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EVM
Setting a standard for the
vaccine supply chain

**Assessment Report and
Comprehensive Improvement
Plans (cIP) 2023-2026**

Lao People's Democratic Republic

National Effective Vaccine Management Assessment 2022

PREFACE

Health Minister

Vaccines have proven to be a cost-effective intervention to prevent diseases and deaths among children. In the Lao People's Democratic Republic, the Expanded Programme on Immunization provides vaccines against vaccine-preventable diseases and COVID-19 free of cost to all citizens of the country.

The Ministry of Health, in close collaboration with the development partners, is committed to delivering safe and potent vaccines at the recommended temperature to all parts of the country including the underserved and hard-to-reach parts of the Lao People's Democratic Republic. A strong immunization supply chain is crucial to ensuring that these vaccines are supplied at the right temperature. The immunization supply chain is assessed based on the global parameters of the Effective Vaccine Management for an efficient performance.

In the Lao People's Democratic Republic, the last Effective Vaccine Management assessment of the immunization supply chain was conducted in 2014, following which many recommendations were implemented through an improvement plan. Now, with support from UNICEF, the Ministry of Health has conducted a new National Effective Vaccine Management Assessment to assess the strengths and the weaknesses of the immunization supply chain in the Lao People's Democratic Republic.

During this assessment, 80 vaccine stores were assessed to give a representative picture of the immunization supply chain. The collaborative efforts of the government and development partners have resulted in improvement of the Effective Vaccine Management score in the country. It has helped us to understand the key focus areas of improvement and formulate a continuous improvement plan for implementation to strengthen the vaccine storage and transportation in the country.

I would like to express my deep appreciation to all representatives from the government and partner organizations who participated in the National Effective Vaccine Management Assessment and have contributed to the development of the continuous improvement plan. I express my gratitude to UNICEF for their support in every step of the Effective Vaccine Management Assessment and overall strengthening of the immunization programme in the Lao People's Democratic Republic. I look forward to a continued collaboration to implement the improvement plan activities to further strengthen the vaccine delivery mechanism in the country.

Director General, Ministry of Health

The Expanded Programme on Immunization (EPI), by the Government of the Lao People's Democratic Republic, is one of the oldest and most-effective public health programmes in the country. Through EPI, free-of-cost vaccines are provided against 10 vaccine-preventable diseases. Over the last decade, many notable achievements are attributed to EPI including the introduction of new vaccines like measles-rubella vaccine, human papillomavirus vaccine, pneumococcal vaccine, tetanus-diphtheria vaccine, etc. As a response to the COVID-19 pandemic, the COVID-19 vaccine was also introduced in the country to provide free COVID-19 vaccines to populations above 5 years of age.

In addition to new vaccines, the country's immunization supply chain has been strengthened through the procurement of new cold chain equipment and vaccine transportation vehicles, and training of health staff to ensure storage and transportation of vaccines at the recommended temperature range. The strong commitment of the Government of the Lao People's Democratic Republic and the close collaborative support by the development partners such as WHO, UNICEF, ADB and CHAI help to continually improve the immunization programme in the country.

Efficiency and performance of the immunization supply chain is assessed using the global Effective Vaccine Management guidelines. In the Lao People's Democratic Republic, the last Effective Vaccine Management assessment was conducted in 2014 using the EVM 1.0 tool. In the current assessment, a more comprehensive web-based EVM 2.0 tool was used to assess all aspects of the immunization supply chain across 80 vaccine stores in 11 provinces and 23 districts of the country.

Involvement of stakeholders from government (both central and provincial) and partner organizations in the Effective Vaccine Management assessment has highlighted an unbiased overview of the immunization supply chain in the Lao People's Democratic Republic. It has demonstrated the impact of recommendations from the last Effective Vaccine Management assessment (Effective Vaccine Management improvement plan 2015-2020) and the existing bottlenecks which require focussed efforts to further improve the efficiency and functioning of the vaccine delivery system.

I want to congratulate the Expanded Programme on Immunization and United Nations' Children's Fund teams for successfully completing this assessment and for using these results to develop a comprehensive improvement plan for strengthening the immunization supply chain in the Lao People's Democratic Republic. I am confident that with continued support and collaboration of the central and provincial health departments with all development partners we can ensure that the improvement plan will be implemented to produce significant impacts on the immunization programme in our country.

