Health Services (DGHS), Ministry of Health and Family Welfare.

The EPI programme is responsible for procuring, storing, and distributing vaccines and vaccine commodities and logistics management. The Central EPI vaccine and dry stores in Mohakhali, Dhaka, are managed by the EPI Cold Chain, logistics, and management sections. The district EPI stores are managed by district authority, while Upazila health facilities manage the Upazila health complex vaccine stores. The respective local government authority manages the vaccine and dry stores in urban areas.

Figure 3: Tiers of iSC system of Bangladesh

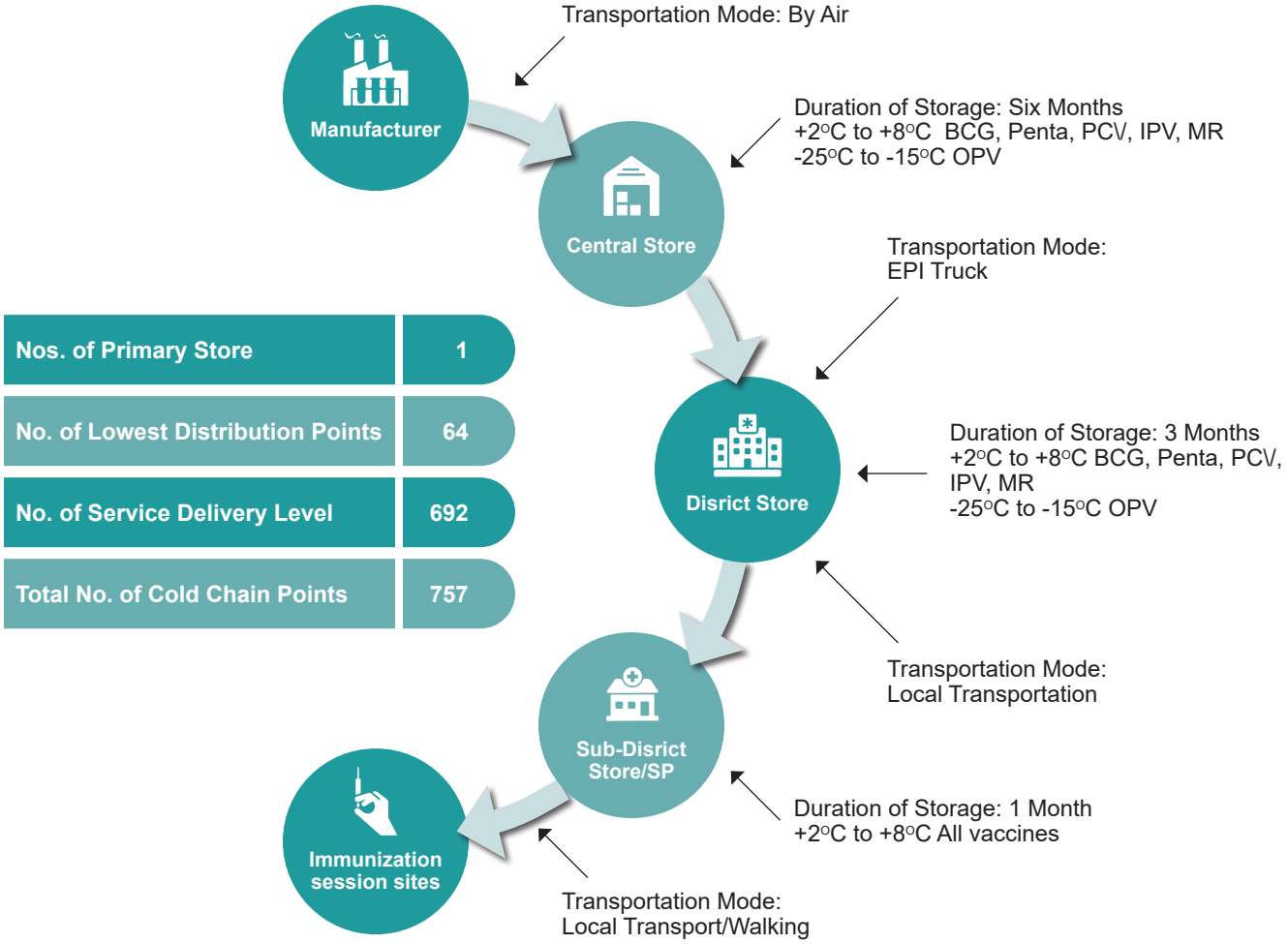
Bangladesh has a three-tier ISC system as follows:

1. **PR level store** is the central EPI vaccine and dry store located in Dhaka, the capital city of Bangladesh. It receives vaccines directly from the vaccine manufacturer through UNICEF Supply Division on a two-monthly basis for all antigens except TT, which is more frequent than international air shipments. Vaccine, ice packs, and cool packs are stored in 24 large cold rooms and 5 freezer rooms of which 1 is repairable.

2. **LD level:** these are the district stores where vaccines are received from the primary store. The lowest delivery level does not provide any immunization services. Central EPI store is responsible to distribute vaccines to the 64 districts, and to Dhaka north city corporation and Dhaka south city corporation, on a quarterly basis, using its own trucks.

3. **SP level:** these are the Upazila health complex (UHC)/ City corporations (CC)/ Zones/municipalities store that collect their vaccines monthly from their corresponding Districts and City Corporations using hired/public transport. Vaccine is stored for a short time in UHCs, CC or Municipality stores before delivery to the target population in vaccine cold boxes or vaccine carriers. More than 90% of vaccinations are administered through outreach programs.

Figure 4: Immunization supply chain levels



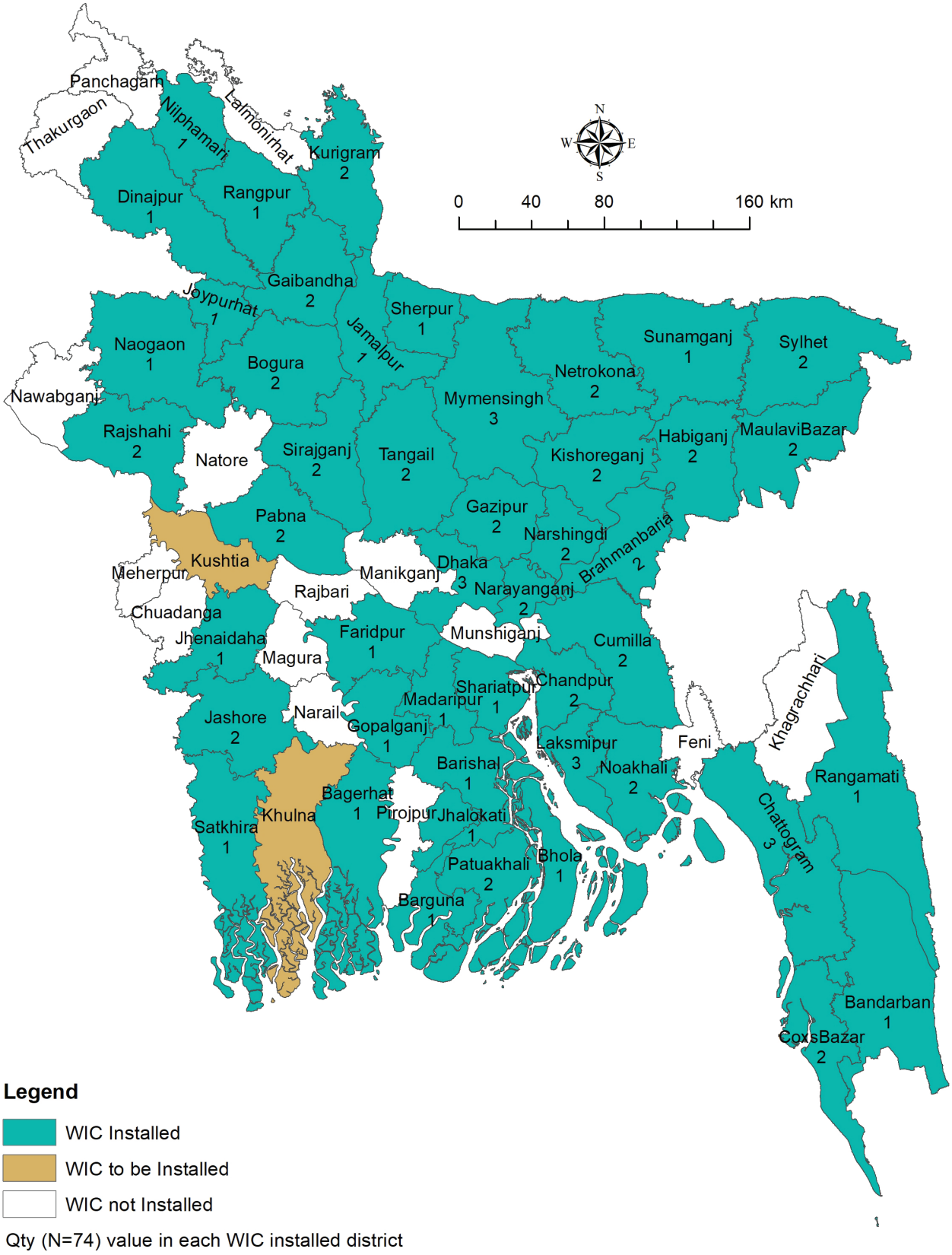
Improvement of the iSC system after 2014 EVM Assessment

Based on the 2014 EVM assessment, recommendation and analysis carried out, the country prioritized deployment of WIC and replace non PQS and CFC, absorption refrigerators and scaled up of storage capacity in districts that required more CCE due to population increase and new vaccine introduction. The country has planned to establish WIC at remaining LDs with assistance from HSS3 and other resources.

Following major improvement made subsequent to the 2014 assessment –

- One Central and 52 District EPI stores were constructed and renovated
- Forty-seven districts were equipped with 74 WIC with a total gross capacity of 790 m^3
- A total of 566 CFC refrigerators were replaced with WHO PQS approved refrigerator
- Twenty-seven new EPI stores expanded at the urban level
- 10,000 Freeze free vaccine carriers and 500 cold boxes supplied at LD and SP level
- Eight WIC (40 m^3 each) and two WIF (30 m^3 each) installed at Central EPI Store
- Introduction of State-of-the-Art Wireless Sensor Systems for Cold Storage Temperature Monitoring
- PQS RTMD was installed to replace non-PQS TMD at Central EPI store, and RTMD was also installed at the LD level for real time temperature monitoring.
- Fridge Tag-2 was introduced at SP level and Freeze Indicator was introduced for the vaccine transportation from SP to EPI outreach session sites
- The country introduced PQS approved Freeze Free vaccine carriers and cold boxes to ensure vaccine quality and safety during transportation and storing of the vaccine at the session sites.
- Four trucks procured for vaccine and logistics transportation
- 1300 bicycles procured and supplied to the porters for the vaccine and logistics transportation at rural immunization outreach sites
- Revised EVM SOP developed and oriented all iSC staffs
- EPI VLMIS and CCEI introduced and implemented through DHIS2 platform at all level of iSC.

Figure 5: Walk-In-Cold room Installation status of Bangladesh



Newly constructed Central EPI store

Newly constructed District EPI store (Naogaon)

Newly installed WIC at Central EPI store

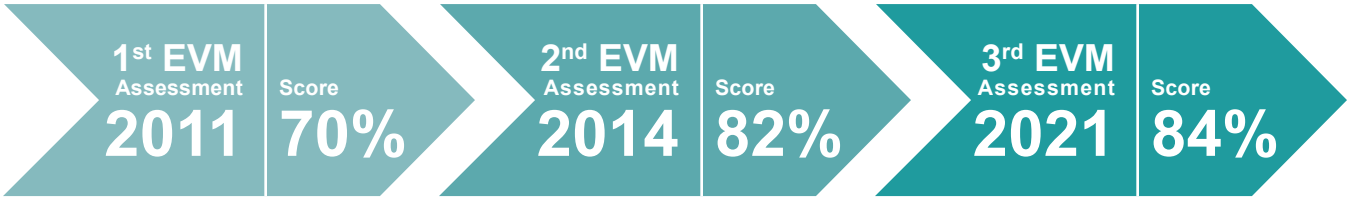
Periodical Effective Vaccine Management Assessments

The Effective Vaccine Management Assessment (EVMA) global tool was developed by the World Health Organization (WHO) and UNICEF to systematically assess and identify strengths and weaknesses in countries' immunization supply chains and to promote the high standard of storage and distribution of vaccines in order to maintain their potency. Country EVM assessment consists of the three stages I) assessing the in-country immunization supply chain using the standard tool, 2) developing improvement plans based on the assessment findings, and III) monitoring implementation of improvement plans. EVMAs are used to systematically analyse the strengths and weaknesses across vaccine supply chains and as supervisory tools to monitor and support the long-term progress of individual facilities and stores.

Bangladesh has conducted EVMAs in 2011, 2014 and 2021.

The scores of the four EVMAs have improved from 52% in the first assessment in 2011 to 82% in the 2014 assessment and 83% in the current 2021 assessment (Figure 6). An area of vaccine management is considered 'effective' if its score is greater than or equal to 80%, which is the EVM standard.

Figure 6: Assessment results from 2011 to 2021



It is important to note that the overall score for the 2021 assessment is not comparable with the overall scores from the two previous EVMAs as more categories were covered by the 2021 assessment. This report presents the findings of the 2021 EVMA, which was carried out in 2021 using the EVM 2.0 tool. This is a paperless online assessment system, which is carried out on tablets and mobile phones.

Previous EVMA 2014 score

	Criteria									
	E1	E2	E3	E4	E5	E6	E7	E8	E9	
	E1: Vaccine arrival	E2: Temperature	E3: Storage capacity	E4: Buildings, equipment, transport	E5: Maintenance	E6: Stock management	E7: Distribution	E8: Vaccine management	E9: MIS, supportive functions	Aggregate Performance by Tier
Primary Store (PR)	82%	48%	93%	77%	85%	79%	81%	88%	77%	79%
District Stores (LD)		89%	94%	84%	66%	83%	67%	94%	86%	83%
Upazila Stores (SP)		95%	100%	90%	67%	80%	56%	94%	88%	84%
Average Performance by Criteria	82%	77%	96%	84%	73%	81%	68%	92%	84%	
Country Overall Performance (%)										82%

Bangladesh has been conducting EVM assessment periodically for strengthening iSC system. Previously two EVM assessments were conducted in 2011 and 2014 using the EVM 1.0 tool. The main recommendations for the 2014 assessment are listed below, as it was described in the 2014 EVMA report, noting that many of these were implemented, as described in the analysis of the findings of the EVMA during 2021.

Key recommendation and status of EVMA 2014

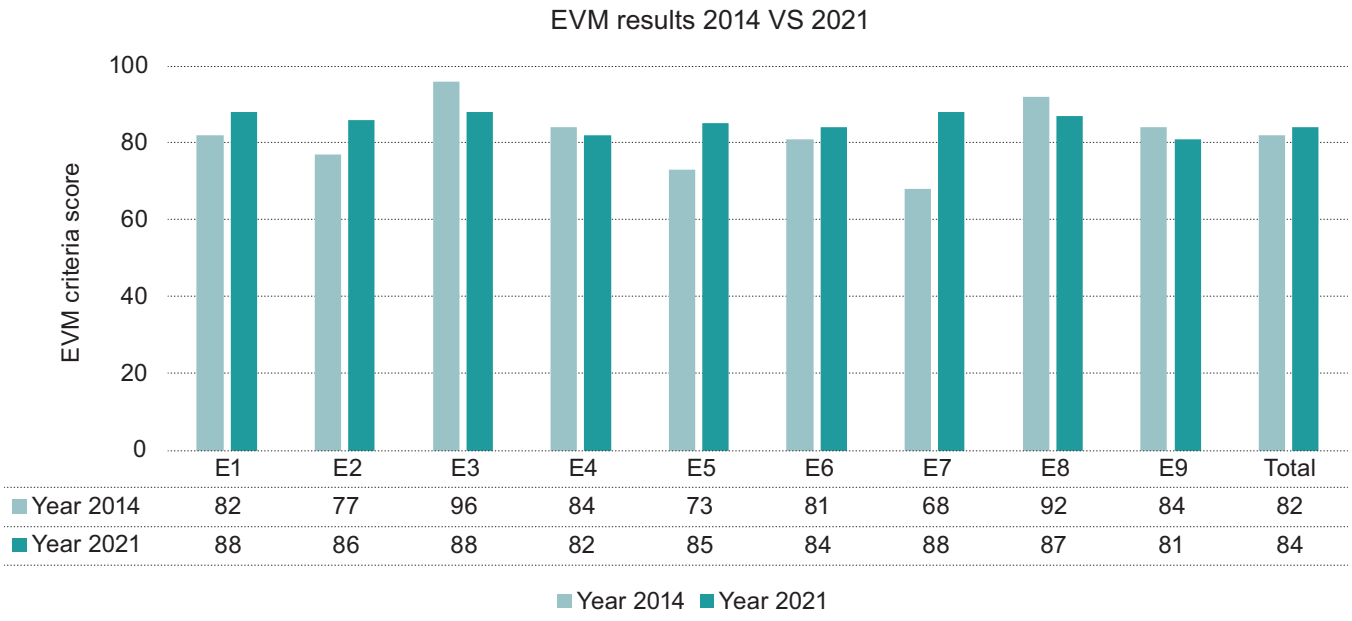
Table 3: Major recommendations of 2014 EVM Assessment

Level	Recommendations	Status	Remarks
PR	Expand the physical infrastructure and Increase storage capacity for vaccines and dry goods at the central store before the introduction of Rotarix scheduled for 2018.	Completed	Dry store capacity partially increased
	Improve temperature monitoring and alarm management, particularly at the central store. (PR)	Completed	
	Improve vaccine stock and dry goods management and reconciliations with stock registers at the central store.	Ongoing	Realtime stock management need to be strengthen
	Embark upon an environmentally responsible waste management plan.	Not done	
	Adopt the cEVM approach and position a manager responsible for the oversight and implementation of the EVM improvement plan with presence at the EPI technical committee as an EVM secretariat.	Completed	
	Revise the guidelines (EVM SOP) and disseminate to all levels	Completed	
	Use EVM SOP to design the training programs	Completed	
	Formally engage maintenance company through a written contract for repair and maintenance of cold rooms at central and district store level	Completed	
	Design three types of training programs (MLM for province level, induction training for new staff and refresher training and conduct trainings as per minimum required schedule (MLM-once 5 years, induction-few batches and refresher – Every 5 years for every HW – several batches annually)	Ongoing	
LD	Equip selected district stores having high target populations with cold rooms and temperature monitoring systems for real time communication of alarms to the central store management.	Completed	
	Embark upon an environmentally responsible waste management plan.	Not done	
	Address systemic weaknesses of preventive maintenance planning and freeze risk to transported vaccines in order to improve criteria performance E5 and E7 which will enable Bangladesh to achieve or exceed the WHO recommended minimum levels of performance in all categories of vaccine management.	Completed	
	Procure, distribute and implement the use of 30 DTR for temperature monitoring at all levels.	Completed	
	Procure Use the freeze indicators for shipments at all levels till the chilled water packs policy is adopted and implemented	Completed	
	Retain the 3 tier supply system by Increasing the storage capacity for vaccines at district stores immediately and provide infrastructure improvements/expansions at some locations.	Completed	

Level	Recommendations	Status	Remarks
SP	Extend the use of cool packs to Upazila stores and use digital freeze indicators for transportation of vaccines to outreach and immunization sessions. (SP)	Completed	Freeze free vaccine carrier introduced
	Supply IT equipment and digitize the data management system initially to district level and progressively to Upazila level and progressively link or integrate this with DHIS2 the nationally adopted health systems information management tool. Data management to include vaccine and dry goods stocks, equipment inventory and storage temperatures.	Completed	Used separate dashboard for temperature monitoring
	Address systemic weaknesses of preventive maintenance planning and freeze risk to transported vaccines in order to improve criteria performance E5 and E7 which will enable Bangladesh to achieve or exceed the WHO recommended minimum levels of performance in all categories of vaccine management.	Completed	
	Embark upon an environmentally responsible waste management plan.	Not done	

EVMA 2014 and 2021 Score

Figure 7: **Criteria results of the EVMA 1.0 (2014) and EVMA 2.0 (2021)**



	E1	E2	E3	E4	E5	E6	E7	E8	E9	Total
Year 2014	82	77	96	84	73	81	68	92	84	82
Year 2021	88	86	88	82	85	84	88	87	81	84

3. Assessment details

Introduction to EVM 2.0

Effective Vaccine Management (EVM) is a national EPI planning process endorsed and supported by WHO and UNICEF to assess and prioritize improvements in the immunization supply chain. The EVM is an assessment tool that sets the standard for vaccine management and immunization supply chain systems. EVM assesses each level of the supply chain:

- *Primary level (PR):* Vaccine stores that receive vaccines directly from an international vaccine manufacturer or distributors or a local vaccine manufacturer. In Bangladesh, EPI Central Store, located at Mohakhali, Dhaka is the primary vaccine store.
- *Sub-national level (SN):* Vaccine stores that receive vaccines from a primary store or higher level sub-national store. Bangladesh has no sub-national store.
- *Lowest distribution level (LD):* Vaccine stores that receive vaccines from a primary level or a sub-national store, and supply vaccine to one or more health facilities. In Bangladesh, the District Stores receive vaccine directly from the PR.
- *Service point level (SP):* Facilities that receive vaccines from any higher-level store and supply immunization services. These are the Upazila health Complexes that receive vaccine from the LD stores.