PREFACE

Country Representative, UNICEF Lao People's Democratic Republic

Vaccines, one of the greatest advances in public health, save around 2 to 3 million children against life-threatening diseases every year. With steady expansion of immunization programmes globally, we have achieved elimination of deadly diseases like smallpox and poliomyelitis and control of highly infectious maternal and neonatal tetanus, measles, and rubella among other diseases. Most recently, the vaccines have proved to be instrumental in the control of the COVID-19 pandemic.

In the 50-year association of UNICEF and the Lao People's Democratic Republic, we have supported the Government of the Lao People's Democratic Republic in implementing the immunization programme through streamlining vaccine delivery and vaccine demand in the community. We continue to work to support the Government of the Lao People's Democratic Republic in effective implementation of the immunization programme, with particular focus on low-performing parts of the country.

The global WHO-UNICEF Effective Vaccine Management guidelines set the benchmark for quality and efficiency of immunization supply chains and cold chains. The Effective Vaccine Management tool has helped more than 80 countries to evaluate the status of vaccine and cold chain management systems and develop a comprehensive improvement plan to strengthen the immunization service delivery.

Since the last Effective Vaccine Management assessment of the Lao People's Democratic Republic in 2014, significant investments have been made to the country's immunization programme through the introduction of newer vaccines, procurement of new cold chain equipment and capacity building of health staff. UNICEF supported the capacity building of 66 national assessors on the global Effective Vaccine Management guidelines and the 2nd National Effective Vaccine Management Assessment across 80 vaccine stores to highlight the strengths and identify the bottlenecks in the immunization supply chain.

The findings of this assessment form the basis of the next continuous and comprehensive improvement plan to strengthen the immunization supply chain in the country. This remains a significant first step in achieving a more efficient, sustainable, and effective immunization supply chain, and helps us to achieve our commitment to reach every mother and child in the country.

I would like to reiterate our commitment to strengthen efforts towards every mother and child in the Lao People's Democratic Republic. I want to express my sincere gratitude to the team at UNICEF for their support to the Ministry of Health to successfully complete the Effective Vaccine Management assessment and contribute to the ongoing strengthening and improvement initiatives for the country's immunization supply chain.

ACKNOWLEDGEMENT

The National Effective Vaccine Management (EVM) Assessment 2022 is an outcome of collective and consistent efforts of all stakeholders. The assessment has been possible due to the kindness, guidance, and support of the Government of the Lao People's Democratic Republic. The commitment of the Honourable Minister and Vice Ministers of Health towards the National Effective Vaccine Management Assessment and its findings was pivotal in highlighting the importance of a strong immunization supply chain in the Lao People's Democratic Republic.

We express our sincere gratitude to Dr. Phounepaseuth Ounaphom, the Director General, Department of Health and Hygiene Promotion, the Ministry of Health, the Government of the Lao People's Democratic Republic, for his presence and leadership through every step of the National Effective Vaccine Management Assessment.

We would like to thank Dr. Kongxay Phounphenghack, the National Expanded Programme on Immunization Manager, and his team for his leadership and problem-solving attitude. We want to express our appreciation to Dr. Chansay Pattamavong and her team for their support in facilitating the huge administrative and logistic work at every stage of the assessment. The National Effective Vaccine Management Assessment would not have been possible without the cooperation and support from the provincial and district Expanded Programme on Immunization managers and the facility in-charge and cold chain staff of the sampled vaccine stores.

We are grateful to the national assessors for their patience in understanding and familiarizing with the new EVM 2.0, their cooperation and hard work to visit and assess the sampled vaccine stores, sometimes navigating through difficult and hard-to-reach terrain.

We are grateful to the immunization team at UNICEF in the Lao People's Democratic Republic who have provided technical and logistical support at every stage of the assessment and development of the Effective Vaccine Management Improvement Plan. We wish to thank the resource persons from the UNICEF Regional Office in Bangkok and the Global Effective Vaccine Management secretariat for their technical guidance and support at every step of the assessment.

We extend our sincere thanks to our colleagues in WHO, CHAI, ADB and Gavi for their relentless support and participation during the training, field visits, and development and finalization of the Effective Vaccine Management continuous improvement plan. We appreciate your commitment to work in close collaboration to strengthen the immunization supply chain in the country.