At the time of writing five of the six stages of Bangladesh's 2021 EVMA shown in Figure 2.1 have been carried out with the data collected, validated, reported (in the current report), and an associated comprehensive improvement plan produced.

Data categories

The EVM Country Manager reviewed and approved the following categories and criteria to be covered by the WHO-EVM secretariat EVM 2.0 app:

- Nine operations categories (E1-E9)
- Four management categories (M1-M4)
- Six vaccine programme management categories (R1-R6)
- Six management functions and outputs and performance.

The EVM assessment criteria and categories are outlined in detail in Annex-3.

Methodology

The EVM manager (Program Manager-EPI) created an EVM account in 2020 for the preparations of EVMA, but due to COVID-19 pandemic, Bangladesh conducted EVMA in 2021. The country manager added administrative units, locations, vaccines, tracers, and immunization supply chain (iSC) parameters into WHO's EVM server to set up the country profile. The method used to obtain a representative sample size was determined by the number of units in the lowest distribution level, after which calculation was made for the sample size required at the desired confidence and precision levels. For Bangladesh, the random site selection method was used with 10% precision and 85% confidence. A total of 72 sites were randomly selected to include PR, 23 LDs and 48 SPs. Then the managers, assessors and observers were recruited and trained on the methodology and interview techniques and other skills to carry out the assessment using the EVMA 2.0 application.

Tool version

The assessment used the EVM 2.0 Tool Version 1.12 in the English language.

Site selection sampling

After many deliberations on 1st September 2021, 72 sites were selected for the 2021 EVMA including the EPI Central Vaccine Store (PR) in Dhaka. The size of the sample of the lowest level of distribution (LD) and service delivery (SP) sites was determined using the automated WHO-UNICEF EVM-2.0 sampling tool. The tool identified 23 lowest level of delivery (LD) and 48 service delivery Points (SP) from amongst the 744 active LD and SP sites in Bangladesh to give a 9.7% site inclusion percentage. Please see Annex 4 for details of all 72 sites and their assessment scores.

Table 4: Sample sites for EVMA

Levels	Sites selected	Sites assessed	Details
Primary (PR) site	1	1	EPI central Vaccine Store, Dhaka
Lowest level of distribution (LD)	23	23	District/Zone vaccine stores
Service delivery points (SPs) 21 21 Health facilities	48	48	Upazila Health Complex, CC Ward, Municipality
Total sites	**72**	**72**	

Site selection

Site selection completion date	01/09/2021
Site selection performed by	EPI-HQ
Confidence	85
Precision	10

No. of SPs per LD	2
Total active locations	744
Total locations selected	72
Total PR	1
Total LD	23
Total SP	48
Location inclusion percentage	9.7%

Preparatory Workshop

EPI in collaboration with WHO and UNICEF organized a preparatory workshop on EVM assessment to finalize the date of national TOT and the date of the training of the field assessors and team leaders and other subsequent activities. The preparatory workshop was held on 1 September 2021 at EPI HQ conference room and finalized the venue, date of training, and field practice.

EVM assessors training

A core group for the national EVM assessments of Bangladesh was formed including members from the EPI HQ, WHO and UNICEF CO as below:

- Dr. Md. Shamsul Haque, Director & Line Director, MNC&AH, DGHS
- Dr. Mowla Baksh Choudhury, DD and PM-EPI
- Dr. Jesmin Ara Khanom, DD, EPI & Surveillance
- Dr. Md. Monjurul Islam, DPM, EPI
- Dr. Tanvir Hossen, DPM, EPI & Surveillance
- Ms. Kohinoor Begum, Training Officer, EPI
- Mr. Mesbahul Haque, Cold Chain Engineer, EPI
- Dr. Jucy Merina Adhikari, Immunization specialist, UNICEF
- Dr. Zahid Hassan, Health Officer, UNICEF
- Md. Jahid Hossen Shahed, Health Officer, UNICEF
- Dr. Rajendra Bohara, Team Leader-IVD, WHO
- Dr. Selina Ahmed, NPO-VSQ, WHO
- Dr. Chiranjit Das, NOP-Immunization, WHO.

- A two-day “Country managers and core group of trainers remote training session” was held on the 12-15th of July, that aimed to build the capacity of country managers in creating and managing assessments on the EVM website and EVM 2.0 Tool.
- Inhouse training on Effective Vaccine Management Assessment 2.0 (EVM) 2021 was held from 17-19 and 23-24 September 2O21 for EVM assessors and supervisors and Team leaders of EPI HQ, WHO and UNICEF.
- Field testing on EVM assessment was conducted by the EVM assessors and supervisors and Team leaders on 25 September 2021 at Dhaka district EPI cold room and dry store (including Tejgaon Thana Health Complex), Narayanganj sadar and zone 5 of Dhaka North City Corporation.
- A discussion meeting was held on 26 September 2021 and feedback was provided on the field test findings and questions.

Data collection

The trained assessors and team leaders were divided into 12 teams who successfully collected the data from all 72 sites on Android tablets. Data collection began on 17 October 2021 and was completed on 31 December.

Locations assessed

	Site selection	Assessed	Difference	% assessed
Total locations	72	72	0	100.0%
Total PR	1	1	0	100.0%
Total LD	23	23	0	100.0%
Total SP	48	48	0	100.0%

Data processing – (cleaning and approval)

The collected data was cleaned and validated. A cleaning and validation workshop was held in the third week of February 2022, where teams of stakeholders cleaned the data and checked it for completeness. This workshop also collected photographs from the data collection exercise to illustrate findings, listed issues for discussion and common agreement, and categorized issues and common findings in terms of strengths, weaknesses, and opportunities (SWOT). The SWOT analysis findings are presented in Chapter 8. The workshop concluded by presenting the draft findings to the EVMA country manager.

Reporting and next steps

After compiling and addressing relevant feedback, the final data set was uploaded onto WHO’s EVM server, the heat maps that are presented in the executive summary and Chapters 4-6 were generated, and the draft report was produced.

4. Primary (PR) level - EPI central vaccine store (86%)

According to the EVM results for the Primary Level (PR), the central EPI vaccine store in Dhaka (Figure 8 & Table 5), the overall score of the EVMA is 86%. Among the nine measured store and facility operation criteria (E1 to E9), eight scored between 84% and 96%, while one scored 79%. These results show a significant improvement since the first EVMA in 2011. And although two of the store and facility management criteria scored 100% (M1 and M2), supervision and performance monitoring (M3 and M4) scored below 80%.

A detailed analysis of each criterion will highlight the strong practices and the areas for improvement. At the end of the analysis, a complete picture of the supply chain system and the main gaps will form the basis of the improvement plan.

Figure 8: **The overall score of the EVMA at the central EPI vaccine store (PR)**

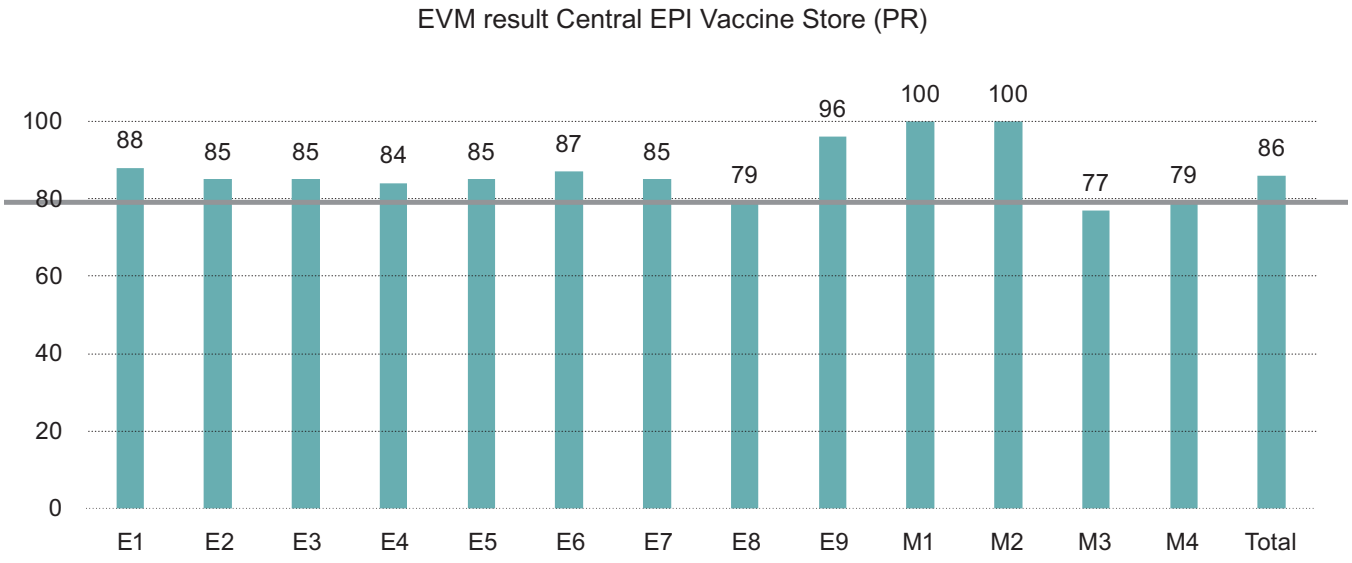


Table 5: **Heat Map presenting the overall EVM criteria and EVM category scores at the central EPI vaccine store**

		Infrastructure	Equipment	Information technology	Human resources	Policies & procedures	Financial resources			TOTAL
		C1	C2	C3	C4	C5	C6	OUTPUT	PERFORMANCE	
Vaccine arrivals	E1			100	50	92		100		88
Temperature management	E2			100	98	100		60	100	85
Storage and transportation capacity	E3	21	90		100	100	100	74		85
Facility infrastructure and equipment	E4	91	68	90			100	79		84
Maintenance and repair	E5			51	100	100	100	67	85	85
Stock management	E6			86	100	100		87	62	87
Distribution of vaccines and dry goods	E7		100	91	60	50	100	98	100	85
Vaccine management	E8				58	100				79
Waste management	E9		75		100		100	50		96
Annual needs forecasting	M1				100	100		100	100	100
Annual work planning	M2				99	100	100	100	100	100
Supportive supervision	M3	100	100	0	100	100	100	83		77
iSC performance monitoring	M4			100	100	100		64		79
TOTAL		86	81	81	89	93	100	78	87	86

2Key: 80%-100% | 50%-80% | Less than 50%

E1 Vaccine arrivals (72%)

The E1 vaccine arrivals criteria are only applicable for assessment at the Centre EPI Vaccine Store site as only this store directly receives vaccines from manufacturers or suppliers through UNICEF Supply Division. These criteria scored 72% because all requirements are not being fulfilled as custom clearance and transit facilities are carried out by central medical stores (CMSD); so, no records were kept at the central EPI store. Vaccine shipments were being inspected and documented according to standard procedures and picked up from the port of entry within 24 hours of arrival. The assessment found that all completed vaccine arrival reports (VARs) were promptly forwarded to the relevant agencies.

Code	Criterion	Score
E1	**Vaccine arrivals**	**72%**
E1.1	Inspection of shipments	100%
E1.2	Customs clearance & transit facilities	0%
E1.3	Transportation from port of entry to primary store	100%

Recommendation:

- E1 - A copy of all documents after customs clearance needs to be maintained at the central EPI store.
- PAR should be completed and documented for each syringe shipment.

C3 Information technology (100%)

C3.2 Data management technology (100%)

Code	Requirement	Score
R0137	The vaccine arrival report (VAR) has all of the required data fields.	100%
R0145	The product arrival report (PAR) has all of the required data fields.	100%

C4 Human resources (50%)

C4.1 Staffing (0%)

Code	Requirement	Score
R0237	C4.1 Staffing - Two or more members of staff are able to inspect vaccine shipments.	0%
R0258	Training - Responsible staff are trained how to inspect vaccine shipments.	100%

At least two staff should be available to manage vaccine arrival inspection and documentation at the central EPI vaccine store.

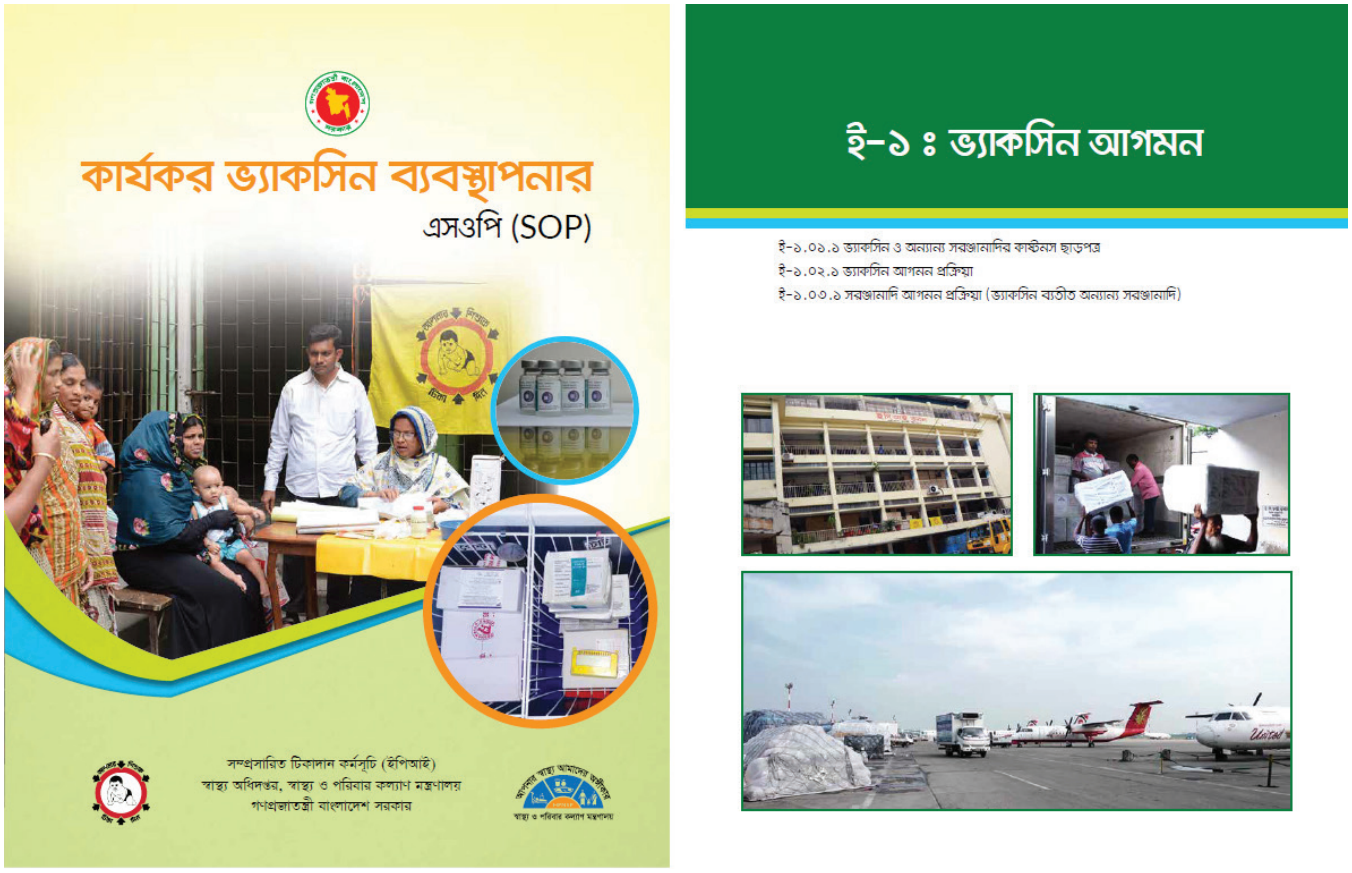
C5 Policies & procedures (55%)

C5.3 SOPs (100%) and C5.4 Contracts (40%)

The Central Vaccine Store has the Standard Operating Procedures (SOPs) and has the iSC performance monitoring guidance materials for managers.

Code	Requirement	Score
R0303	The facility has iSC performance monitoring guidance materials for managers staff.	100%
R0348	There is an MoU with the government department or agency that transports vaccine from the port of entry to the national store specifying working arrangements.	100%
R0331	There is an MoU with the port of entry authorities specifying working arrangements.	20%
R0338	The customs clearance contract includes all required clauses.	0%

Figure 9: EVM SOP



Recommendations: EPI should get a copy of the MoU, customs clearance contract from the CMSD or relevant service providers.

O Output (92%)

Code	Requirement	Score
R0411	Vaccine shipments are inspected and documented according to standard procedures.	100%
R0433	Vaccine shipments are picked up from the port of entry within 24 hours.	100%
R0417	Vaccine arrivals reports are well organised and secure.	100%
R0420	Completed VARs are forwarded to the relevant agencies in a timely manner.	100%
R0428	Customs clearance performance is monitored.	0%

E2 Temperature management (84%)

Computerized RTMD real-time data were downloaded monthly and were preserved at the national store. Generated data were reviewed, and the results were kept secure for three years. Bangladesh used an online real-time dashboard for temperature monitoring of all WICs and WIFs at the central EPI store. Based on these findings, the overall scores on temperature management at the primary level are 84%, and temperature management in storage is 88%.

The temperature mapping of any cold room and freezer room at the Central EPI Vaccine Store was not conducted in any time between 2014 and 2021. However, the records of the RTMD show that the temperature inside the cold room and freezer room was found to be within the acceptable range, and all the cold and freezer rooms were safe to store vaccines.

Code	Criterion	Score
E2	**Temperature management**	**84%**
E2.1	Temperature management in storage	88%
E2.2	Temperature management during transportation	50%

Recommendations:

- Temperature mapping should be done immediately for all the cold rooms and freezer rooms at the central EPI stores.
- Freeze indicators should be used during vaccine transportation of any freeze sensitive vaccines.

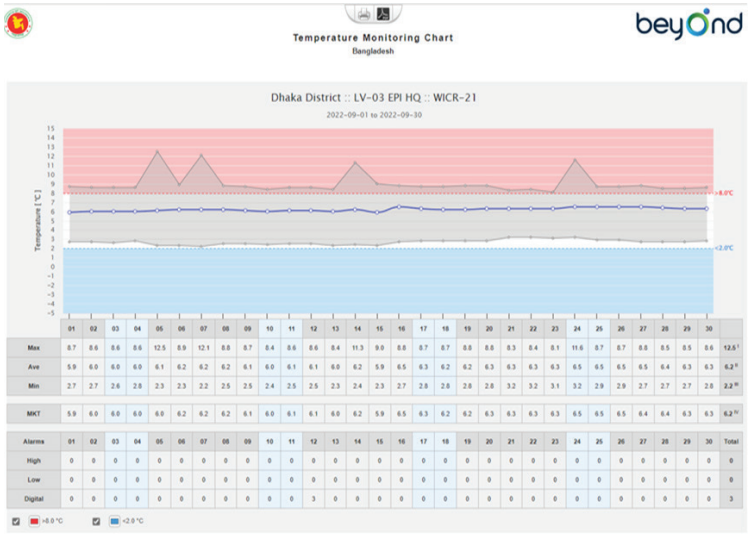
C3 Information technology (100%)

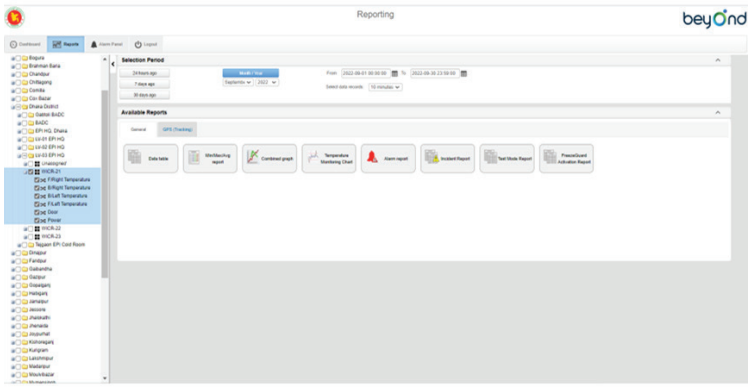
C3.2 Data management technology (100%)

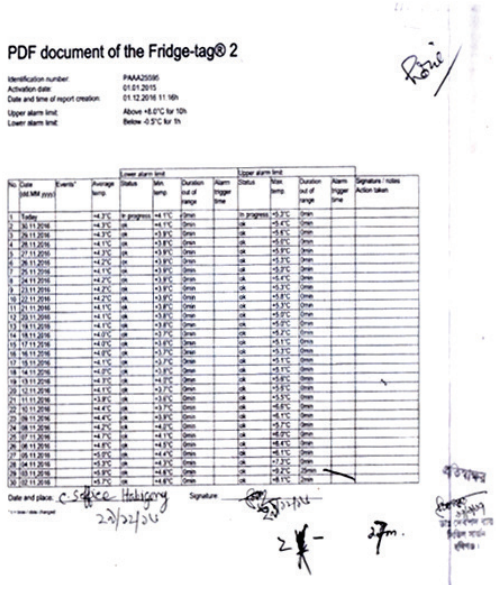
Code	Requirement	Score
R0152	The vaccine storage manual temperature monitoring form meets minimum requirements.	100%

Code	Requirement	Score
R0157	The facility's cold/freezer rooms are monitored by a computerised temperature monitoring system.	100%
R0158	The computerised temperature monitoring system meets minimum requirements.	100%
R0164	Cold/freezer rooms have backup temperature monitoring device.	100%

Figure 10: RTMD used in country







C4 Human resources (96%)

C4.1 Staffing (100%)

Code	Requirement	Score
R0238	Adequate staff are assigned to monitor vaccine temperatures.	100%

C4.2 Training (100%)

Code	Requirement	Score
R0259	Responsible staff are trained how to monitor vaccine temperatures.	100%

C4.3 Knowledge & understanding (88%)

Code	Requirement	Score
R0268	Responsible staff are knowledgeable of key principles and procedures of temperature monitoring.	88%

C5 Policies & procedures (100%)

Bangladesh developed EVM SOP in 2018 and completed training of all iSC staff by December 2018.

C5.3 SOPs (100%)

Code	Requirement	Score
R0304	The facility has SOPs for temperature mapping of cold/freezer rooms.	100%
R0305	The facility has SOPs for vaccine temperature monitoring in storage.	100%

O Output (60%)

Code	Requirement	Score
R0442	Vaccine storage temperatures are systematically monitored.	100%
R0449	Temperature records are well organised and secure.	100%
R0462	Vaccine transportation temperatures are systematically monitored.	100%
R0439	Vaccine cold/freezer rooms are temperature mapped.	0%
R0459	Freeze indicators are correctly packed with freeze-sensitive vaccine when there is a risk of freezing.	0%

Recommendations:

- Temperature mapping should be done immediately for all the cold and freezer rooms at the central EPI stores.
- Freeze indicators should be used during vaccine transportation of any freeze sensitive vaccines.

P Performance (100%)

Code	Requirement	Score
R0457	Vaccines are not exposed to damaging high temperatures during storage.	100%
R0458	Vaccines are not exposed to damaging low temperatures during storage.	100%

Recommendations:

EVM SOP should be revised to include job aid for iSC staff, temperature mapping, and use of Freeze indicators with freeze-sensitive vaccine during transportation.

E3 Storage and transportation capacity (85%)

Code	Criterion	Score
E3	**Storage and transportation capacity**	**85%**
E3.1	Capacity of infrastructure and equipment	76%
E3.2	Utilisation of available capacity	74%

C1 Infrastructure (21%)

Currently, the central EPI store does not have sufficient dry goods storage capacity to accommodate the expected maximum stock levels of diluents, syringes, and safety boxes. Currently, EPI stores dry logistics in open spaces and stairs exposed to sun and rain, causing logistics wastage.

Recommendation:

The newly constructed EPI building can be extended vertically. This will provide an additional 1400M^3 of dry storage space. However, this will not also resolve the dry goods storage capacity shortage. Therefore, EPI would be looking for space/land to construct a start-of-the-art dry store with a minimum gross volume of 8000m^3. Alternatively, EPI may also decide to demolish an old (circa: 1960s) building to construct a high-rise dry store and office building.

C1.2 Buildings & facilities (21%)

Code	Requirement	Score
R0028	The facility has sufficient dry goods storage capacity to accommodate the expected maximum stock levels of diluents, syringes and safety boxes.	21%

C2 Equipment (90%)

C2.1 Storage equipment (80%)

According to the EVM assessment 2021, the central EPI store does not have sufficient cold storage capacity to accommodate the expected maximum stock levels of vaccines and diluents. However, this shortage can be covered by newly procured WICs through COVAX facilities.

Code	Requirement	Score
R0073	The facility has sufficient coolant pack storage capacity to accommodate the expected maximum daily demand for coolant packs.	100%
R0039	The facility has sufficient cold storage capacity to accommodate the expected maximum stock levels of vaccines and diluents.	60%

C2.2 Transportation equipment (100%)

Code	Requirement	Score
R0078	The facility's vaccine transportation vehicles have sufficient capacity to accommodate the expected maximum load of vaccines and dry goods.	100%
R0096	The facility's insulated containers have sufficient capacity to accommodate the expected maximum load of vaccines.	100%

C4 Human resources (100%)

The facility has a shortage of iSC staff to carry out the routine vaccine and logistics management duties. The store manager, logistics officer, two storekeepers, and MIS officer have been lying vacant.

C4.3 Knowledge & understanding (100%)

Code	Requirement	Score
R0272	Responsible staff are knowledgeable of key principles and procedures of vaccine & dry goods storage.	100%

Recommendation

- The facility should recruit staffs for all the vacant positions at the EPI central store.

C5 Policies & procedures (100%)

C5.3 SOPs (100%)

Code	Requirement	Score
R0307	The facility has SOPs for vaccine storage.	100%
R0308	The facility has a vaccine storage emergency contingency plan.	100%

C6 Financial resources (100%)

C6.2 Funds for operations (100%)

Code	Requirement	Score
R0383	Facility funds budgeted for storage are received in full and on time.	100%
R0386	Facility funds received for storage are sufficient.	100%

O Output (74%)

Code	Requirement	Score
R0482	Vaccines are stored safely.	96%
R0501	Dry goods are stored safely.	72%
R0489	Vaccine stocks are well organized.	54%

Recommendation

- Vaccine stock should be kept by lot and expiry date as per EVM SOP.
- Train the newly recruited officers and staff of the vaccine stores on EVM SOP.

E4 Facility infrastructure and equipment (84%)

The quality of infrastructure and equipment scored 84%. However, the assessment found room for improvement in the Quality of equipment.

Code	Criterion	Score
E4	**Facility infrastructure and equipment**	**84%**
E4.1	Quality of infrastructure	86%
E4.2	Quality of equipment	73%

C1 Infrastructure (91%)

C1.1 Utilities & services (95%)

Code	Requirement	Score
R0005	The facility receives at least eight hours of grid electricity each day.	100%
R0007	The facility has access to water, sanitation and hygiene service (WASH).	100%
R0001	The facility has functional means of communication.	86%

C1.2 Buildings & facilities (89%)

Code	Requirement	Score
R0014	The facility is secure.	100%
R0019	Cold stores meet minimum requirements.	100%
R0029	Packing and loading area(s) areas meet minimum requirements.	100%
R0034	Storage buildings have fire alarm systems.	100%
R0037	Storage buildings have functional certified fire extinguishers.	100%
R0038	Buildings have guttering and drainage for rainwater.	100%
R0022	Dry stores meet minimum requirements.	68%
R0011	The store manager's office meets minimum requirements.	50%

Recommendation

- Recommendation regarding the dry storage mentioned above.
- New building recommendation mentioned above.

C2 Equipment (68%)

C2.1 Storage equipment (63%)

Code	Requirement	Score
R0043	The facility's vaccine cold storage equipment is appropriate for the expected maximum vaccine stock volume.	100%
R0046	Vaccine cold/freezer rooms meet minimum requirements.	88%
R0074	A warm coat is available for working in cold/freezer rooms.	0%

Recommendation

- Cold liveries, safety and personal protective equipment for cold and freezer rooms should be provided once a year.

C2.2 Transportation equipment (75%)

Code	Requirement	Score
R0095	Insulated containers comply with WHO or national specifications.	100%
R0079	Vaccine transportation vehicles meet minimum Road Safety Requirements.	50%

C3 Information technology (90%)

C3.1 General IT equipment (90%)

Code	Requirement	Score
R0135	The facility has an operational printer.	100%
R0136	iSC staff have work mobile phones.	100%
R0131	The facility has a suitable computer.	72%

C6 Financial resources (100%)

C6.2 Funds for operations (100%)

Code	Requirement	Score
R0363	Funds budgeted for fuel for the generator are received in full and on time.	100%
R0366	Funds received for fuel for the generator are sufficient.	100%

O Output (79%)

Code	Requirement	Score
R0473	The facility uses a computer to support supply chain operations.	100%
R0474	The facility WASH services are fully operational.	100%

Code	Requirement	Score
R0478	The facility buildings are clean and dry.	5/5
R0479	The facility equipment are clean and dry.	100%
R0475	The facility buildings layout and space are well arranged/organized.	50%
R0472	The facility uses reliable means of communication for supply chain operations.	24%

E5 Maintenance and repair (85%)

An overall assessment score of 85% was achieved for maintenance and repair at the primary level store. It was noted that the maintenance and repair of vehicles needed improvement.

Code	Criterion	Score
E5	**Maintenance and repair**	**85%**
E5.1	Maintenance & repair of buildings	86%
E5.2	Maintenance & repair of Cold Chain equipment	84%
E5.3	Maintenance & repair of vehicles	63%

C3 Information technology (51%)

C3.2 Data management technology (51%)

Code	Requirement	Score
R0172	The facility has an inventory of Cold Chain equipment.	54%
R0178	The facility has an inventory of vaccine transportation vehicles.	40%

Recommendation

- Develop physical inventory for the insulated container and generator.

C4 Human resources (100%)

C4.1 Staffing (100%)

Code	Requirement	Score
R0239	At least one staff is assigned to carry out routine refrigeration maintenance tasks.	100%
R0240	At least one staff is assigned to maintain an inventory of Cold Chain equipment.	100%
R0243	Refrigeration technicians or services are available to maintain and repair Cold Chain equipment.	100%

Recommendation:

- Vacant posts should be filled at the earliest.

C4.2 Training (100%)

Code	Requirement	Score
R0260	Responsible staff are trained in routine refrigeration maintenance.	100%
R0261	Responsible staff are trained to maintain an inventory of Cold Chain equipment.	100%

C5 Policies & procedures (100%)

C5.3 SOPs (100%)

Code	Requirement	Score
R0309	The facility has SOPs/guidelines for routine maintenance of refrigeration equipment.	100%
R0310	The facility has SOPs/guidelines for maintaining a Cold Chain equipment inventory.	100%

C6 Financial resources (100%)

C6.2 Funds for operations (100%)

Code	Requirement	Score
R0387	Facility funds budgeted for maintenance of buildings are received in full and on time.	100%
R0390	Facility funds received for maintenance of buildings are sufficient.	100%
R0391	Facility funds budgeted for maintenance of Cold Chain equipment are received in full and on time.	100%
R0394	Facility funds received for maintenance of Cold Chain equipment are sufficient.	100%
R0395	Facility funds budgeted for maintenance of vehicles are received in full and on time.	100%
R0398	Facility funds received for maintenance of vehicles are sufficient.	100%

O Output (67%)

Code	Requirement	Score
R0518	Generator repair work is carried out promptly.	100%
R0545	Cold Chain equipment repair work is carried out promptly.	100%
R0556	The facility maintains an up-to-date inventory of its vaccine transportation vehicles.	100%
R0507	Visual evidence shows that buildings are maintained.	66%
R0519	Cold Chain equipment is maintained according to a documented schedule.	66%
R0526	The facility maintains an up-to-date inventory of its Cold Chain equipment.	66%
R0523	The facility follows a standard fault reporting procedure for Cold Chain equipment.	60%

Code	Requirement	Score
R0549	The facility's vehicles are maintained according to a documented schedule.	0%
R0505	Preventive maintenance work on buildings is recorded.	0%
R0553	The facility follows a standard vehicle fault reporting procedure.	0%

Recommendation

- Keep the building maintenance record for three years at central EPI
- The building condition is damaged as this is an old building. New building construction is recommended above. As an interim measurement, this building should be renovated and repaired.
- CCE preventive maintenance work carried out regularly however the preventive schedule was not maintained. To maintain the schedule, EPI should maintain a schedule logbook.
- Also, improve the preventive maintenance for the cold/freezer rooms by developing a documented preventive maintenance checklist that includes all the activities with specific timelines, train the responsible staff on how to conduct these preventive maintenance activities, and ensure proper documentation is carried out.
- WICs and WIFs should be included in the online Cold Chain inventory and update the status regularly.
- EPI should develop a documented procedure for the CCE fault reporting.
- Due to vacant position of technicians', non-availability of spare parts and funds, the facility's vehicles are not well maintained, and there is no documented schedule for vehicle maintenance. Explore outsourcing the repair maintenance if it is not possible to be carried out by the technicians. In addition, ensure sufficient funds available to cover the expenses of repair maintenance and spare parts. The delay in repair maintenance may lead to interruption of the vaccine transportation.

P Performance (85%)

Code	Requirement	Score
R0517	The generator is maintained fully functional.	100%
R0560	Vehicles are maintained fully functional.	100%
R0506	The delivery and quality of building maintenance work meets facility requirement.	94%
R0561	Vaccine transportation vehicles are maintained in good physical condition.	90%
R0535	Cold Chain equipment is maintained in good physical condition.	80%
R0530	Cold Chain equipment is maintained fully functional.	48%

E6 Stock management (87%)

A score of 87% was achieved for stock management at the Central EPI Vaccine Store. The assessment found very good stock management on the release and dispatch of vaccines and on managing returns and damaged and expired vaccines. Still, stock replenishment needs improvement as it scored only 42%.

Code	Criterion	Score
E6	**Stock management**	**87%**
E6.1	Replenishment	42%
E6.3	Inventory management	82%
E6.4	Release and dispatch	100%
E6.5	Managing returns, damaged and expired stock	100%

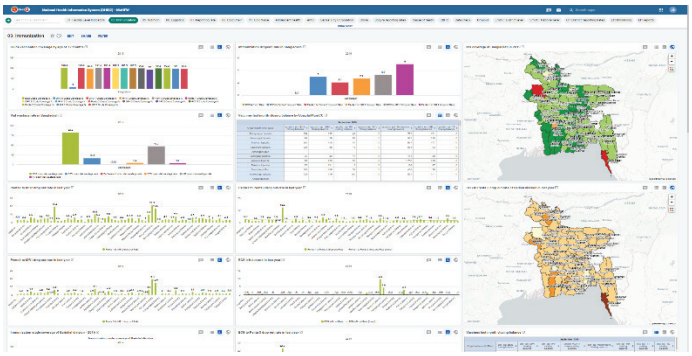
C3 Information technology (86%)

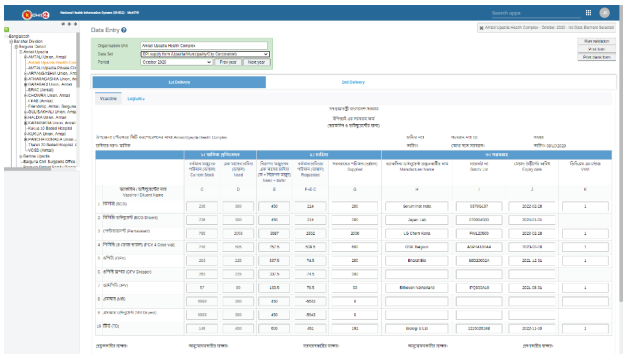
C3.2 Data management technology (86%)

The Central EPI Vaccine Store had an online vaccine and logistics management system (VLMIS) in DHIS2, covering most of the minimum requirements for supplying vaccines and logistics. However, the system could not generate any stock alerts.

Code	Requirement	Score
R0196	The vaccine issue form has all of the required fields.	100%
R0213	The facility has a computerised vaccine stock management system.	100%
R0214	The computerised vaccine stock management system meets minimum requirements	76%
R0179	The vaccine stock record form has all of the required fields.	68%

Figure 11: VLMIS





Recommendation

- Introduce an integrated vaccine and logistics stock management system (preferably WEB based Stock Management Tool or Blockchain-based stock management system).
- Include maximum stock level for both vaccine and AD syringes in the existing stock management system.
- The stock management system should include the options for recording reasons for unopened vial wastage.

C4 Human resources (100%)

C4.1 Staffing (100%)

Code	Requirement	Score
R0245	Two or more members of staff are assigned to manage vaccine stocks.	100%

C4.2 Training (100%)

Code	Requirement	Score
R0262	Responsible staff are trained in vaccine stock management.	100%

C4.3 Knowledge & understanding (100%)

Code	Requirement	Score
R0274	Responsible staff are knowledgeable of key principles and procedures of vaccine stock management.	100%

C5 Policies & procedures (100%)

C5.3 SOPs (100%)

Code	Requirement	Score
R0311	The facility has SOPs for managing vaccine stock transactions.	100%
R0312	The facility has SOPs for using VVMs.	100%

O Output (87%)

Code	Requirement	Score
R0584	Vaccine stock records are complete.	100%
R0591	Physical vaccine stock counts are conducted regularly.	100%
R0592	Vaccine issues are complete and documented.	100%
R0599	Reasons for vaccine losses are recorded.	100%
R0587	Vaccine stock records are well organized and secure.	100%
R0567	Stock levels are documented for all vaccines.	50%
R0570	Stock levels are documented for all dry goods.	0%

Recommendation

- Maximum stock levels recommended to be included in the stock management system.

P Performance (62%)

Code	Requirement	Score
R0601	Vaccine and diluent stock records are accurate.	76%
R0600	Vaccine and diluent stock levels match.	50%

Recommendation

- Follow EVM SOP guidelines for vaccine and diluent management at the central EPI vaccine store.

E7 Distribution of vaccines and dry goods (85%)

Code	Criterion	Score
E7	**Distribution of vaccines and dry goods**	**85%**
E7.1	Distribution planning	91%
E7.2	Transportation of vaccines	100%

Recommendation

- Develop a route map for the vaccine and logistics distribution.

C2 Equipment (100%)

C2.2 Transportation equipment (100%)

Code	Requirement	Score
R0077	Transport is available for scheduled vaccine distribution, collection or outreach.	100%

C3 Information technology (91%)

C3.2 Data management technology (91%)

Code	Requirement	Score
R0219	Vaccine transportation vehicles management meets minimum fleet management requirements.	92%

C4 Human resources (60%)

C4.1 Staffing (50%)

Code	Requirement	Score
R0246	Two or more members of staff are assigned to carry out vaccine distribution tasks.	50%

Recommendation for recruiting iSC staff mentioned above

C4.2 Training (67%)

Code	Requirement	Score
R0263	Responsible staff are trained how to carry out vaccine distribution tasks.	66%

Recommendation

- Vaccine handlers and drivers should be trained periodically on vaccine loading, unloading, and preventive measures during transportation.
- This part should be included in the revised EVM SOP.

C4.3 Knowledge & understanding (65%)

Code	Requirement	Score
R0277	Responsible staff are knowledgeable of key principles and procedures of vaccine distribution.	64%

Recommendation

- Periodical refresher training on contingency plan plans for vehicle breakdown and any other transport emergency need to be provided.
- Supportive supervision and mentoring support need to be strengthened on key principles of vaccine distribution.