Lastly, our appreciation to Gavi and USAID for their financial support during the National Effective Vaccine Management Assessment. Your support and continued commitment towards the immunization programme in the Lao People's Democratic Republic is instrumental in both assessment and implementation of the recommendations of this assessment.

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ACRONYMS

30-DTR	30-days temperature recorder
ADB	Asian Development Bank
AMC	annual maintenance contract
AEFI	adverse events following immunization
AQE	availability, quality, efficiency
AWP	annual work plan
BCG	anti-tuberculosis vaccine (bacillus Calmette Geurin)
CCE	cold chain equipment
CCEOP	cold chain equipment optimization platform
CDC	Centers for Disease Control and Prevention, of the United States of America
CHAI	Clinton Health Access Inc.
cIP	continuous improvement plan
COVID-19	CoronaVirus Disease 2019
c-MYP	comprehensive multiyear plans for immunization
CVS	central vaccine store
DHHP	Department of Health and Hygiene Promotion
DHIS	District Health Information System
DHO	district health office
DVS	district vaccine store
EPI	Expanded Programme on Immunization
EVM	Effective Vaccine Management
FIC	full immunization coverage
Gavi	Global Alliance for Vaccines and Immunization
GoL	Government of the Lao People's Democratic Republic
HC	health centre
HPV	human papillomavirus vaccine
HR	human resources
ILR	ice lined refrigerator
IPV	inactivated poliovirus vaccine
iSC	immunization supply chain
IT	information technology
JE	Japanese encephalitis
KPI	key performance indicators
LD	lowest distribution store
LMIS	logistics management information system
LSIS	Lao Social Indicator Survey
MCHC	mother and child health centre
MCV	measles-containing vaccine
MDVP	multi-dose vial policy

ACRONYMS

MOH	Ministry of Health
MoU	memorandum of understanding
MPI	Ministry of Planning and Investment
MR	measles-rubella
NLWG	national logistics working group
NIP	national immunization programme
OPV	oral poliovirus vaccine
PAR	product arrival report
PCV	pneumococcal vaccine
PHO	province health office
PPM	planned preventative maintenance
PPS	probability proportional to size
PQS	Performance Quality Standards
PR	primary store
PVS	provincial vaccine store
RTMD	remote temperature monitoring device
SDD	solar direct drive
SMS	Short Message Service
SN	sub-national vaccine store
SOP	standard operating procedures
SP	service provider level
SS	supportive supervision
ST	strategic planning
Td	tetanus and adult diphtheria
ToR	terms of reference
TMS	temperature monitoring study
TWG	technical working group
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 cold room
WIF	walk-in freezer

EXECUTIVE SUMMARY

Immunization, being one of the most cost-effective and high impact preventive interventions to promote child health, underwent massive expansion in recent years. With the addition of newer more-expensive childhood vaccines such as human papillomavirus vaccine and the roll-out of COVID-19 vaccines to control the pandemic, the immunization supply chain (iSC) in the Lao People's Democratic Republic, with support from the development partners and donor organizations, has also undergone many new developments in the last few years.

While the cold chain storage and transportation capacity has increased over the past few years, it continues to expand further under the Cold Chain Equipment Optimization Platform (CCEOP) project through the support of the Global Alliance for Vaccines and Immunization (Gavi) and the United Nations Children's Fund (UNICEF). Under the ongoing augmentation drive, the cold chain capacity has already increased by more than 123,000 litres at different levels of supply chain and will include an additional 74,000 litres of cold chain storage space within this year. It involved an introduction of new technology through freeze-free vaccine carriers, solar direct drive equipment and new refrigerated vaccine transportation vehicles, in addition to the walk-in cold rooms, refrigerators, freezers and cold boxes to meet the increased need for cold chain space. An introduction of remote temperature monitoring devices in the walk-in cold rooms at the central vaccine store and regional cold chain hubs is the recent development in the robust supply chain of the Lao People's Democratic Republic to facilitate better temperature monitoring practices.