C5 Policies & procedures (50%)

C5.3 SOPs (50%)

Code	Requirement	Score
R0313	The facility has required SOPs/guidelines for vaccine distribution planning.	100%
R0319	Vaccine transportation vehicles have vaccine transport emergency contingency plans.	0%

Recommendation

- Develop SOP for vehicle management through the expert agency on fleet management
- Conduct training on vaccine transport management and SOP once a year for the drivers, helpers, supervisors, and vaccine handlers

C6 Financial resources (100%)

C6.2 Funds for operations (100%)

Code	Requirement	Score
R0359	Funds budgeted for fuel for vehicles are received in full and on time.	100%
R0362	Funds received for fuel for vehicles are sufficient.	100%

Code	Requirement	Score
R0399	Facility funds budgeted for vaccine transportation or outreach are received in full and on time.	100%
R0402	Facility funds received for vaccine transportation or outreach are sufficient.	100%

O Output (98%)

Code	Requirement	Score
R0614	Insulated containers are packed according to the manufacturer's guidelines or SOPs.	100%
R0615	Coolant packs are prepared and used according to standard procedures.	100%
R0626	Vaccine transportation trips are recorded	100%
R0611	Insulated containers and coolant packs are stored in permanently shaded areas.	100%
R0604	The facility has a documented vaccine distribution plan.	92%

P Performance (100%)

Code	Requirement	Score
R0629	All scheduled vaccine distributions take place as scheduled.	100%

E8 Vaccine management (79%)

C4 Human resources (58%)

C4.3 Knowledge & understanding (58%)

Code	Requirement	Score
R0286	Responsible staff are knowledgeable of key principles and procedures of vaccine management.	58%

Recommendation for refresher training mentioned above.

C5 Policies & procedures (100%)

C5.3 SOPs (100%)

Code	Requirement	Score
R0320	The facility has the required SOPs/guidelines for vaccine management.	100%

E9 Waste management (96%)

Waste management assessment at the central level scored 96%. But there are no SOPs or guidelines on immunization waste management such as bulk vaccine wastage, non-usable icepacks, cardboards, tertiary packages of vaccines, etc.

Code	Criterion	Score
E9	**Waste management**	**96%**
E9.2	Storage of immunization waste	50%

Recommendation

- Develop and implement the waste management SOP following WHO guidelines for the Central level.
- Develop and implement the waste management format for documentation.

C2 Equipment (75%)

There were no suitable facilities and equipment for storing waste at the Central EPI Store. Expired vaccines and damaged packing materials were not stored properly.

C2.3 Other equipment (75%)

Code	Requirement	Score
R0125	There are suitable facilities and equipment for storing waste.	80%

Recommendation

- Provide equipment for the waste management at the central level.
- MoU with third party agency for waste disposal.
- Provision of waste management fund through GoB OP or Partners.

C4 Human resources (100%)

C4.3 Knowledge & understanding (100%)

Code	Requirement	Score
R0294	Responsible staff are aware of key principles and procedures of immunization waste management.	100%

C6 Financial resources (100%)

C6.2 Funds for operations (100%)

Code	Requirement	Score
R0403	Facility funds budgeted for waste management are received in full and on time.	100%
R0406	Facility funds received for waste management are sufficient.	100%

O Output (50%)

Waste was often not removed from the central store and there was no schedule for waste disposal. There were huge piles of tertiary vaccines and dry goods packs in different corner of central EPI store.

Code	Requirement	Score
R0656	Waste is removed from the facility frequently.	50%

M1 Annual needs forecasting (100%)

C4 Human resources (100%)

C4.1 Staffing (100%)

Code	Requirement	Score
R0232	At least one member of staff is responsible for forecasting vaccine and dry goods needs.	100%

C4.2 Training (100%)

Code	Requirement	Score
R0252	Responsible staff are trained how to forecast vaccine and dry goods needs.	100%

C5 Policies & procedures (100%)

C5.3 SOPs (100%)

Code	Requirement	Score
R0299	The facility has vaccine and dry goods needs forecasting guidance materials for managers.	100%

O Output (100%)

Code	Requirement	Score
R0659	The facility has vaccine needs forecasts for all vaccines for the current year.	100%
R0660	The facility has dry goods needs forecasts for the current year.	100%

Code	Requirement	Score
R0661	The facility uses a standard method to forecast its vaccine needs.	100%

P Performance (100%)

Code	Requirement	Score
R0662	The facility's vaccine needs forecasts are accurate.	100%

M2 Annual work planning (100%)

C4 Human resources (99%)

C4.1 Staffing (98%)

Code	Requirement	Score
R0233	At least one member of staff is responsible for annual work planning.	100%
R0251	The turnover of iSC facility staff is low.	90%

C4.2 Training (100%)

Code	Requirement	Score
R0253	Responsible staff are trained in annual work planning.	100%

C5 Policies & procedures (100%)

C5.3 SOPs (100%)

Code	Requirement	Score
R0300	The facility has annual work planning guidance materials for managers.	100%

C6 Financial resources (100%)

C6.1 Salaries (100%)

Code	Requirement	Score
R0355	Funds for staff salaries are received in full and on time.	100%
R0358	Staff are paid in full and on time.	100%

C6.2 Funds for operations (100%)

Code	Requirement	Score
R0367	Funds budgeted for electricity are received in full and on time.	100%
R0370	Funds received for electricity are sufficient.	100%

Code	Requirement	Score
R0371	Funds budgeted for the internet connection are received in full and on time.	100%
R0374	Funds received for the internet connection are sufficient.	100%
R0375	Funds budgeted for the mobile reception are received in full and on time.	100%
R0378	Funds received for the mobile reception are sufficient.	100%

O Output (100%)

Code	Requirement	Score
R0663	The facility has a budgeted annual work plan.	100%
R0666	The facility monitors the implementation status of the work plan activities.	100%
R0668	The facility records its income and expenditure.	100%

P Performance (100%)

Code	Requirement	Score
R0667	Implementation of the annual work plan is on schedule.	100%

M3 Supportive supervision (77%)

The overall score for the supportive supervision criterion achieved was 77%. There is a reliable supply of fuel for vehicles, and transport is available for supervisory visits. But there is no standard supervision checklist used by the central level.

It is important to mention that the Central EPI store did not receive any supervisory visit with in the past 12 months of the assessment date, while it should receive at least four visits annually.

C1 Infrastructure (100%)

C1.1 Utilities & services (100%)

Code	Requirement	Score
R0006	There is a reliable supply of fuel for vehicles for supervision visits.	100%

C2 Equipment (100%)

C2.2 Transportation equipment (100%)

Code	Requirement	Score
R0076	Transport is always available for scheduled supervision visits.	100%

C3 Information technology (0%)

C3.2 Data management technology (0%)

Code	Requirement	Score
R0223	Supervisors use a standard supervision checklist.	0%
R0224	The supervision checklist covers key areas of vaccine management.	0%

Recommendation

- Develop standardised supervision checklist for iSC key performance.
- Develop supervision app/ ODK based tool.

C4 Human resources (100%)

C4.2 Training (100%)

Code	Requirement	Score
R0254	Supervisors are trained in supportive supervision.	100%

C5 Policies & procedures (100%)

C5.3 SOPs (100%)

Code	Requirement	Score
R0301	The facility has supportive supervision guidance materials for supervisors.	100%

C6 Financial resources (100%)

C6.2 Funds for operations (100%)

Code	Requirement	Score
R0407	Facility funds budgeted for supportive supervision are received in full and on time.	100%
R0410	Facility funds received for supportive supervision are sufficient.	100%

O Output (83%)

Code	Requirement	Score
R0669	Supervisory visits are arranged according to a fixed schedule.	100%
R0671	All scheduled visits take place.	100%
R0670	Supervisors maintain a record of visits and findings.	80%
R0672	Staff receive feedback from supervisors.	50%

M4 iSC performance monitoring (79%)

C3 Information technology (100%)

C3.2 Data management technology (100%)

Code	Requirement	Score
R0230	The reporting form includes essential supply chain data.	100%
R0231	The facility monitors reporting rates.	100%

C4 Human resources (100%)

C4.1 Staffing (100%)

Code	Requirement	Score
R0234	There are enough staff able to carry out iSC performance monitoring tasks.	100%

C4.2 Training (100%)

Code	Requirement	Score
R0255	Responsible staff are trained how to carry out ISC performance monitoring tasks.	100%

C5 Policies & procedures (100%)

C5.3 SOPs (100%)

Code	Requirement	Score
R0302	The facility has iSC performance monitoring guidance materials for managers.	100%
R0329	The SOPs are written in a local language.	100%
R0330	The SOPs are up-to-date.	100%

O Output (64%)

The administrative unit monitors temperature alarm rates of its lower facilities for 47 Districts where WIC and RTMD have been installed. Out of remaining 17 districts, the MoH has planned to install WIC in 11 Districts along with RTMD by 2022 and in six Districts only RTMD will be installed for the ILRs and Deep Freezers. The vaccine forecast system is in place, however the system needs to be strengthened at MoH. The iSC KPIs are in existence sporadically in a vertical manner. However, this should be oriented and disseminated among the users and managers, and it should be practiced systematically for informed policy decisions.

Code	Requirement	Score
R0675	The facility monitors its temperature alarm rates.	100%
R0680	The facility monitors the functionality of its Cold Chain equipment.	100%
R0684	The administrative unit monitors functionality of Cold Chain equipment of its lower facilities	100%
R0685	The facility monitors its vaccine stock status indicators	100%
R0689	The administrative unit monitors vaccine stock status indicators of its lower facilities	100%
R0693	The facility monitors its unopened vial wastage rates.	100%
R0700	Reporting facilities report on time and in full.	100%
R0690	The facility monitors its order timeliness and fill rates.	50%
R0679	The administrative unit monitors temperature alarm rates of its lower facilities	0%
R0696	The facility monitors its vaccine forecast accuracies.	0%
R0701	The facility reviews iSC performance at least annually.	0%
R0699	All iSC KPIs are displayed on one consolidated dashboard.	0%

Recommendation

- Develop and implement a system and dashboard to monitor the iSC key performance indicators.
- Develop and implement a SOP on iSC KPI.

5. Lowest distribution (LD) level (84%)

The assessment recorded an overall score of 84% for the management of the vaccine supply chain by Bangladesh's Lowest distribution (LD) levels – the 23 Districts and City Corporation's Zone stores. Among the 23 stores, 20 scored between 80% and 90%, three between 70% and 79%.

By the facility operation criteria assessed (E1 to E9), the Vaccine management (E8) scored highest 90%, and the lowest score for waste management (E9) 72%. And for management criteria of annual needs forecasting (M1) it scored 97%, and the annual work planning (M2) has the lowest score of 76%.

The categories that scored less than 80%, and where improvement is most needed was equipment, which is affected by the waste management score of 42%.

Figure 12: **Criteria results of the EVMA 2.0 (2021) at the LD Vaccine Stores**

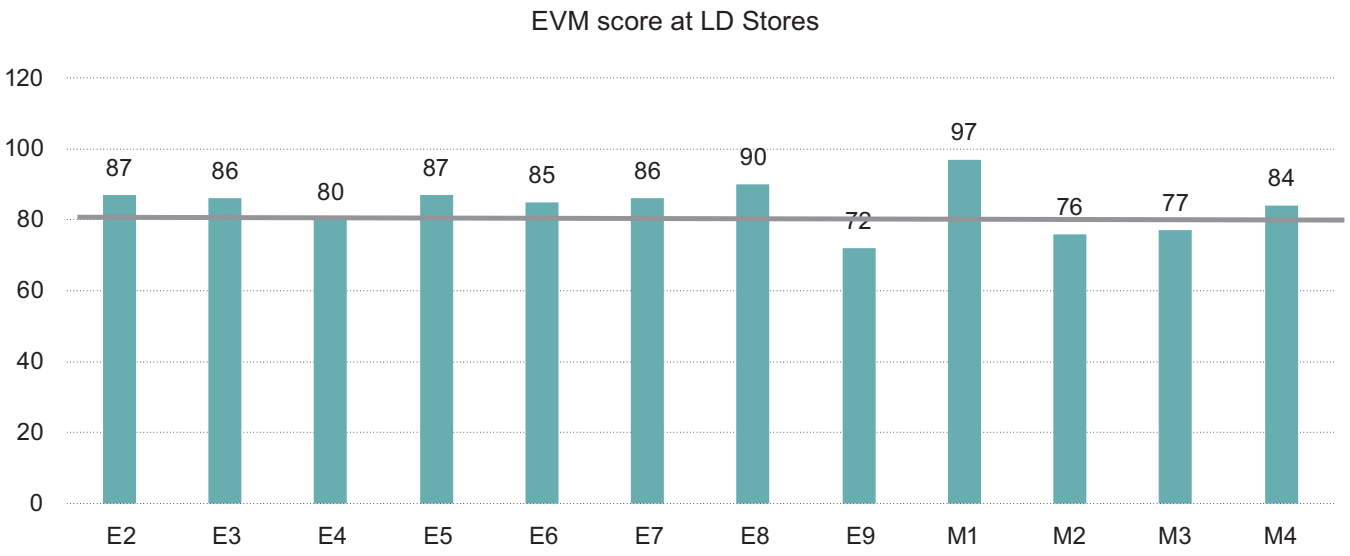


Table 6: Heat Map presenting the overall EVM criteria and EVM category scores at the LD vaccine stores

		Infrastructure	Equipment	Information technology	Human resources	Policies & procedures	Financial resources			TOTAL
		C1	C2	C3	C4	C5	C6	OUTPUT	PERFORMANCE	
Vaccine arrivals	E1									
Temperature management	E2			85	88	100		74	99	87
Storage and transportation capacity	E3	96	82		96	100	100	71	100	86
Facility infrastructure and equipment	E4	82	66	94			100	79		80
Maintenance and repair	E5			56	99	100	100	77	90	87
Stock management	E6			93	90	100		77	74	85
Distribution of vaccines and dry goods	E7				85	68	100	88		86
Vaccine management	E8				81	100		0		90
Waste management	E9		42		85			43	86	72
Annual needs forecasting	M1				95	100		96	99	97
Annual work planning	M2				72	52	100	73	59	76
Supportive supervision	M3	100	100	43	96	100	100	66		77
iSC performance monitoring	M4			89	92	100		74		84
TOTAL		85	74	82	90	94	100	76	91	84

E2 Temperature management (87%)

The overall assessment score for vaccine temperature management at LD level is satisfactory with 87% score. The 47 LD stores have been using RTMD and remaining 17 LD stores use Fridgetag-2 to record the temperature of vaccines during storage. All 47 stores also have backup temperature monitoring devices such as gas vapour thermometer, temperature recording graph, and alarm unit.

RTMD stores in the cloud and data are backed up periodically. All 47 stores use the real time temperature monitoring dashboard where the user can observe all WICs real time temperature utilizing four sensors located at 4 critical point of each WICs. If there is any temperature excursion, an automated system generated SMS alert is send to authorized users and managers for immediate action. The national level managers can also monitor all 47 LDs' real time temperature of the WICs using RTMD dashboard.

Daily temperatures in stores were recorded on temperature monitoring sheets and RTMD data was downloaded to the stores' computers monthly. Temperatures were reviewed every month and documented. Temperature management in storage scored 87%. But the assessment found that the LD stores were not using freeze indicators during transportation to SP vaccine stores.

Code	Criterion	Score
E2	**Temperature management**	**87%**
E2.1	Temperature management in storage	86%
E2.2	Temperature management during transportation	87%

C3 Information technology (85%)

A total score of 85% has been achieved. Most of the manual temperature forms met the minimum requirements. The major gap was in the availability of the continuous temperature monitoring forms especially at the LD and SP level.

C3.2 Data management technology (85%)

Code	Requirement	Score
R0157	The facility's cold/freezer rooms are monitored by a computerised temperature monitoring system.	100%
R0152	The vaccine storage manual temperature monitoring form meets minimum requirements.	96%
R0165	Vaccine refrigerators have 30DTRs or equivalent.	70%
R0166	Vaccine refrigerators/freezers have backup temperature monitoring device.	60%

Recommendation

- Update the Cold Chain inventory. Central EPI should identify the shortages in the 30 DTRs and backup temperature-monitoring device and ensure that 30 DTRs are available at all the refrigerators.

- Printed copies of manual temperature recording form should be supplied in adequate quantity to LD and SP level from central EPI.

C4 Human resources (88%)

C4.1 Staffing (78%)

At present 27 Districts Cold Chain Technicians (CCT) positions have fallen vacant due to retirements. As a result, the Cold Chain equipment maintenance has been critically affected at these 27 District stores.

Code	Requirement	Score
R0238	Adequate staff are assigned to monitor vaccine temperatures.	78%

Recommendation

- The main area for improvement is the absence of adequate staff to monitor vaccine temperatures at LD stores (according to the EVM standards, at least two staff should be trained on all vaccine management functions to make sure temperature monitoring is not interrupted due to absence of staff).
- Recruit Cold Chain Technician as early as possible.

C4.2 Training (94%)

Code	Requirement	Score
R0259	Responsible staff are trained how to monitor vaccine temperatures.	94%

Recommendation

- Mid-level managers training on temperature monitoring which is a core matter of iSC performance.
- At least two staff should be trained on temperature monitoring practices at each LD, so there is always a backup when the main responsible staff is absent.

C4.3 Knowledge & understanding (91%)

Code	Requirement	Score
R0268	Responsible staff are knowledgeable of key principles and procedures of temperature monitoring.	90%

Recommendation

- Update the training programs for all the iSC staffs to ensure knowledge on the vaccine and Cold Chain management practices and functions including temperature monitoring (formal training, on the job training, etc).

C5 Policies & procedures (100%)

C5.3 SOPs (100%)

Code	Requirement	Score
R0305	The facility has SOPs for vaccine temperature monitoring in storage.	100%

Recommendation

- SOPs for temperature management are available at LD level, the central EPI should ensure it is disseminated to all the SPs.

O Output (74%)

Code	Requirement	Score
R0462	Vaccine transportation temperatures are systematically monitored.	94%
R0449	Temperature records are well organised and secure.	92%
R0445	Temperature alarms during storage are recorded and acknowledged.	84%
R0442	Vaccine storage temperatures are systematically monitored.	58%
R0459	Freeze indicators are correctly packed with freeze-sensitive vaccine when there is a risk of freezing.	50%

Recommendation

- Use of freeze indicators during transportation of freeze sensitive vaccines mentioned at PR level.
- Out of 64 LDs only 47 LDs use RTMD, where WIC have been installed. Out of 23 assessed LDs only 15 LDs have RTMD. MoH planned to introduce RTMD 17 more LDs by 2023.
- Freeze indicators should be introduced at LD level for packing with freeze-sensitive vaccine during transportation from LD to SP.

P Performance (99%)

Code	Requirement	Score
R0457	Vaccines are not exposed to damaging high temperatures during storage.	100%
R0470	Vaccines are not exposed to damaging high temperatures during transportation to this facility.	100%
R0471	Vaccines are not exposed to damaging low temperatures during transportation to this facility.	100%
R0458	Vaccines are not exposed to damaging low temperatures during storage.	96%

E3 Storage and transportation capacity (86%)

The assessment scored 86% for the storage and transportation capacity of the LD stores, although the score was only71% for the utilization of available capacity.

Code	Criterion	Score
E3	**Storage and transportation capacity**	**86%**
E3.1	Capacity of infrastructure and equipment	85%
E3.2	Utilisation of available capacity	71%

C1 Infrastructure (96%)

C1.2 Buildings & facilities (96%)

Code	Requirement	Score
R0028	The facility has sufficient dry goods storage capacity to accommodate the expected maximum stock levels of diluents, syringes, and safety boxes.	96%

C2 Equipment (82%)

C2.1 Storage equipment (78%)

Some of the districts and city corporations (LD) do not have sufficient cold storage capacity to accommodate the expected maximum stock levels of vaccines, diluents, and sufficient coolant pack storage capacity.

Code	Requirement	Score
R0039	The facility has sufficient cold storage capacity to accommodate the expected maximum stock levels of vaccines and diluents.	90%
R0073	The facility has sufficient coolant pack storage capacity to accommodate the expected maximum daily demand for coolant packs.	64%

Recommendation:

- Cold Chain equipment is in pipeline through partners to mitigate the Cold Chain storage capacity for the LDs where there is storage capacity gap
- Conduct Cold Chain equipment gap analysis to identify the gap and plan for CCE replace, expansion and extension

C2.2 Transportation equipment (89%)

Sufficient quantity of freeze free cold box and vaccine carrier are available through COVAX CCE and CCEOP support for transportation of vaccines. Additional containers will be distributed periodically from the central EPI store.

Code	Requirement	Score
R0096	The facility's insulated containers have sufficient capacity to accommodate the expected maximum load of vaccines.	90%

C4 Human resources (96%)

C4.3 Knowledge & understanding (96%)

Most of the LD iSC staff are well trained and had knowledge on key principles and procedures of vaccine & dry goods storage. Periodical training on immunization supply chain has been conducted at District and national level.

Code	Requirement	Score
R0272	Responsible staff are knowledgeable of key principles and procedures of vaccine & dry goods storage.	96%

C5 Policies & procedures (100%)

EVM SOP (Vaccine storage, Cold Chain maintenance and storage emergency contingency plan, vaccine transportation) developed and implemented since 2018 at National, LD and SP level.

C5.3 SOPs (100%)

Code	Requirement	Score
R0307	The facility has SOPs for vaccine storage.	100%
R0308	The facility has a vaccine storage emergency contingency plan.	100%

C6 Financial resources (100%)

C6.2 Funds for operations (100%)

Code	Requirement	Score
R0383	Facility funds budgeted for storage are received in full and on time.	100%
R0386	Facility funds received for storage are sufficient.	100%

O Output (71%)

Code	Requirement	Score
R0497	Non-vaccine medical products are segregated from vaccines and clearly labelled.	100%
R0482	Vaccines are stored safely.	78%
R0489	Vaccine stocks are well organized.	74%
R0501	Dry goods are stored safely.	60%

P Performance (100%)

Code	Requirement	Score
R0496	Appropriate action is taken to protect vaccines in the event of refrigeration equipment breakdown, power loss or other storage emergency.	100%

E4 Facility infrastructure and equipment (80%)

The assessment scored 80% for infrastructure and equipment at the LD stores. The quality of equipment (71%) scored less than the quality of infrastructure (80%). All LD level facilities have more than 22 hours grid electricity supply. As per 2014 EVM assessment recommendation, 47 LD stores were newly built and five were renovated.

All 47 stores having WICs and stand-by generators that met WHO PQS standard and met requirements of the EVM assessment. However, some of the equipment of the eight LDs out of 23 LD assessed, are not Grade-A equipment. Most of the LDs have fire extinguisher but are not refilled and certified by the fire authority. All LDs have sufficient PQS approved and standard/freeze free cold boxes and vaccine carriers.

Code	Criterion	Score
E4	**Facility infrastructure and equipment**	**80%**
E4.1	Quality of infrastructure	81%
E4.2	Quality of equipment	71%

C1 Infrastructure (82%)

C1.1 Utilities & services (91%)

Code	Requirement	Score
R0005	The facility receives at least eight hours of grid electricity each day.	100%
R0007	The facility has access to water, sanitation and hygiene service (WASH).	88%
R0001	The facility has functional means of communication.	84%

C1.2 Buildings & facilities (76%)

Code	Requirement	Score
R0019	Cold stores meet minimum requirements.	100%
R0014	The facility is secure.	100%
R0038	Buildings have guttering and drainage for rainwater.	100%
R0011	The store manager's office meets minimum requirements.	86%
R0022	Dry stores meet minimum requirements.	74%
R0037	Storage buildings have functional certified fire extinguishers.	36%

Recommendation

- All LD level dry stores should have proper racking facility to keep dry goods (ex. Syringes, cold boxes, vaccine carrier, and other EPI logistic).
- All LDs should ensure the refilling and certification from the fire department in time or before the expiry date.

C2 Equipment (66%)

C2.1 Storage equipment (57%)

Code	Requirement	Score
R0043	The facility's vaccine cold storage equipment is appropriate for the expected maximum vaccine stock volume.	100%
R0046	Vaccine cold/freezer rooms meet minimum requirements.	100%
R0060	Vaccine refrigerators/freezers meet minimum requirements.	62%
R0066	The facility has a suitable standby generator.	58%
R0074	A warm coat is available for working in cold/freezer rooms.	0%

Recommendation

- Sufficient reserve fuel required at LD levels where WIC have been installed.
- Provide personal protective equipment at LD level.

C2.2 Transportation equipment (100%)

Code	Requirement	Score
R0095	Insulated containers comply with WHO or national specifications.	100%

C3 Information technology (94%)

C3.1 General IT equipment (94%)

Code	Requirement	Score
R0136	iSC staff have work mobile phones.	98%
R0135	The facility has an operational printer.	96%
R0131	The facility has a suitable computer.	88%

C6 Financial resources (100%)

C6.2 Funds for operations (100%)

Code	Requirement	Score
R0363	Funds budgeted for fuel for the generator are received in full and on time.	100%
R0366	Funds received for fuel for the generator are sufficient.	100%

O Output (79%)

Code	Requirement	Score
R0473	The facility uses a computer to support supply chain operations.	90%
R0479	The facility equipment is clean and dry.	84%
R0475	The facility buildings layout and space are well arranged/organized.	80%
R0478	The facility buildings are clean and dry.	82%
R0474	The facility WASH services are fully operational.	80%
R0472	The facility uses reliable means of communication for supply chain operations.	20%

Recommendation

- Provide subsidy for the mobile communication.

E5 Maintenance and repair (87%)

The assessment scored 87% overall on maintenance and repair by the LD stores. The maintenance and repair of buildings and Cold Chain equipment was satisfactory. The reason for a low score of 50% at repair and maintenance of vehicles is due to the fact that LD stores do not use vehicles for distributing vaccine and logistics to the SP level. The SPs are collecting vaccines from LD stores. District Cold Chain technicians are responsible for the repair and maintenance of the Cold Chain equipment (ILR and Freezers).

For some of the LDs third party agencies has been contracted for the WIC and generator maintenance regularly.

Code	Criterion	Score
E5	**Maintenance and repair**	**87%**
E5.1	Maintenance & repair of buildings	86%
E5.2	Maintenance & repair of Cold Chain equipment	86%
E5.3	Maintenance & repair of vehicles	50%

The LDs are being supplied through central level vehicles, and the service points are collecting vaccine from LD by their own arrangement.

C3 Information technology (56%)

C3.2 Data management technology (56%)

Code	Requirement	Score
R0172	The facility has an inventory of Cold Chain equipment.	56%

Recommendation:

- Every LD should update inventory of Cold Chain equipment at least monthly through DHIS2.
- Provision can be made in DHIS2 to include passive containers which is currently not available.

C4 Human resources (99%)

C4.1 Staffing (100%)

Code	Requirement	Score
R0239	At least one staff is assigned to carry out routine refrigeration maintenance tasks.	100%
R0240	At least one staff is assigned to maintain an inventory of Cold Chain equipment.	100%
R0243	Refrigeration technicians or services are available to maintain and repair Cold Chain equipment.	100%
R0242	Building maintenance staff or services are available to maintain buildings.	100%
R0244	Auto mechanics or services are available to maintain and repair vaccine transportation vehicles.	100%
R0241	At least one staff is assigned to carry out routine vehicle maintenance tasks.	0%

C4.2 Training (98%)

Code	Requirement	Score
R0260	Responsible staff are trained in routine refrigeration maintenance.	98%
R0261	Responsible staff are trained to maintain an inventory of Cold Chain equipment.	100%

C5 Policies & procedures (100%)

C5.3 SOPs (100%)

The country has EVM SOP for maintenance of Cold Chain equipment at each level.

Code	Requirement	Score
R0309	The facility has SOPs/guidelines for routine maintenance of refrigeration equipment.	100%
R0310	The facility has SOPs/guidelines for maintaining a Cold Chain equipment inventory.	100%

C6 Financial resources (100%)

The central EPI provides adequate funds to all LDs for maintenance of Cold Chain equipment. Health Engineering Department (HED) and the Public Works Department (PWD) maintain building renovation and repair yearly. The country has a standard policy for the repair and maintenance of the buildings.

C6.2 Funds for operations (100%)

Code	Requirement	Score
R0387	Facility funds budgeted for maintenance of buildings are received in full and on time.	100%
R0390	Facility funds received for maintenance of buildings are sufficient.	100%
R0391	Facility funds budgeted for maintenance of Cold Chain equipment are received in full and on time.	100%

Code	Requirement	Score
R0394	Facility funds received for maintenance of Cold Chain equipment are sufficient.	100%
R0395	Facility funds budgeted for maintenance of vehicles are received in full and on time.	100%
R0398	Facility funds received for maintenance of vehicles are sufficient.	100%

O Output (77%)

The outsourced agencies doing regular maintenance and repair for a limited number of district facilities.

Code	Requirement	Score
R0518	Generator repair work is carried out promptly.	100%
R0545	Cold Chain equipment repair work is carried out promptly.	94%
R0507	Visual evidence shows that buildings are maintained.	86%
R0523	The facility follows a standard fault reporting procedure for Cold Chain equipment.	80%
R0519	Cold Chain equipment are maintained according to a documented schedule.	68%
R0526	The facility maintains an up-to-date inventory of its Cold Chain equipment.	66%
R0505	Preventive maintenance work on buildings is recorded.	60%
R0548	The performance of the Cold Chain equipment maintenance contractor is monitored.	0%

Recommendation

- The performance of outsource agencies for Cold Chain maintenance service to be monitored and certified by the concerned LD focal person.
- The repair maintenance document should be kept for review at least for three years.

P Performance (90%)

Code	Requirement	Score
R0517	The generator is maintained fully functional.	100%
R0530	Cold Chain equipment are maintained fully functional.	94%
R0535	Cold Chain equipment are maintained in good physical condition.	90%
R0506	The delivery and quality of building maintenance work meets facility requirement.	70%

E6 Stock management (85%)

The score for Stock management was 85% for the 23 LDs assessed. All criteria except the Replenishment and Inventory management scored low, 48% and 75% respectively. It was found during the assessment that vaccines are not being supplied from central store to LD stores as per their indent or forecast. The country is using DHIS2 system for vaccine and logistic stock management system, but the central store is not updating the stock information regularly.

Paper and online DHIS2 stock management forms had most of the required fields available, but the updating and validating is not in practice. Most of the responsible staffs were knowledgeable about the key principles and procedures of vaccine stock management. SOPs for managing vaccine stock transactions were available.

Code	Criterion	Score
E6	**Stock management**	**85%**
E6.1	Replenishment	48%
E6.2	Receipt and put-away	97%
E6.3	Inventory management	75%
E6.4	Release and dispatch	82%
E6.5	Managing returns, damaged and expired stock	96%

Recommendation

- Introduce integrated vaccine and logistics stock management system (preferably WEB based Stock Management Tool or Blockchain based stock management system).
- The central store should put priority to supply vaccine and logistic to LDs as per their indent or forecast. So that there will be no stock out or no excess stock at any LD.
- The paper-based stock management system shall be modified as per EVM criteria (include all minimum required fields – target, forecast information, maximum stock level, replace vial with dose, add key indicators calculation for stock management).

C3 Information technology (93%)

C3.2 Data management technology (93%)

Code	Requirement	Score
R0189	The vaccine request form has all of the required fields.	100%
R0196	The vaccine issue form has all of the required fields.	98%
R0205	The vaccine receipt form has all of the required fields.	98%
R0179	The vaccine stock record form has all of the required fields.	90%
R0213	The facility has a computerised vaccine stock management system.	90%
R0214	The computerised vaccine stock management system meets minimum requirements	40%

C4 Human resources (90%)

C4.1 Staffing (74%)

Code	Requirement	Score
R0245	Two or more members of staff are assigned to manage vaccine stocks.	74%

C4.2 Training (100%)

Code	Requirement	Score
R0262	Responsible staff are trained in vaccine stock management.	100%

C4.3 Knowledge & understanding (96%)

Code	Requirement	Score
R0274	Responsible staff are knowledgeable of key principles and procedures of vaccine stock management.	96%

C5 Policies & procedures (100%)

C5.3 SOPs (100%)

Code	Requirement	Score
R0311	The facility has SOPs for managing vaccine stock transactions.	100%
R0312	The facility has SOPs for using VVMs.	100%

O Output (77%)

Vaccine requests are completed and documented regularly. Vaccine received are inspected for each shipment and recorded upon arrival. Any loss recorded and reported to authority. Vaccine and logistic stocks record are completed and updated. However, physical stock is not counting regularly and maximum level not set in the stock recording system for vaccine and dry goods.

Code	Requirement	Score
R0573	Vaccine requests are complete and documented.	100%
R0579	Vaccine received are inspected and recorded upon arrival.	98%
R0599	Reasons for vaccine losses are recorded.	96%
R0583	Stock records are up-to-date.	100%
R0584	Vaccine stock records are complete.	94%
R0587	Vaccine stock records are well organized and secure.	90%
R0592	Vaccine issues are complete and documented.	82%
R0591	Physical vaccine stocks counts are conducted regularly.	50%
R0567	Stock levels are documented for all vaccines.	42%
R0570	Stock levels are documented for all dry goods.	30%

Recommendation:

- Monthly physical and recorded stock must be counted and validated by the supervisor.
- The maximum stock level of vaccine and dry goods must be set and recorded for all LD level stores in the stock management system.

P Performance (74%)

Code	Requirement	Score
R0601	Vaccine and diluent stock records are accurate.	80%
R0600	Vaccine and diluent stock levels match.	68%

E7 Distribution of vaccines and dry goods (86%)

Vaccine and dry goods are not being distributed from LDs to SPs rather all SPs are collecting vaccine and dry goods from LD by their own arrangements. EVM SOP for vaccine distribution planning are available but not applicable for the LDs. Three iSC staff are assigned for the vaccine and Cold Chain management and distribution. They received training periodically on distribution of vaccines and dry goods.

Code	Criterion	Score
E7	**Distribution of vaccines and dry goods**	**86%**
E7.1	Distribution planning	55%
E7.2	Transportation of vaccines	89%

C4 Human resources (85%)

C4.1 Staffing (93%)

Code	Requirement	Score
R0246	Two or more members of staff are assigned to carry out vaccine distribution tasks.	90%

C4.2 Training (84%)

Code	Requirement	Score
R0263	Responsible staff are trained how to carry out vaccine distribution tasks.	84%

C4.3 Knowledge & understanding (82%)

Code	Requirement	Score
R0277	Responsible staff are knowledgeable of key principles and procedures of vaccine distribution.	82%

C5 Policies & procedures (68%)

C5.3 SOPs (68%)

Code	Requirement	Score
R0313	The facility has required SOPs/guidelines for vaccine distribution planning.	68%
R0318	The facility has a vaccine transport emergency contingency plan(s).	0%

C6 Financial resources (100%)

C6.2 Funds for operations (100%)

Code	Requirement	Score
R0359	Funds budgeted for fuel for vehicles are received in full and on time.	100%
R0362	Funds received for fuel for vehicles are sufficient.	100%
R0399	Facility funds budgeted for vaccine transportation or outreach are received in full and on time.	100%
R0402	Facility funds received for vaccine transportation or outreach are sufficient.	100%

O Output (88%)

Code	Requirement	Score
R0611	Insulated containers and coolant packs are stored in permanently shaded areas.	100%
R0615	Coolant packs are prepared and used according to standard procedures.	94%
R0614	Insulated containers are packed according to manufacturer's guidelines or SOPs.	82%
R0604	The facility has a documented vaccine distribution plan.	54%

Recommendation:

- All LDs should have vaccine and dry goods collection plan of SPs.

E8 Vaccine management (90%)

Knowledge of the iSC staff is adequate regarding vaccine management and also the EVM SOP is available in the LD stores. There was no incident of suspected freezing of freeze sensitive vaccines as all vaccines are being stored in the WICs at 47 LD stores and most of the remaining LDs have PQS Grade-A equipment.

Code	Criterion	Score
E8	**Vaccine management**	**90%**
E8.1	The shake test	0%

C4 Human resources (81%)

C4.3 Knowledge & understanding (81%)

Code	Requirement	Score
R0286	Responsible staff are knowledgeable of key principles and procedures of vaccine management.	80%

C5 Policies & procedures (100%)

C5.3 SOPs (100%)

Code	Requirement	Score
R0320	The facility has the required SOPs/guidelines for vaccine management.	100%

O Output (0%)

Code	Requirement	Score
R0631	Shake tests are conducted in response to low temperature alarms.	0%

E9 Waste management (72%)

The assessment scored the 23 LD stores 72% for waste management, which is below the EVM standard. District vaccine stores generally produce waste of unopened vials and dry goods and scored only 63% for its storage and 50% for its disposal. The waste management facility needs to be strengthened at the LD stores.

Code	Criterion	Score
E9	**Waste management**	**72%**
E9.2	Storage of immunization waste	63%
E9.3	Disposal of immunization waste	50%

C2 Equipment (42%)

C2.3 Other equipment (42%)

- At all 23 LD stores, there were no suitable facilities and equipment for storing immunization waste.
- The waste management practices used by the stores did not meet the minimum requirements.
- No personal protective equipment available in LDs to use for handling vaccine waste.

Code	Requirement	Score
R0104	The waste burial facilities meet minimum requirements.	50%
R0125	There are suitable facilities and equipment for storing waste.	40%
R0116	The facility has personal protective equipment for handling waste.	16%

C4 Human resources (85%)

C4.3 Knowledge & understanding (85%)

Responsible staff had knowledge on the key principles and procedures for immunization waste management.

Code	Requirement	Score
R0294	Responsible staff are aware of key principles and procedures of immunization waste management.	84%

O Output (43%)

Immunization waste was not generated at the LD level but wastages such as vaccine packages, broken ice packs, cold boxes, vaccine carriers, and other dry materials were not removed frequently and was not disposed up as per SOP guideline.

Code	Requirement	Score
R0656	Waste is removed from the facility frequently.	40%
R0657	Immunization waste is disposed using a safe method.	34%

P Performance (86%)

Code	Requirement	Score
R0655	The waste storage area is maintained free of used syringes, needles, vials, ampoules and other types of health waste.	80%
R0658	The waste disposal site is maintained free of used syringes, vials and ampoules.	66%

Recommendation

- Develop SOP or guideline and action plan for immunization waste management for all level of stores.
- Implement the waste management facilities in selected LDs and SPs including necessary infrastructure, equipment, and technical assistance.

M1 Annual needs forecasting (97%)

All districts have annual vaccine and dry goods requirement information in place and implemented. Adequate staff are in position and have the SOP for calculating the annual vaccine and dry goods forecasting.

C4 Human resources (95%)

C4.1 Staffing (100%)

Code	Requirement	Score
R0232	At least one member of staff is responsible for forecasting vaccine and dry goods needs.	100%

C4.2 Training (91%)

Code	Requirement	Score
R0252	Responsible staff are trained how to forecast vaccine and dry goods needs.	91%

C5 Policies & procedures (100%)

C5.3 SOPs (100%)

Code	Requirement	Score
R0299	The facility has vaccine and dry goods needs forecasting guidance materials for managers.	100%

O Output (96%)

Code	Requirement	Score
R0659	The facility has vaccine needs forecasts for all vaccines for the current year.	96%
R0660	The facility has dry goods needs forecasts for the current year.	96%
R0661	The facility uses a standard method to forecast its vaccine needs.	96%

P Performance (99%)

Code	Requirement	Score
R0662	The facility's vaccine needs forecasts are accurate.	98%

M2 Annual work planning (76%)

Annual work plan is in a nascent stage which need wider dissemination among mid-level managers and iSC staff. The existing annual workplan includes only two indicators of immunization program. EPI program is implemented in the country with an integration of government and different partner agencies where all put their plan in different activities for strengthening health system.

C4 Human resources (72%)

C4.1 Staffing (91%)

Code	Requirement	Score
R0233	At least one member of staff is responsible for annual work planning.	92%
R0251	The turnover of iSC facility staff is low.	90%

C4.2 Training (49%)

Training scored 49% as iSC staff were not trained in annual work planning since the annual work plan is still at the introductory phases where only health managers are involved in the preparation.

Code	Requirement	Score
R0253	Responsible staff are trained in annual work planning.	50%

C5 Policies & procedures (52%)

The policies and procedures scored 52% which is below EVM standard as there is an evident lack of annual work planning guidance materials for managers.

C5.3 SOPs (52%)

Code	Requirement	Score
R0300	The facility has annual work planning guidance materials for managers.	52%

C6 Financial resources (100%)

Financial resources scored 100% since all iSC staff receive salary from the budget of the MOH&FW.

C6.1 Salaries (100%)

Code	Requirement	Score
R0355	Funds for staff salaries are received in full and on time.	100%
R0358	Staff are paid in full and on time.	100%

C6.2 Funds for operations (100%)

Most of the other resources for operation are fully funded by the MOH&FW.

Code	Requirement	Score
R0367	Funds budgeted for electricity are received in full and on time.	100%
R0370	Funds received for electricity are sufficient.	100%
R0371	Funds budgeted for the internet connection are received in full and on time.	100%
R0374	Funds received for the internet connection are sufficient.	100%
R0375	Funds budgeted for the mobile reception are received in full and on time.	100%
R0378	Funds received for the mobile reception are sufficient.	100%

O Output (73%)

Code	Requirement	Score
R0668	The facility records its income and expenditure.	86%
R0666	The facility monitors the implementation status of the work plan activities.	82%
R0663	The facility has a budgeted annual work plan.	58%

P Performance (59%)

Code	Requirement	Score
R0667	Implementation of the annual work plan is on schedule.	60%

Recommendation

- There should be activity wise annual workplan with budget, which must be prepared jointly by government and development partners.
- Monitoring mechanism should be developed follow the implementation of the workplan.