The Lao People's Democratic Republic conducted its last national Effective Vaccine Management (EVM) assessment in 2014, following which a five-year

improvement plan was generated and implemented between 2015 and 2020. However, due to the COVID-19 pandemic, certain activities could not be completed as part of the previous improvement plan. While the progress of some activities halted, the COVID-19 pandemic provided an opportunity to strengthen the cold chain capacity in the country through the contribution of multiple donors. Initially the EVM assessment was planned for 2020 (as recommended every 5 years). However, the COVID-19 pandemic delayed the EVM assessment in the country by nearly two years. Hence, the augmentation of cold chain capacity and the introduction of newer technology and newer vaccines (including COVID-19 vaccines) warranted a comprehensive assessment of the functioning of iSC using the standard Effective Vaccine Management guidelines. During this assessment, it is expected that the tremendous changes in iSC within the last two years of the COVID-19 pandemic have impacted the EVM scores and findings obtained herewith.

The Effective Vaccine Management assessment, jointly designed by the World Health Organization (WHO) and UNICEF, helps to assess, plan, implement and monitor the different functions of the supply chain through its six key inputs (infrastructure, equipment, information and technology, human resources, policies and procedures, and financial resources), output and performance. It helps to improve and maintain the quality of vaccine and cold chain management from the time when a vaccine arrives in the country to its last vaccine store (or the service delivery point).

To assess the progress made since the last Effective Vaccine Management assessment and the current situation of iSC, the National Effective Vaccine Management Assessment was conducted in October

2022. The National Effective Vaccine Management Assessment 2022 was conducted using the revised and more comprehensive EVM 2.0 tool for the first time in the Lao People's Democratic Republic. The EVM 2.0 is a standardized questionnaire hosted on the android-based EVM assessor application which allows for a paperless data collection. For this assessment, a country profile was created on the EVM web portal where the immunization schedule with vaccine and supply chain parameters, list and hierarchy of vaccine stores, and the assessor and manager profiles were added.

Using the 80 per cent confidence and 10 per cent precision, a random sample of 80 vaccine stores was generated. The sampled vaccine stores included the national or central vaccine store (primary or PR), 11 provincial vaccine stores (sub-national or SN), 23 district vaccine stores (lowest distribution or LD) and 45 health centres (service providers or SP). From the sampled 80 locations, 18 were swapped. The most common reason for swapping a location was its inaccessibility due to heavy rains in different parts of the country.

A 5-day orientation of assessors was conducted to train around 66 assessors on the Effective Vaccine Management tool. During the orientation, each assessor was given an android tablet with the preloaded EVM assessor app and a dummy questionnaire for practice. A scenario with a fictitious vaccine store was used to offer a mock-up exercise to the assessors during the orientation. It was supplemented with a field visit to a nearby health centre to allow them to become comfortable with the EVM questions and in using different techniques of data collection such as interviews, observations, data reviews, etc. The questionnaires were pre-translated into the Lao language for use in the EVM assessment. Following the orientation, the assessors proceeded for the field assessment of the 80 sampled vaccine stores according to a pre-approved team deployment plan.

A total of 18 teams, with representation from the central Government, provincial Expanded Programme on Immunization teams and development partners, was deployed for a period of 6-9 days depending on their route plan (Annex 3). During the field assessment, the completion of the Effective Vaccine Management questionnaires and their submission were tracked daily. Furthermore, the quality of data was maintained through a WhatsApp group, created with the assessors and facilitators, for quick doubt sharing, clarifications, and relevant updates to the teams. Each team was provided with two android tablets (one primary and one back-up) with the preloaded EVM assessor app and questionnaires.

Following an intensive data review and cleaning exercise jointly with the Effective Vaccine Management secretariat, the data analysis was conducted for the Effective Vaccine Management assessment. Though the new EVM 2.0 tool limits the comparability of the Effective Vaccine Management scores between 2014 and 2022, the country achieved an overall cumulative score of 78 per cent across all levels of the supply chain. Individually, the Lao People's Democratic Republic scored 78 per cent for the primary store, 78 per cent for sub-national stores, 79 per cent for lowest distribution stores and 76 per cent for service provider stores. The key areas identified for improvement at different levels of the supply chain included:

- Inadequate vaccine stock management:
 - Practices – multi-dose vial policy, record maintenance, vaccine forecasting
 - Performance – vaccine stock outs, quality of services
- Inadequate temperature management especially during vaccine transportation
- Poor planning and implementation of vaccine distribution practices
- Insufficient capacity for vaccine distribution (insulated containers and vehicles) and dry store