M3 Supportive supervision (77%)

The national and divisional supervisors visited LDs but there was no standard checklist for the supervisory visit. However, HR, transport, fuel, SOPs, and financial support are available for the supportive supervision.

C1 Infrastructure (100%)

C1.1 Utilities & services (100%)

Reliable supply of fuel for vehicles for supervision visits are available.

Code	Requirement	Score
R0006	There is a reliable supply of fuel for vehicles for supervision visits.	100%

C2 Equipment (100%)

C2.2 Transportation equipment (100%)

Code	Requirement	Score
R0076	Transport is always available for scheduled supervision visits.	100%

C3 Information technology (43%)

C3.2 Data management technology (43%)

Code	Requirement	Score
R0223	Supervisors use a standard supervision checklist.	48%
R0224	The supervision checklist covers key areas of vaccine management.	38%

C4 Human resources (96%)

C4.2 Training (96%)

Code	Requirement	Score
R0254	Supervisors are trained in supportive supervision.	96%

C5 Policies & procedures (100%)

C5.3 SOPs (100%)

Code	Requirement	Score
R0301	The facility has supportive supervision guidance materials for supervisors.	100%

C6 Financial resources (100%)

C6.2 Funds for operations (100%)

Code	Requirement	Score
R0407	Facility funds budgeted for supportive supervision are received in full and on time.	100%
R0410	Facility funds received for supportive supervision are sufficient.	100%

O Output (66%)

Code	Requirement	Score
R0669	Supervisory visits are arranged according to a fixed schedule.	82%
R0670	Supervisors maintain a record of visits and findings.	70%
R0672	Staff receive feedback from supervisors.	68%
R0671	All scheduled visits take place.	44%

Recommendation

- Develop a standardized, and customized supervision checklist for all levels.
- All supervisory report must be tracked and analysed the strength of the iSC.
- A simplified tool can be introduced like a mobile app.

M4 iSC performance monitoring (84%)

The iSC performance monitoring scored 84% since the LD stores regularly and actively monitor the functionality of Cold Chain equipment of its lower facilities, vaccine stock status of its own and lower facilities, the functionality of its Cold Chain equipment, reporting rates of its own and lower facility, opened and unopened vial wastage rates.

C3 Information technology (89%)

C3.2 Data management technology (89%)

Code	Requirement	Score
R0231	The facility monitors reporting rates.	96%
R0230	The reporting form includes essential supply chain data.	82%

C4 Human resources (92%)

C4.1 Staffing (89%)

Code	Requirement	Score
R0234	There are enough staff able to carry out iSC performance monitoring tasks.	90%

C4.2 Training (96%)

Code	Requirement	Score
R0255	Responsible staff are trained how to carry out ISC performance monitoring tasks.	96%

C5 Policies & procedures (100%)

C5.3 SOPs (100%)

Code	Requirement	Score
R0302	The facility has iSC performance monitoring guidance materials for managers.	100%
R0329	The SOPs are written in a local language.	100%
R0330	The SOPs are up-to-date.	100%

O Output (74%)

Code	Requirement	Score
R0684	The administrative unit monitors functionality of Cold Chain equipment of its lower facilities	100%
R0689	The administrative unit monitors vaccine stock status indicators of its lower facilities	100%
R0680	The facility monitors the functionality of its Cold Chain equipment.	96%
R0700	Reporting facilities report on time and in full.	90%
R0685	The facility monitors its vaccine stock status indicators	90%
R0693	The facility monitors its unopened vial wastage rates.	86%
R0675	The facility monitors its temperature alarm rates.	76%
R0690	The facility monitors its order timeliness and fill rates.	66%
R0701	The facility reviews iSC performance at least annually.	62%
R0679	The administrative unit monitors temperature alarm rates of its lower facilities	60%
R0699	All iSC KPIs are displayed on one consolidated dashboard.	50%
R0696	The facility monitors its vaccine forecast accuracies.	0%

Recommendation:

- Temperature alarm rates should be monitored on a monthly basis for all facilities in the prescribed format.
- A simplified EVM assessment 2.0 tool should be made available to review iSC performance annually.
- iSC KPIs and its dashboard should be introduced at all levels.
- Introduce digitization of micro-planning to monitor vaccine forecast accuracies.

6. Service Point (SP) level (81%)

E2 Temperature management (85%)

The Cold Chain handlers are doing temperature monitoring every morning and evening, which has been recorded in the temperature monitoring chart. Freeze-free vaccine carriers are being used for vaccine transportation from the service point to the session's sites. Also, some SPs use freeze-free cold boxes for vaccine collection from LDs.

Code	Criterion	Score
E2	**Temperature management**	**85%**
E2.1	Temperature management in storage	91%
E2.2	Temperature management during transportation	86%

Recommendation:

- Central shall supply freeze-free cold boxes and vaccine carriers for string and transportation of vaccines at SPs.
- Use freeze indicators in cold boxes and vaccine carriers during transportation and storage of vaccines till the availability of freeze-free devices.

C3 Information technology (86%)

C3.2 Data management technology (86%)

All SPs monitor the temperature of ILR and Deep freezer in the morning and evening. Also, the power cut duration and temperature breach are being properly recorded and monitored by Cold Chain handlers and supervisors. During the assessment, it was observed that 82% (n=48) of ILRs have 30 DTRs for recording temperature; some of the SPs did not have due to breakage, low battery, etc.

Code	Requirement	Score
R0152	The vaccine storage manual temperature monitoring form meets minimum requirements.	98%
R0165	Vaccine refrigerators have 30DTRs or equivalent.	82%
R0166	Vaccine refrigerators/freezers have backup temperature monitoring device.	50%

Table 7: **Heat Map presenting the overall EVM criteria and EVM category scores at the SP vaccine stores**

		Infrastructure	Equipment	Information technology	Human resources	Policies & procedures	Financial resources			TOTAL
		C2	C3	C4	C5	C6	OUTPUT	PERFOR-MANCE		
Vaccine arrivals	E1									
Temperature management	E2			86	68	100		87	95	85
Storage and transportation capacity	E3		96		94	100	100	89		95
Facility infra-structure and equipment	E4	79	82	97			86	78		81
Maintenance and repair	E5				90	100	95	63	87	84
Stock manage-ment	E6			96	70	100		75	84	81
Distribution of vaccines and dry goods	E7				81	98	82	93	95	91
Vaccine manage-ment	E8				86	100		90		92
Waste manage-ment	E9		79		59	98	80	75	80	76
Annual needs forecasting	M1				96	96		98	100	97
Annual work planning	M2				48	17	97	67	75	59
Supportive super-vision	M3							73		73
iSC performance monitoring	M4				63	83		65		70
TOTAL		79	86	93	72	88	97	78	88	81

Recommendation:

Central EPI store should ensure timely replacement of 30 DTRs to LDs and SPs.

C4 Human resources (68%)

As per the EVM 2.0 tool, at least two persons are required to monitor vaccine temperature and recording. However, only one person (Medical Technologist-EPI) is available at the SP level for monitoring and recording temperature. Consequently, the score in Human resources was as low as 68%.

Sub-category	Code	Requirement	Score
C4.1 Staffing	R0238	Adequate staff are assigned to monitor vaccine temperatures.	21%
C4.2 Training	R0259	Responsible staff are trained how to monitor vaccine temperatures.	97%
C4.3 Knowledge & understanding	R0268	Responsible staff are knowledgeable of key principles and procedures of temperature monitoring.	87%

C5 Policies & procedures (100%)

Sub-category	Code	Requirement	Score
SOPs	R0305	The facility has SOPs for vaccine temperature monitoring in storage.	100%

O Output (87%)

Code	Requirement	Score
R0462	Vaccine transportation temperatures are systematically monitored.	94%
R0449	Temperature records are well organised and secure.	94%
R0442	Vaccine storage temperatures are systematically monitored.	92%
R0459	Freeze indicators are correctly packed with freeze-sensitive vaccine when there is a risk of freezing.	74%
R0445	Temperature alarms during storage are recorded and acknowledged.	0%

P Performance (95%)

Code	Requirement	Score
R0458	Vaccines are not exposed to damaging low temperatures during storage.	100%
R0457	Vaccines are not exposed to damaging high temperatures during storage.	96%
R0470	Vaccines are not exposed to damaging high temperatures during transportation to this facility.	92%
R0471	Vaccines are not exposed to damaging low temperatures during transportation to this facility.	92%

E3 Storage and transportation capacity (95%)

The 48 SPs scored 95% for storage and transportation capacity. The infrastructure and equipment capacity scored 96% and 89% for utilization of the available capacity. Note that SPs usually store vaccines and other dry goods for one month with an additional buffer stock of 15 days.

Code	Criterion	Score
E3	**Storage and transportation capacity**	**95%**
E3.1	Capacity of infrastructure and equipment	96%
E3.2	Utilisation of available capacity	89%

Recommendation:

- To make the best utilization of capacity, all SPs should have an adjustable rack for dry goods and one almirah for keeping records.

C2 Equipment (96%)

Sub-category	Code	Requirement	Score
C2.1 Storage equipment (97%)	R0039	The facility has sufficient cold storage capacity to accommodate the expected maximum stock levels of vaccines and diluents.	97%
	R0073	The facility has sufficient coolant pack storage capacity to accommodate the expected maximum daily demand for coolant packs.	
C2.2 Transportation equipment	R0096	The facility's insulated containers have sufficient capacity to accommodate the expected maximum load of vaccines.	93%

C4 Human resources (94%)

Sub-category	Code	Requirement	Score
C4.3 Knowledge & understanding	R0272	Responsible staff are knowledgeable of key principles and procedures of vaccine & dry goods storage.	94%

C5 Policies & procedures (100%)

Sub-category	Code	Requirement	Score
C5.3 SOPs	R0307	The facility has SOPs for vaccine storage.	100%
	R0308	The facility has a vaccine storage emergency contingency plan.	

C6 Financial resources (100%)

Sub-category	Code	Requirement	Score
C6.2 Funds for operations	R0383	Facility funds budgeted for storage are received in full and on time.	100%
	R0386	Facility funds received for storage are sufficient.	

O Output (89%)

Code	Requirement	Score
R0500	Vaccines are stored safely during immunization sessions.	92%
R0482	Vaccines are stored safely.	92%
R0489	Vaccine stocks are well organized.	86%

Recommendation:

Refreshers training on vaccine storage management at SPs and during immunization sessions to be conducted by central EPI (For MT-EPI and Porters).

E4 Facility infrastructure and equipment (81%)

The availability of infrastructure and equipment scored 81% overall and 78% for the quality of their infrastructure and 82% for the quality of their equipment.

Code	Criterion	Score
E4	**Facility infrastructure and equipment**	**81%**
E4.1	Quality of infrastructure	78%
E4.2	Quality of equipment	82%

Recommendation:

- The UH&FPOs of SPs should coordinate with HED and PWD for regular maintenance of the building.
- MoH or Partners may take the initiative to construct new buildings in place of hired or dilapidated buildings of Sadar Upazilas.

C1 Infrastructure (79%)

Sub-category	Code	Requirement	Score
C1.1 Utilities & services (92%)	R0005	The facility receives at least eight hours of grid electricity each day.	98%
	R0007	The facility has access to water, sanitation and hygiene service (WASH).	92%
	R0001	The facility has functional means of communication.	86%
C1.2 Buildings & facilities (47%)	R0014	The facility is secure.	100%
	R0037	Storage buildings have functional certified fire extinguishers.	36%

Recommendation:

All SPs should ensure the availability of fire extinguishers, refilling, and certification from the fire department in time or before the expiry date.

C2 Equipment (82%)

Sub-category	Code	Requirement	Score
C2.1 Storage equipment (65%)	R0060	Vaccine refrigerators/freezers meet minimum requirements.	64%
C2.2 Transportation equipment (100%)	R0095	Insulated containers comply with WHO or national specifications.	100%

Recommendation: Physical inventory should be conducted in all SPs to identify non-PQS, “non-grade A” Cold Chain equipment, and it should be replaced gradually with PQS, “grade-A” equipment.

C3 Information technology (97%)

Sub-category	Code	Requirement	Score
C3.1 General IT equipment (97%)	R0136	iSC staff have work mobile phones.	97%

C6 Financial resources (86%)

Sub-category	Code	Requirement	Score
C6.2 Funds for operations (86%)	R0363	Funds budgeted for fuel for the generator are received in full and on time.	86%
	R0366	Funds received for fuel for the generator are sufficient.	86%

O Output (78%)

Code	Requirement	Score
R0478	The facility buildings are clean and dry.	86%
R0474	The facility WASH services are fully operational.	80%
R0479	The facility equipment are clean and dry.	80%
R0473	The facility uses a computer to support supply chain operations.	80%
R0472	The facility uses reliable means of communication for supply chain operations.	30%

E5 Maintenance and repair (84%)

Code	Criterion	Score
E5	**Maintenance and repair**	**84%**
E5.1	Maintenance & repair of buildings	65%
E5.2	Maintenance & repair of Cold Chain equipment	84%

Recommendation:

- The UH&FPOs of SPs should coordinate with HED and PWD for regular maintenance and repair of the building.

C4 Human resources (90%)

Sub-category	Code	Requirement	Score
C4.1 Staffing (96%)	R0242	Building maintenance staff or services are available to maintain buildings.	100%
	R0243	Refrigeration technicians or services are available to maintain and repair Cold Chain equipment.	98%
	R0239	At least one staff is assigned to carry out routine refrigeration maintenance tasks.	94%
C4.2 Training (80%)	R0260	Responsible staff are trained in routine refrigeration maintenance.	86%
	R0261	Responsible staff are trained to maintain an inventory of Cold Chain equipment.	60%

Recommendation:

- Refreshers training for the MT-EPI on preventative maintenance and CCT on routine refrigeration maintenance and Cold Chain equipment inventory.

C5 Policies & procedures (100%)

Sub-category	Code	Requirement	Score
C5.3 SOPs (100%)	R0309	The facility has SOPs/guidelines for routine maintenance of refrigeration equipment.	100

C6 Financial resources (95%)

Sub-category	Code	Requirement	Score
C6.2 Funds for operations (95%)	R0387	Facility funds budgeted for maintenance of buildings are received in full and on time.	100%
	R0390	Facility funds received for the maintenance of buildings are sufficient.	100%
	R0394	Facility funds received for the maintenance of Cold Chain equipment are sufficient.	100%
	R0395	Facility funds budgeted for the maintenance of vehicles are received in full and on time.	100%
	R0398	Facility funds received for the maintenance of vehicles are sufficient.	100%
	R0391	Facility funds budgeted for maintenance of Cold Chain equipment are received in full and on time.	78%

O Output (63%)

Output scored 63% because of Cold Chain equipment maintenance at the SP level by District CCT and routine preventive maintenance carried out by MT-EPI. CCT from the LD level makes a scheduled visit to SPs to maintain Cold Chain equipment once a month regularly.

Code	Requirement	Score
R0545	Cold Chain equipment repair work is carried out promptly.	82%
R0507	Visual evidence shows that buildings are maintained.	80%
R0523	The facility follows a standard fault reporting procedure for Cold Chain equipment.	70%
R0519	Cold Chain equipment are maintained according to a documented schedule.	40%
R0548	The performance of the Cold Chain equipment maintenance contractor is monitored.	0%

Recommendation:

Civil Surgeons should ensure the routine visit of the CCT to all the SPs for routine preventive maintenance of Cold Chain equipment once a month. Central EPI HQ should provide the fund for the CCT for regular visits to the SPs.

P Performance (87%)

Code	Requirement	Score
R0530	Cold Chain equipment are maintained fully functional.	94%
R0535	Cold Chain equipment are maintained in good physical condition.	80%
R0506	The delivery and quality of building maintenance work meets facility requirement.	50%

E6 Stock management (81%)

Code	Criterion	Score
E6	**Stock management**	**81%**
E6.1	Replenishment	51%
E6.2	Receipt and put-away	89%
E6.3	Inventory management	81%
E6.5	Managing returns, damaged and expired stock	92%

Recommendation:

There should be a proper vaccine forecasting and distribution plan at the central store, LDs, and SPs. All stores must have maximum, minimum, and reorder levels so that there will be no stockout or more than maximum stock at each level of stores. Central EPI store should make timely replenishment of vaccines and dry goods based on the LDs' indent so that LDs can replenish to SPs.

C3 Information technology (96%)

Sub-category	Code	Requirement	Score
C3.2 Data management technology (96%)	R0189	The vaccine request form has all of the required fields.	100%
	R0205	The vaccine receipt form has all of the required fields.	100%
	R0179	The vaccine stock record form has all of the required fields.	88%

C4 Human resources (70%)

Sub-category	Code	Requirement	Score
C4.1 Staffing (19%)	R0245	Two or more members of staff are assigned to manage vaccine stocks.	19%
C4.2 Training (95%)	R0262	Responsible staff are trained in vaccine stock management.	95%
C4.3 Knowledge & understanding (96%)	R0274	Responsible staff are knowledgeable of key principles and procedures of vaccine stock management.	96%

Recommendation:

One HA of the respective SPs ward or nearby ward may be assigned after proper training on Cold Chain and vaccine logistics management. This could help raise the number of staff to two as required by the EVM assessment tool. He can work in the absence of MT-EPI.

C5 Policies & procedures (100%)

Sub-category	Code	Requirement	Score
C5.3 SOPs (100%)	R0311	The facility has SOPs for managing vaccine stock transactions.	100%
	R0312	The facility has SOPs for using VVMs.	100%

O Output (75%)

The stock record is up to date in all SPs. Vaccine indents were in place, vaccine losses were recorded, stock records were well organized and secured, and vaccines received were inspected and recorded during the vaccine. Some issues identified like and complete the physical vaccine stocks counts are not conducted regularly in some places. The vaccine and dry good stock levels are not documented in the stock register.

Code	Requirement	Score
R0583	Stock records are up to date.	100%
R0573	Vaccine requests are complete and documented.	100%
R0599	Reasons for vaccine losses are recorded.	96%
R0584	Vaccine stock records are complete.	94%
R0587	Vaccine stock records are well organized and secure.	90%
R0579	Vaccine received are inspected and recorded upon arrival.	88%
R0591	Physical vaccine stocks counts are conducted regularly.	54%
R0567	Stock levels are documented for all vaccines.	46%
R0570	Stock levels are documented for all dry goods.	30%
R0598	Damaged or expired vaccine are clearly labelled and stored outside of cold storage until final disposal.	20%

Recommendation:

- Every SP must document physical and recorded stock reconciliation in the stock register once a month.
- All vaccine and dry goods stock levels must be appropriately documented in the register at the beginning of the year.
- Damaged or expired vaccines should be clearly labelled and stored outside of cold storage until final disposal.

P Performance (84%)

Code	Requirement	Score
R0601	Vaccine and diluent stock records are accurate.	84%
R0600	Vaccine and diluent stock levels match.	84%

E7 Distribution of vaccines and dry goods (91%)

The distribution of vaccines and dry goods scored 91% with the EVM standard met for distribution planning (100%) and the transportation of vaccines (92%).

Code	Criterion	Score
E7	**Distribution of vaccines and dry goods**	**91%**
E7.1	Distribution planning	100%
E7.2	Transportation of vaccines	92%

C4 Human resources (81%)

Sub-category	Code	Requirement	Score
C4.1 Staffing (54%)	R0246	Two or more members of staff are assigned to carry out vaccine distribution tasks.	54%
C4.2 Training (90%)	R0263	Responsible staff are trained how to carry out vaccine distribution tasks.	90%
C4.3 Knowledge & understanding (85%)	R0277	Responsible staff are knowledgeable of key principles and procedures of vaccine distribution.	85%

Recommendation:

- One HA of the respective SPs ward or nearby ward may be assigned after proper training on Cold Chain and vaccine logistics management. This could help raise the number of staff to two as required by the EVM assessment tool. He can work in the absence of MT-EPI.

C5 Policies & procedures (98%)

Sub-category	Code	Requirement	Score
C5.3 SOPs (98%)	R0313	The facility has required SOPs/guidelines for vaccine distribution planning.	98%

C6 Financial resources (82%)

Sub-category	Code	Requirement	Score
C6.2 Funds for operations (82%)	R0399	Facility funds budgeted for vaccine transportation or outreach are received in full and on time.	90%
	R0362	Funds received for fuel for vehicles are sufficient.	86%
	R0402	Facility funds received for vaccine transportation or outreach are sufficient.	76%

O Output (93%)

Code	Requirement	Score
R0608	The facility has a documented outreach plan.	100%
R0611	Insulated containers and coolant packs are stored in permanently shaded areas.	100%
R0614	Insulated containers are packed according to manufacturer's guidelines or SOPs.	92%
R0615	Coolant packs are prepared and used according to standard procedures.	88%

P Performance (95%)

Code	Requirement	Score
R0630	All scheduled outreach activities take place as scheduled.	96%

E8 Vaccine management (92%)

Code	Criterion	Score
E8	**Vaccine management**	**92%**
E8.2	Use of freeze-dried vaccines	100%
E8.3	Multi-Dose Vial Policy (MDVP)	69%

Recommendation:

- The vaccine and logistics stock register must be modified to capture opened vials in and out from the service points and track/update the daily vaccine stock register.

C4 Human resources (86%)

Sub-category	Code	Requirement	Score
C4.3 Knowledge & understanding (86%)	R0286	Responsible staff are knowledgeable of key principles and procedures of vaccine management.	86%

C5 Policies & procedures (100%)

Sub-category	Code	Requirement	Score
C5.3 SOPs (100%)	R0320	The facility has the required SOPs/guidelines for vaccine management.	100%

O Output (90%)

Code	Requirement	Score
R0634	The correct diluents are used to reconstitute freeze-dried vaccines.	100%
R0635	Diluents are stored in the Cold Chain for at least 12 hours prior to reconstitution.	100%
R0636	Opened multi-dose vials are marked with the date of opening.	70%

E9 Waste management (76%)

The assessed SPs scored 76% for waste management. The handling of syringes after use met the required standard (89%), but the proper storage of immunization waste was 74%, and the proper disposal of immunization waste scored only 42%.

Code	Criterion	Score
E9	**Waste management**	**76%**
E9.1	Handling of syringes after use	89%
E9.2	Storage of immunization waste	74%
E9.3	Disposal of immunization waste	42%

C2 Equipment (79%)

Sub-category	Code	Requirement	Score
C2.3 Other equipment (79%)	R0097	Safety boxes meet minimum standards.	100%
	R0125	There are suitable facilities and equipment for storing waste.	60%
	R0116	The facility has personal protective equipment for handling waste.	54%
	R0104	The waste burial facilities meet minimum requirements.	50%

Recommendations:

- Update existing SOP on immunization waste disposal based on WHO and UNICEF waste management guidelines. Prepare job aids on immunization waste disposal, establish an immunization waste disposal system and train all EPI staff on proper management of immunization waste.

C4 Human resources (59%)

Sub-category	Code	Requirement	Score
Staffing (19%)	R0250	Adequate number of staff is assigned to manage immunization waste.	18%
C4.2 Training (88%)	R0267	Responsible staff is trained in immunization waste management.	90%
C4.3 Knowledge & understanding (94%)	R0294	Responsible staff are aware of key principles and procedures of immunization waste management.	94%

C5 Policies & procedures (98%)

Sub-category	Code	Requirement	Score
C5.3 SOPs (98%)	R0324	The facility has the required SOPs/guidelines for immunization waste management.	100%
	R0328	There are safe injection SOPs in the immunization room.	80%

C6 Financial resources (80%)

Sub-category	Code	Requirement	Score
C6.2 Funds for operations (80%)	R0403	Facility funds budgeted for waste management are received in full and on time.	88%
	R0406	Facility funds received for waste management are sufficient.	72%

Recommendation:

Sufficient fund may be allocated for the routine EPI waste management and disposal.

O Output (75%)

Code	Requirement	Score
R0642	The facility uses standard safety boxes.	92%
R0639	The facility uses recommended syringes.	90%
R0648	Safe injection practices are followed.	84%
R0654	Filled safety boxes are stored safely pending disposal or removal.	84%
R0656	Waste is removed from the facility frequently.	50%
R0657	Immunization waste is disposed using a safe method.	28%

Recommendation mentioned above in waste management

P Performance (80%)

Code	Requirement	Score
R0645	The facility has no needle stick injuries and or risk environment	92%
R0653	The immunization room is maintained clean and free of used syringes, vials and ampoules.	88%
R0655	The waste storage area is maintained free of used syringes, needles, vials, ampoules and other types of health waste.	80%
R0658	The waste disposal site is maintained free of used syringes, vials and ampoules.	56%

M1 Annual needs forecasting (97%)

C4 Human resources (96%)

Sub-category	Code	Requirement	Score
C4.1 Staffing (98%)	R0232	At least one member of staff is responsible for forecasting vaccine and dry goods needs.	100%
C4.2 Training (94%)	R0252	Responsible staff are trained how to forecast vaccine and dry goods needs.	90%

C5 Policies & procedures (96%)

Sub-category	Code	Requirement	Score
C5.3 SOPs (96%)	R0299	The facility has vaccine and dry goods needs forecasting guidance materials for managers.	100%

O Output (98%)

Code	Requirement	Score
R0661	The facility uses a standard method to forecast its vaccine needs.	100%
R0660	The facility has dry goods needs forecasts for the current year.	100%
R0659	The facility has vaccine needs forecasts for all vaccines for the current year.	100%

P Performance (100%)

Code	Requirement	Score
R0662	The facility's vaccine needs forecasts are accurate.	100%

M2 Annual work planning (59%)

The annual work plan is nascent and needs wider dissemination among mid-level managers and iSC staff. The existing annual work plan includes only two indicators of the immunization program. EPI program is implemented in the country with the integration of government and different partner agencies where all put their plan in different activities for strengthening the health system.

C4 Human resources (48%)

Sub-category	Code	Requirement	Score
C4.1 Staffing (68%)	R0251	The turnover of iSC facility staff is low.	90%
	R0233	At least one member of staff is responsible for annual work planning.	64%
C4.2 Training (23%)	R0253	Responsible staff are trained in annual work planning.	22%

C5 Policies & procedures (17%)

Sub-category	Code	Requirement	Score
C5.3 SOPs (17%)	R0300	The facility has annual work planning guidance materials for managers.	16%

C6 Financial resources (97%)

Sub-category	Code	Requirement	Score
C6.1 Salaries (99%)	R0355	Funds for staff salaries are received in full and on time.	100%
	R0358	Staff are paid in full and on time.	98%
C6.2 Funds for operations (88%)	R0371	Funds budgeted for the internet connection are received in full and on time.	98%
	R0367	Funds budgeted for electricity are received in full and on time.	92%
	R0370	Funds received for electricity are sufficient.	90%
	R0375	Funds budgeted for the mobile reception are received in full and on time.	86%
	R0374	Funds received for the internet connection are sufficient.	76%
	R0378	Funds received for the mobile reception are sufficient.	76%

O Output (67%)

Code	Requirement	Score
R0666	The facility monitors the implementation status of the work plan activities.	84%
R0668	The facility records its income and expenditure.	84%
R0663	The facility has a budgeted annual work plan.	48%

P Performance (75%)

Code	Requirement	Score
R0667	Implementation of the annual work plan is on schedule.	80%

Recommendation

- There should be an activity-wise annual work plan with a budget prepared jointly by government and development partners.
- A monitoring mechanism should be developed to follow the implementation of the work plan.

M3 Supportive supervision (73%)

The LD and SP level supervisors visited SPs and vaccination sessions, but there was no standard checklist for the supervisory visit. However, HR, transport, fuel, SOPs, and financial support are available for supportive supervision.

O Output (73%)

Code	Requirement	Score
R0672	Staff receive feedback from supervisors.	74%

Recommendation:

Supervisors should use a standardised checklist for supervision, analyse the findings, share it with staff in the monthly meeting, and provide on-job training.

M4 iSC performance monitoring (70%)

Immunization supply chain (iSC) performance scored 70% because specific KPIs like stock out events, Cold Chain repair time, vaccine wastage rate was not regularly monitored. No specific person was assigned to monitor the KPIs.

C4 Human resources (63%)

Sub-category	Code	Requirement	Score
C4.1 Staffing (47%)	R0234	There are enough staff able to carry out iSC performance monitoring tasks.	46%
C4.2 Training (79%)	R0255	Responsible staff are trained how to carry out ISC performance monitoring tasks.	80%

Recommendation:

Adopt a number of KPIs to be used in monitoring the performance of the supply chain, based on the minimum KPIs recommended by the EVM 2.0 standard.

C5 Policies & procedures (83%)

Sub-category	Code	Requirement	Score
C5.3 SOPs (83%)	R0329	The SOPs are written in a local language.	100%
	R0330	The SOPs are up to date.	100%
	R0302	The facility has iSC performance monitoring guidance materials for managers.	48%

O Output (65%)

The stock record is up to date in all SPs. Vaccine indents were in place, vaccines losses are also recorded, stock record were well organized and secured, vaccine received are inspected and recorded during received of vaccine. Some issues identified like and completely the physical vaccine stocks counts are not conducted regularly in some places, the vaccine and dry good stock levels are not documented in stock register.

Code	Requirement	Score
R0685	The facility monitors its vaccine stock status indicators	92%
R0693	The facility monitors its unopened vial wastage rates.	90%
R0675	The facility monitors its temperature alarm rates.	56%
R0701	The facility reviews iSC performance at least annually.	44%
R0696	The facility monitors its vaccine forecast accuracies.	4%

Recommendation:

- Temperature alarm rates should be monitored monthly for all facilities in the prescribed format.
- Simplified EVM assessment 2.0 tool should be made available to review iSC performance annually.
- Introduce digitization of micro planning to monitor vaccine forecast accuracies.

7. System indicators (Availability, Quality, Efficiency)

The EVMA system indicators measure the immunization supply chain's availability, quality, and efficiency. The 2021 Bangladesh assessment found good quality (96%) and efficient (91%) vaccine supply management. However, the assessment scored only 71% for the availability of the supply chain system. The detailed findings were as follows:

- Facilities have been supplied with adequate vaccines; therefore, it scored 97% in the R0704 criterion. All the supply was made in multiple shipments against a single indent. Therefore, it scored 36% in the R0707 criterion.
- Two criteria (R0712 & R0722) related to MDVP were scored less than 80% for quality because some facilities did not have the opening date marked on MDVP vials in the immunisation session and refrigerator.
- On efficiency, all requirements scored more than 80% except the criterion R0734 - *No vaccines are discarded due to physical damage*- scored 21%. Especially the diluent of MR vaccine is wasted due to physical damage during storage.

Table 8: EVMA 2021 scores for the Availability, Quality, and Efficiency of vaccine supply chain

Code	Criterion	Score
SY.1	Availability	71
SY.2	Quality	96
SY.3	Efficiency	91
TOTAL		89

Table 9: Availability (71%)

Code	Requirement	Score
R0704	Facilities have been supplied with adequate vaccines	97
R0707	All requests for vaccine are met in full and on time	36

Table 10: Quality (96%)

Code	Requirement	Score
R0710	Expired vaccines are never administered	95
R0711	Heat damaged vaccines are never administered	92
R0712	Multi-dose vial vaccines are never administered more than 28 days after opening	70
R0713	There are no expired vaccines in stock	98
R0716	There are no heat damaged vaccines in stock	96
R0719	There are no tOPV or mOPV2 in the Cold Chain or in dry storage	100
R0722	There are no opened multi-dose vials in the refrigerators that were opened more than 28 days ago	69

Table 11: Quality (91%)

Code	Requirement	Score
R0725	No vaccines are discarded due to expiry	99
R0726	No vaccines are discarded due to freeze damage	98
R0730	No vaccines are discarded due to heat exposure	99
R0734	No vaccines are discarded due to physical damage	21

8. SWOT analysis and Overall Recommendations

SWOT analysis

STRENGTHS	• All LD stores have designated spaces/buildings/offices for Vaccine stores; • Appropriate Cold Chain equipment is in place at all LD levels; • The EVM SOP for vaccine and Cold Chain management is in place; • Contingency plans are in place at the LD level; • HR in Cold Chain management is trained and dedicated to vaccine and Cold Chain maintenance and vaccine management; • Continuous support from partners; • WHO PQS CCE available at LD level; • ICT equipment is available at all LD levels; • Despite uninterrupted power supply, 47 LD stores are equipped with a backup generator;
WEAKNESSES	• Inadequate staffing for Cold Chain management; • Poor documentation on vaccine stock management and equipment inventory; • Limitation of proper HTR plan; • Adequate dry goods space at majority LDs; • No established session plan for fixed sites; • The wastage management plan is not comprehensive; • No subsidiary for the mobile bill; • Necessary ICT skill to report iSC data • Comprehensive contingency plan; • Improper documentation of CCE repair and maintenance; • Expired and non-certified fire extinguisher; • Lack of regular monitoring and supervision from higher to lower levels with feedback;

OPPORTUNITIES	• Long-term passive storage device (Piloting, implementation); • Proper Hard to reach plan with the budget; • Rearrange the dry goods storage and extension if necessary; • Vaccine storage capacity, Human resources, Training, National level budget, Supervision capacity to introduce a new vaccine; • Coordination with MIS, DGHS; • Basic computer training through MIS and update IST curriculum to include basic computer training; • The existing contingency plan should be updated; • Update the EVM SOP; • Real-time vaccine and logistics stock management system • Vaccine forecasting tools up to SP level; • EPI micro plan as a source of EPI budgeted workplan guidance; • Update DHIS2 for CCEI;
THREATS	• The ongoing COVID vaccination campaign has critically affected the routine Cold Chain spaces (Cold Chain rooms, refrigerators, and insulated containers are occupied with the COVID-19 vaccine). • The current COVID-19 pandemic can affect timely procurement and disruption in the supply chain of vaccines and logistics due to restricted mobility. • Staffs at vaccine stores of all levels are at risk of COVID-19 infection. Additional supportive staffs need to be trained for smooth supply and maintenance of the Cold Chain at all levels. • Due to an incomplete and improper recording system, there is difficulty in forecasting, which might lead to the inadequate distribution of vaccines and logistics. • There is a gap in coordination between the division, district, and municipalities, which may compromise Cold Chain capacity and performance. • Technical assistance of development partners will reduce • Slow recruitment process for adequate staff

Overall recommendations

Timeframe	Recommendations	PR	LD	SP
Immediate	Vaccine should be stored by lot or Batch number and expiry date as per EVM SOP at all levels	✓	✓	✓
	Cold Chain inventory must be updated at all levels in DHIS2/CCEI	✓	✓	✓
	Quarterly physical and recorded stock in register must be counted and validated by the supervisor at central level and monthly at the LD and SP level.	✓	✓	✓
	Introduce digitization of micro planning to monitor vaccine forecast accuracies	✓	✓	✓
Short term	For ensuring the quality and safety of vaccines in all WICs/WIF temperature mapping shall be done	✓	✓	
	EPI should arrange basic EPI training for the newly appointed, promoted officers and staffs of the vaccine stores on EVM SOP at all level and periodical refreshers training for key EPI personnel	✓	✓	✓
	Supportive supervision and mentoring support need to be strengthened on all areas of immunization supply chain including stock management, vaccine distribution, Cold Chain, data management, session organization, on-job training, safe injection practice, reporting and feedback etc.	✓	✓	✓
	Strengthen supportive supervision by developing standardized supervision checklist for iSC key performance and by developing supervision app/ ODK based tool	✓		
	To ensure fire safety for all level, fire extinguisher should be refilled and certified before expiry date.	✓	✓	✓
Long term	As there is insufficient storage space of dry goods at central store (Syringes, diluents, Safety boxes, vaccine carriers, vaccination cards etc), EPI may consider extending the newly constructed EPI building vertically along with proper racking system and stacker. This will provide an additional 1400M^3 of dry storage space. Additionally, EPI may also decide to demolish old (circa: 1960s) building to construct a high-rise dry store and office building.	✓	▪	▪
	The central EPI should fill-up vacant key staff positions (Store manage-1, Logistics Officer-1, Storekeeper-2, Sub Asstt. Engineer-3) at the EPI central store and CCT-24 at district level for effective and efficient vaccine and logistics management	✓	✓	▪

Timeframe	Recommendations	PR	LD	SP
	Introduce integrated vaccine and logistics stock management system (preferably both online and based Stock Management Tool or Blockchain based stock management system) at all levels	✓	▪	▪
	Develop and implement the immunization waste management SOP at all levels	✓	✓	✓
	Develop and implement a SOP on iSC KPI, and implement a system and dashboard to monitor the iSC key performance indicators	✓	✓	✓
	There should be activity wise annual workplan with budget and timeline which must be prepared jointly by government and development partners at all level.	✓	✓	✓
	Assess Cold Chain and dry store capacity at all level with focus on next 10 years	✓	✓	✓
	Develop a condemnation procedure for unusable CCE	✓		

9. Conclusion

Effective Vaccine Management Assessment 2021 of Bangladesh confirms that the country has maintained a laudable three-tier based immunization supply chain system that has demonstrated consistent progress since preceding EVMs in 2011 and 2014. Bangladesh did its best to implement the recommendations of the previous EVMAs and met almost all key strategic recommendations. Bangladesh scored above or close to the WHO recommended 80% in all the criteria. Overall performance of the country is above the WHO requirement of 80%. The assessment noted that PR has an acute shortage of dry storage space and remains responsible for conducting MLM training, refresher training, and strengthening supportive supervision at all levels, including LD and SP.

The assessment also identified areas for improvement, particularly

- Temperature management including temperature mapping at PR and LD. Special emphasis needs to be given to temperature management during transportation.
- Waste management at all levels and recommends a long-term sustainable solution to mitigate this particular concern
- Filling up vacant posts at all levels also poses a vital weakness with a lack of adequate, skilled, and trained human resources.

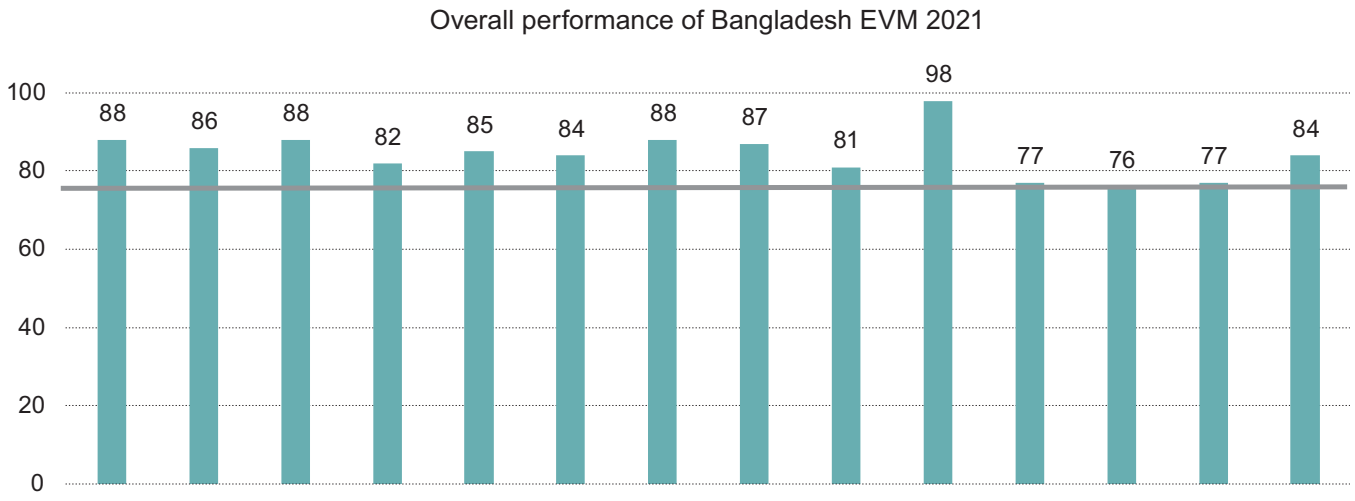
The EVMA 2021 depicts a good history of success of the Bangladesh EPI program with ample scope for sustainable improvement elaborated in the recommendations of this EVM report.