- Inadequate waste management policies and procedures
- Lack of digital inventory for cold chain equipment, generators and vaccine transportation vehicles
- Lack of updated policies and procedures including recording/reporting formats related to iSC
- Inadequate cold chain equipment or vehicle repair and maintenance
- Insufficient monitoring of iSC related to key performance indicators, and
- Non-adherence to an annual work plan

The performance of the supply chain was measured by the Availability, Quality, Efficiency scores, which includes availability of vaccines, quality of vaccine management practices and efficiency of iSC. Across all levels of the supply chain, persistently low scores for availability of vaccines (PR=75 per cent, SN=63 per cent, LD=54 per cent, SP=59 per cent) implied inaccurate vaccine forecasts leading to vaccine shortage and vaccine stock out. Quality of vaccine management practices and efficiency of iSC were fairly maintained despite low vaccine availability. Some health centres and district vaccine stores scored relatively low on quality and efficiency. The vaccine management practices were compromised at some health centres due to storage of expired vaccine and opened vials (longer 28 days) in the refrigerator, and higher vaccine wastage due to heat/cold damage or expiration.

After completing the analysis, the Effective Vaccine Management findings were shared with the key stakeholders from the National Immunization Programme (NIP), the provincial EPI and development partners. The Effective Vaccine Management findings formed the basis of a three-day consultative Effective Vaccine Management improvement plan workshop in February 2023. The Effective Vaccine Management continuous improvement plan (cIP) workshop was an interactive workshop with dedicated group work

to use the Effective Vaccine Management findings to set goals and targets for strengthening iSC in the Lao People's Democratic Republic. The standard Effective Vaccine Management continuous improvement plan development tool, with support from the Global Effective Vaccine Management secretariat, was used to set 65 targets for iSC in the Lao People's Democratic Republic. These targets were further merged based on their domains; a list of 50 targets was finalized.

As part of cIP, NIP, with support from UNICEF and other development partners, has translated the finalized 50 targets into 216 activities to be implemented over the next four years. The implementation of these activities has already started to support the expanding iSC in the country. These activities encompass 10 domains of supply chain: Infrastructure, Vaccine Storage and Transportation, Temperature Monitoring, Repair and Maintenance, Policy making and documentation, Research, Waste management, Supportive Supervision, Human Resources and Training, and Funds and Annual Work Planning. The EVM cIP 2023-2026 also outlines the priorities and roles of development partners in supporting the strengthening of iSC in the Lao People's Democratic Republic.

This document provides a snapshot into the strengths of iSC in the Lao People's Democratic Republic and highlights the key areas of improvement. It outlines a direction to further strengthen the supply chain in the country to ensure a more equitable supply of safe and potent vaccines in the remotest and most under-served parts of the country. Effective monitoring of the implementation of activities under the EVM cIP 2023-2026 will be conducted as part of the quarterly meetings of the national cold chain and logistics technical working group and mid-year and annual reviews by the government. Going forward, the impact of the implementation of these activities can be judged through targeted sub-national or national assessments as and when required.

1. Background

1.1 Country context

The Lao People's Democratic Republic is a land-locked and mountainous country, with a population of 7.3 million in 2021, around 70 per cent of the country's area is mountainous, with many remote and inaccessible communities; less than one-fifth of the country is classified as agricultural land. It has a total land area of 236,800 km². The administrative units of the Lao People's Democratic Republic consist of 18 provinces, including the capital, Vientiane Capital. There are a total of 148 districts including 8,404 villages and 1,315,760 households across the 18 provinces (Lao Statistics Bureau, 2021).¹ The country is characterized by a high degree of geographical, cultural and linguistic diversity.

The Lao People's Democratic Republic is at risk from disasters triggered by climate-related hazards, such as droughts and floods. The high vulnerability and exposure are due to the low resilience of the poor and settlement patterns, where most of the population live in areas most exposed to these hazards.

With the continued investment and efforts by the Government, the Lao People's Democratic Republic is making progress from a low-income country to a

low-middle income country. Over the past few years, the economic growth has been driven by the capital-intensive resource sector, supported by debt-driven infrastructure development, with limited spillover to the rest of the economy. Inflation in the Lao People's Democratic Republic rose from less than 2 per cent in February 2021 to an all-time high of 40.3 per cent in January 2023.² This is mostly driven by fuel prices and a steep depreciation of the Lao Kip against the US dollar. This has fuelled inflation, with essential commodity prices (oil, food, vaccines and medicines) increasing sharply.