Annexes

Annex-1. Overall performance of EVM 2021

		Infrastructure	Equipment	Information technology	Human resources	Policies & procedures	Financial resources			TOTAL
		C2	C3	C4	C5	C6	OUTPUT	PERFORMANCE		
Vaccine arrivals	E1			100	50	92		100		88
Temperature management	E2			90	84	100		73	98	86
Storage and transportation capacity	E3	45	89		96	100	100	78	100	88
Facility infrastructure and equipment	E4	84	72	94			95	79		82
Maintenance and repair	E5			54	96	100	98	69	87	85
Stock management	E6			92	86	100		80	73	84
Distribution of vaccines and dry goods	E7		100	91	75	69	94	93	98	88
Vaccine management	E8				74	100		9		87
Waste management	E9		63		79	98	89	55	83	81
Annual needs forecasting	M1				97	99		98	100	98
Annual work planning	M2				70	44	99	79	76	77
Supportive supervision	M3	100	100	7	98	100	100	74		76
iSC performance monitoring	M4			94	84	94		67		77
TOTAL		83	81	85	83	92	99	78	89	84

Annex-2. A very good overall performance



Annex-3. EVM assessment criteria and categories

Nine operations criteria (E1-E9)	Four management criteria (M1-M4)	Six vaccine programme management categories	Six management functions and outputs and performance
E1 Vaccine arrivals	M1 Annual needs forecasting	R1-R6	
E2 Temperature management	M2 Annual work planning		
E3 Storage and transportation capacity	M3 Supportive supervision		
E4 Facility infrastructure and equipment	M4 iSC performance monitoring		
E5 Maintenance and repair			
E6 Stock management			
E7 Distribution of vaccines and dry goods			
E8 Vaccine management			
E9 Waste management			

Annex-4. Location scores

AU1	AU2	Location name	Parent	Level	Score
	Dhaka Division	EPI HQ		PR	85%
Chattogram Division	Chandpur District	Chandpur Civil Surgeon Office	EPI HQ	LD	80%
Chattogram Division	Chandpur District	Haimchar Upazila Health Complex	Chandpur Civil Surgeon Office	SP	83%
Chattogram Division	Chandpur District	Saharasthi Upazila Health Complex	Chandpur Civil Surgeon Office	SP	89%
Chattogram Division	Chattogram District	Chattogram Civil Surgeon Office	EPI HQ	LD	87%
Chattogram Division	Chattogram District	Boalkhali Upazila Health Complex	Chattogram Civil Surgeon Office	SP	82%
Chattogram Division	Chattogram District	Mirarsarai Upazila Health Complex	Chattogram Civil Surgeon Office	SP	87%
Chattogram Division	Cumilla District	Cumilla Civil Surgeon Office	EPI HQ	LD	84%
Chattogram Division	Cumilla District	Muradnagar Upazila Health Complex	Cumilla Civil Surgeon Office	SP	86%
Chattogram Division	Cumilla District	Nangolkot Upazila Health Complex	Cumilla Civil Surgeon Office	SP	81%
Dhaka Division	Dhaka District	Dhaka Civil Surgeon Office	EPI HQ	LD	88%
Dhaka Division	Dhaka District	Dhamrai Upazila Health Complex	Dhaka Civil Surgeon Office	SP	85%
Dhaka Division	Dhaka District	Nawabganj Upazila Health Complex	Dhaka Civil Surgeon Office	SP	87%
Dhaka Division	Dhaka District	Savar Municipality	Dhaka Civil Surgeon Office	SP	77%
Dhaka Division	Dhaka District	Savar Upazila Health Complex	Dhaka Civil Surgeon Office	SP	83%
Dhaka Division	Dhaka North City Corporation (DNCC)	DNCC Zone-3	EPI HQ	LD	78%
Dhaka Division	Dhaka North City Corporation (DNCC)	DNCC Ward-23	DNCC Zone-3	SP	75%
Dhaka Division	Dhaka North City Corporation (DNCC)	DNCC Ward-35	DNCC Zone-3	SP	71%
Dhaka Division	Dhaka South City Corporation (DSCC)	DSCC Zone-3	EPI HQ	LD	82%
Dhaka Division	Dhaka South City Corporation (DSCC)	DSCC Ward-22	DSCC Zone-3	SP	71%
Dhaka Division	Dhaka South City Corporation (DSCC)	DSCC Ward-27	DSCC Zone-3	SP	81%
Dhaka Division	Dhaka South City Corporation (DSCC)	DSCC Zone-5	EPI HQ	LD	79%
Dhaka Division	Dhaka South City Corporation (DSCC)	DSCC Ward-41	DSCC Zone-5	SP	74%
Dhaka Division	Dhaka South City Corporation (DSCC)	DSCC Ward-47	DSCC Zone-5	SP	79%
Dhaka Division	Faridpur District	Faridpur Civil Surgeon Office	EPI HQ	LD	84%
Dhaka Division	Faridpur District	Bhanga Upazila Health Complex	Faridpur Civil Surgeon Office	SP	83%
Dhaka Division	Faridpur District	Modhukhali Upazila Health Complex	Faridpur Civil Surgeon Office	SP	84%

AU1	AU2	Location name	Parent	Level	Score
Chattogram Division	Feni District	Feni Civil Surgeon Office	EPI HQ	LD	77%
Chattogram Division	Feni District	Feni Municipality	Feni Civil Surgeon Office	SP	82%
Chattogram Division	Feni District	Fulgazi Upazila Health Complex	Feni Civil Surgeon Office	SP	86%
Dhaka Division	Gazipur District	Gazipur Civil Surgeon Office	EPI HQ	LD	81%
Dhaka Division	Gazipur City Corporation	Gazipur CC Zone-3	Gazipur Civil Surgeon Office	SP	76%
Dhaka Division	Gazipur District	Kapasia Upazila Health Complex	Gazipur Civil Surgeon Office	SP	85%
Khulna Division	Jashore District	Jashore Civil Surgeon Office	EPI HQ	LD	89%
Khulna Division	Jashore District	Bagerpara Upazila Health Complex	Jashore Civil Surgeon Office	SP	87%
Khulna Division	Jashore District	Monirampur Upazila Health Complex	Jashore Civil Surgeon Office	SP	90%
Rangpur Division	Kurigram District	Kurigram Civil Surgeon Office	EPI HQ	LD	87%
Rangpur Division	Kurigram District	Kurigram (sadar) Upazila Health Office	Kurigram Civil Surgeon Office	SP	77%
Rangpur Division	Kurigram District	Rajarhat Upazila Health Complex	Kurigram Civil Surgeon Office	SP	64%
Khulna Division	Magura District	Magura Civil Surgeon Office	EPI HQ	LD	85%
Khulna Division	Magura District	Magura (sadar) Upazila Health Office	Magura Civil Surgeon Office	SP	73%
Khulna Division	Magura District	Sreepur MG Upazila Health Complex	Magura Civil Surgeon Office	SP	86%
Mymensingh Division	Mymensingh District	Mymensingh Civil Surgeon Office	EPI HQ	LD	91%
Mymensingh Division	Mymensingh District	Gauripur Municipality	Mymensingh Civil Surgeon Office	SP	87%
Mymensingh Division	Mymensingh District	Trisal Upazila Health Complex	Mymensingh Civil Surgeon Office	SP	89%
Dhaka Division	Narayanganj District	Narayanganj Civil Surgeon Office	EPI HQ	LD	89%
Dhaka Division	Narayanganj District	Narayanganj (sadar) Upazila Health Office	Narayanganj Civil Surgeon Office	SP	77%
Dhaka Division	Narayanganj District	Rupganj Upazila Health Complex	Narayanganj Civil Surgeon Office	SP	82%
Rajshahi Division	Natore District	Natore Civil Surgeon Office	EPI HQ	LD	83%
Rajshahi Division	Natore District	Bagatipara Upazila Health Complex	Natore Civil Surgeon Office	SP	80%
Rajshahi Division	Natore District	Lalpur Upazila Health Complex	Natore Civil Surgeon Office	SP	81%
Rangpur Division	Nilphamari District	Nilphamari Civil Surgeon Office	EPI HQ	LD	88%
Rangpur Division	Nilphamari District	Dimla Upazila Health Complex	Nilphamari Civil Surgeon Office	SP	86%
Rangpur Division	Nilphamari District	Kishoreganj Upazila Health Complex	Nilphamari Civil Surgeon Office	SP	88%
Chattogram Division	Noakhali District	Noakhali Civil Surgeon Office	EPI HQ	LD	87%
Chattogram Division	Noakhali District	Kabirhat Upazila Health Complex	Noakhali Civil Surgeon Office	SP	88%
Chattogram Division	Noakhali District	Noakhali (sadar) Upazila Health Office	Noakhali Civil Surgeon Office	SP	80%

AU1	AU2	Location name	Parent	Level	Score
Barishal Division	Pirojpur District	Pirojpur Civil Surgeon Office	EPI HQ	LD	86%
Barishal Division	Pirojpur District	Nesarabad Upazila Health Complex	Pirojpur Civil Surgeon Office	SP	87%
Barishal Division	Pirojpur District	Pirojpur (sadar) Upazila Health Office	Pirojpur Civil Surgeon Office	SP	84%
Dhaka Division	Shariatpur District	Shariatpur Civil Surgeon Office	EPI HQ	LD	83%
Dhaka Division	Shariatpur District	Damudya Upazila Health Complex	Shariatpur Civil Surgeon Office	SP	79%
Dhaka Division	Shariatpur District	Shariatpur (sadar) Upazila Health Office	Shariatpur Civil Surgeon Office	SP	65%
Rajshahi Division	Sirajganj District	Sirajganj Civil Surgeon Office	EPI HQ	LD	76%
Rajshahi Division	Sirajganj District	Kamarkhanda Upazila Health Complex	Sirajganj Civil Surgeon Office	SP	78%
Rajshahi Division	Sirajganj District	Tarash Upazila Health Complex	Sirajganj Civil Surgeon Office	SP	77%
Sylhet Division	Sunamganj District	Sunamganj Civil Surgeon Office	EPI HQ	LD	85%
Sylhet Division	Sunamganj District	Chhatak Upazila Health Complex	Sunamganj Civil Surgeon Office	SP	80%
Sylhet Division	Sunamganj District	Dharmapasha Upazila Health Complex	Sunamganj Civil Surgeon Office	SP	84%
Dhaka Division	Tangail District	Tangail Civil Surgeon Office	EPI HQ	LD	85%
Dhaka Division	Tangail District	Basail Upazila Health Complex	Tangail Civil Surgeon Office	SP	81%
Dhaka Division	Tangail District	Bhuapur Upazila Health Complex	Tangail Civil Surgeon Office	SP	83%

Annex-5. Continuous Improvement Plan (cIP) Development Tool Bangladesh. 28/06/2022

EPI organized three national level workshops with the participation of MoH&FW, WHO and UNICEF technical staffs to prepare the continuous improvement plan (cIP). The plan has been prepared based on EVM criteria and category score of EVM 2.0 assessment report as well as the recommendations. MoH formed a committee to review the EVM assessment report and cIP. The committee approved the draft report and cIP after review and discussion and finally it has been endorsed by the 63rd ICC meeting chaired by Secretary, Health Services Division, MOH&FW. The detail cIP is attached as annex-5.

#	Cat	Activity	Priority	Responsability	Budget	Target start	Target end	Completion indicator	State	Sign off date
1	C1	Supply of SDD CCE with solar panel for emergency prone Upazilas (Costal, flood, Haor, Char, Hilly area etc.)	Medium	EPI/UNICEF	$750,000	1/1/2023	31/12/2023	50 Upazila have SDD CCE	Not started	
2	C1	Supply of sufficient shelves, racks, pallet and ladder for dry store at LD level	High	EPI/UNICEF	$60,000	1/1/2023	31/12/2026	30 store received rack	Not started	
3	C1	Construction of new dry store with 35000sqf space and wide approach road facilities	High	EPI/UNICEF	$3,100,000	1/1/2023	31/12/2026	New EPI dry store constructed	Not started	
4	C1	Extension or renovation to ensure at least 3 rooms for EPI store at SP level	Medium	EPI/UNICEF	$2,000,000	1/1/2023	31/12/2024	50 store have 3 rooms for EPI	Not started	
5	C1	Ensure fire safety management including availability of fire safety equipment, training and fire drill in collaboration with fire service department.	Medium	EPI/UNICEF/ WHO	$84,000	1/1/2023	31/12/2024	752 store have functioning fire extinguisher	Not started	
6	C1	Visual display of instruction for standard way of dry good organization (Dry storage)	Medium	EPI/UNICEF/ WHO	$37,600	1/1/2023	31/12/2024	752 stores have visual display of instruction	Not started	
7	C1	Construction of EPI store in emrgency prone districts and upazila with elevated platform (like flood shelter center)	Medium	EPI/UNICEF	$1,000,000	1/1/2023	31/12/2024	10 EPI stores constructed with elevated platform	Not started	
8	C2	Assessment of cold storage capacity and coolant packs in view of existing and new vaccine introduction	High	EPI/UNICEF	$22,000	1/1/2024	31/12/2025	752 stores assessed	Not started	
9	C2	Additional WIC at LD stores, ILR at SP stores and replacement of all non PQS CCE to PQS CCE	High	EPI/UNICEF	$2,370,000	1/1/2023	31/12/2025	13 WIC, 300 ILR and 500 Freezers installed in recommended facilities	Not started	
11	C2	Preventive maintenance of cold rooms including spare parts	Medium	EPI/UNICEF	$120,000	1/1/2023	31/12/2023	Spare parts procured and installed for recommended facilities	Not started	
12	C2	Replacement of older WIC and WIF including renovation of infrastructure and provision of precool area	High	EPI/UNICEF	$800,000	1/1/2023	31/12/2023	6 Cold rooms replaced and facility renovated at primary level	Not started	
13	C2	Develop temperature mapping SOP and conduct mapping for all the cold rooms and freezer rooms annually	High	EPI/UNICEF/ WHO	$145,000	1/1/2023	30/06/2026	110 WIC and WIF Temperature mapped	Not started	
14	C2	Procure and supply adequate voltage regulator to LD and SP levels	High	EPI/UNICEF	$225,000	1/1/2023	31/12/2024	1500 Voltage regulator supplied	Not started	

#	Cat	Activity	Priority	Responsability	Budget	Target start	Target end	Completion indicator	State	Sign off date
15	C2	Construction or extension of district EPI store in 17 districts for installation of WIC	Medium	EPI/UNICEF	$3,250,000	1/1/2023	31/12/2023	EPI store constructed or renovated or extended in 17 districts	Not started	
16	C2	Supply of proper clothing set including warm coat for WIC	Medium	EPI/UNICEF/ WHO	$71,000	1/1/2023	31/12/2024	128 sets of clothes including warm coat is delivered	Not started	
17	C2	Procurement of GPS, and fire extinguisher for vaccine transports	Medium	EPI/UNICEF/ WHO	$15,000	1/1/2023	31/12/2024	20 GPS and fire extinguisher will be installed in vaccine transports	Not started	
18	C2	Technical assistance and exchange visits to develop and update waste management guidelines, implement an environmentally friendly integrated waste management system in selected facilities and assess the waste management system once in two years.	High	EPI/WHO	$200,000	1/1/2023	31/12/2024	Waste management system and strategy developed. Waste management system established in selected facilities.	Not started	
19	C2	Establishment of waste management infrastructure.	High	EPI/WHO	$1,762,182	1/1/2023	31/12/2026	8 waste management infrastructer estalished	Not started	
20	C2	Training on newly developed waste management system at all level	High	EPI/UNICEF/ WHO	$50,000	1/1/2024	31/12/2025	Training completed in national and sub national level	Not started	
21	C2	SBCC to raise awareness on health hazard of immunization and medical waste	High	EPI/UNICEF/ WHO	$50,000	1/1/2023	31/12/2024	Four types of SBCC material develpoed and disseminated at all level	Not started	
23	C2	Allocation or provision of fuel and other maintenance cost for newly installed generators in 17 Districts	Medium	EPI/UNICEF/ WHO	$652,800	1/1/2024	31/12/2025	Fund disbursed to 17 District stores	Not started	
24	C3	Ensuring dedicated Computer & accessories to Central and districts stores for Immunization supply chain through MIS, DGHS	Medium	EPI/UNICEF/ WHO	$127,000	1/1/2023	31/12/2023	119 Computer procured and distributed to Central, 64 District and 45 CC Zone stores	Not started	
25	C3	The 30DTR and freeze indicator supply to all LDs and SPs as required.	High	EPI/UNICEF/ WHO	$235,000	1/1/2023	31/12/2023	3800 30DTR will be procured and distributed at LD and SP	Not started	
26	C3	Update the Cold Chain equipment and generator inventory (both active and passive CCE) in the DHIS2, conduct training and CCE data update periodically with all recommendad fields for the CCEI as per EVM guidline	High	EPI/UNICEF/ WHO	$50,000	1/1/2023	31/12/2026	Cold chian inventory will be updated		
27	C3	Introduce dedicated eVLMIS software for real time tracking of vaccine and logistics	High	EPI/UNICEF/ WHO	$1,762,182	1/1/2023	31/12/2025	Introduce eVLMIS software at all level	Not started	
28	C4	Develop guideline , conduct training and implement annual workplan at all level	Medium	EPI/UNICEF/ WHO	$150,000	1/1/2023	21/12/2023	Annual workplan guidline developed and implemented at 64 Districts	Not started	
29	C4	Update EVM SOP, conduct training and implement the EVM SOP at all level of iSC	Medium	EPI/UNICEF	$1,705,000	1/1/2023	31/12/2024	EVM SOP updated and disseminated at all level	Not started	
30	C4	Regular National logistics working group periodical review meeting on iSC	Medium	EPI/UNICEF/ WHO	$5,000	1/1/2023	31/12/2026	Quarterly review meeting conducted	Not started	
31	C5	Develop Key Performance Indicator (KPI) for performance Evaluation (iSC) and include KPI in EVM SOP and Cold Chain guidline	High	EPI/UNICEF/ WHO	$5,000	1/1/2023	31/12/2023	A set of KPI introduced		
32	C5	Develop SOP for vehicle management through the expert agency on fleet management	High	EPI/UNICEF/ WHO	$25,000	1/1/2023	31/12/2026	One vehicle management SOP developed		

#	Cat	Activity	Priority	Responsability	Budget	Target start	Target end	Completion indicator	State	Sign off date
33	C5	Conduct training on vaccine transport management and SOP once a year for the drivers, helpers, supervisors, and vaccine handlers	Medium	EPI/UNICEF/ WHO	$5,000	1/1/2023	31/12/2026	Annual trainning will be conducted at EPI-HQ		
34	C6	Procure Smart device and mobile connectivity for both data and voice for all EPI stores to strengthen iSC reporting and monitoring	High	EPI/UNICEF/ WHO	$225,600	1/1/2023	31/12/2026	Smart device procured and supplied to 752 EPI stores	Not started	
35	C6	Procurement and modification of bycycle for transportation of multiple FFVC	Medium	EPI/UNICEF/ WHO	$396,000	1/1/2023	30/06/2025	2000 Bicylce procured and distributed at 495 Upazilas	Not started	
36	C6	Strengthening iSC staff for supply chain operation for establishing reliable communication	High	EPI/UNICEF/ WHO	$153,548	1/1/2023	30/06/2026	Financial support will be provided to all 752 facilities	Not started	
37	C4	Develop Cold Chain guideline and conduct training of Cold Chain technicians and MT-EPI	High	EPI/UNICEF	$60,000	1/1/2023	30/06/2024	One Cold Chain guidline developed and 30 batches trainning conducted	Not started	
38	C1	Develop and submit annual workplan for repair and maintenance activities to PWD and HED	Medium	EPI	$0	1/1/2023	30/06/2026	One Memo issued to PWD and HED from local health authorities	Not started	
39	C4	Develop vaccine supply route map with distance and update guideline	High	EPI/UNICEF/ WHO	$0	1/1/2023	30/06/2023	Route map developed for 64 Districts	Not started	
40	C5	Update EPI guideline and conduct refresher training	High	EPI/UNICEF/ WHO	$100,000	1/1/2023	30/06/2025	One national EPI guidline updated and 110 batch training conducted		
41	C5	Conduct basic training for newly recruited health workers and Supervisors	Medium	EPI/UNICEF/ WHO	$70,000	1/1/2023	30/06/2026	8 City Corporations health workers and supervisors training will be completed		

Budget Summary					
Continuous Improvement Plan (cIP) Development Tool					28/06/2022
Bangladesh					
Improvement Plan Budget Summary	2023	2024	2025	2026	Total Budget
					USD
Infrastructure	$ 750,000	$ 3,121,600	$ -	$ 3,160,000	**$ 7,031,600**
Equipment	$ 4,170,000	$ 561,000	$ 3,094,800	$ 1,907,182	**$ 9,732,982**
Information Technology	$ 362,000	$ -	$ 1,762,182	$ 50,000	**$ 2,174,182**
Human Resources	$ 150,000	$ 1,765,000	$ -	$ 5,000	**$ 1,920,000**
Policies and Procedures	$ 5,000	$ -	$ 100,000	$ 100,000	**$ 205,000**
Financial resources	$ -	$ -	$ 396,000	$ 379,148	**$ 775,148**
	$ 5,437,000	$ 5,447,600	$ 5,352,982	$ 5,601,330	**$ 21,838,912**

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