The immunization programme in the Lao People's Democratic Republic is still heavily dependent on external funding support for operational costs to deliver vaccines, while the government contribution towards procurement of vaccines has been growing steadily. External funding is still substantial, but shrinking, and includes funds from the Global Alliance for Vaccines and Immunization (Gavi), the United Nations Children's Fund (UNICEF), the World Health Organization (WHO), the Center for Disease Control and Prevention (CDC) of the United States of America, the World Bank Group, and others.

1.2 Child health profile

The country's infant and child statistics remain one of the poorest in the region. According to the Lao Social Indicator Survey (LSIS), the Lao People's Democratic Republic has an under-five mortality rate of 46 deaths

per 1000 live births despite the progress in recent years. The main reasons for a high under-five mortality rate are newborn complications and childhood diseases like diarrhea and pneumonia.

¹ Lao Statistics Bureau. <https://laosis.lsb.gov.la/majorIndicators.do?rootId=2102000&menuId=2102101&lang=en¶mGrpId=all&keyword=undefined&searchType=undefined>

² Lao News Agency. URL: <https://kpl.gov.la/EN/detail.aspx?id=71329>

Most child deaths are preventable or treatable with high-impact, low-cost health and nutrition interventions such as immunization and the integrated management of newborn and childhood illnesses.

The impact on child health varies greatly depending on socio-economic groups, ethnicities, geographical locations and the educational levels of the parents.

1.3 Expanded Programme on Immunization

Vaccination is one of the most cost-effective, low-investment and high-impact interventions to prevent child morbidity and mortality. The National Immunization Programme (NIP) was launched as the “Expanded Programme on Immunization” (EPI) in 1979. It was launched with vaccines against six vaccine preventable diseases: bacillus Calmette-Geurin (BCG), diphtheria, pertussis, tetanus, polio and measles. The programme was initially piloted in 2 provinces and 10 districts, and later expanded to all provinces by 1989. Over the past three decades, EPI has expanded to include newer vaccines including the hepatitis B, haemophilus influenzae type B (as part of pentavalent vaccine), injectable polio vaccine (IPV), pneumococcal

conjugate vaccine (PCV), rubella vaccine (as part of measles-rubella vaccines), Japanese encephalitis vaccine and human papilloma virus (HPV) vaccine as part of EPI. With the changing epidemiological trends, the vaccines have been extended to include boosters for MR to children more than 12 months of age. Another recent landmark includes the replacement of tetanus toxoid vaccine with the tetanus-adult diphtheria (Td) vaccine for adolescent and adult females and pregnant women. Apart from the routine childhood vaccines, EPI also provides influenza vaccines to high-risk groups and has successfully implemented COVID-19 vaccination in the country. The current Expanded Programme on Immunization schedule is detailed in the Table below.

Table 1: National Expanded Programme on Immunization schedule, the Lao People’s Democratic Republic

Vaccine antigen	Age	Dose	Route of administration
BCG	Birth (up to 1 year)	0.05 ml	Intradermal
Hepatitis B	First 24 hours (up to 7 days)	0.5 ml	Intramuscular
Pentavalent	6, 10 and 14 weeks	0.5 ml	Intramuscular
PCV13	6, 10 and 14 weeks	0.5 ml	Intramuscular
IPV	14 weeks (up to 1 year)	0.5 ml	Intramuscular
OPV	6, 10 and 14 weeks	2 drops	Oral
MR	MR1: 9-11 months	0.5 ml	Subcutaneous
	MR2: 12-18 months		
JE	9-11 months	0.5 ml	Subcutaneous
HPV	HPV-1: 9 years and above females	0.5 ml	Intramuscular
	HPV-2: 6 months after HPV1		
Td	15-45 years females (5 doses in total)	0.5 ml	Intramuscular
Td (pregnant women)	3 doses (0, 1 and 6 months)	0.5 ml	Intramuscular
Flu	Pregnant women, elderly, health workers and patients with chronic diseases	0.5 ml	Intramuscular

EPI is considered one of the most successful public health interventions in the country. However, whilst immunization coverage improved remarkably between 2005 and 2015, there was a decline in vaccine coverage seen in 2016 for almost all antigens.³ Despite the efforts, the proportion of zero-dose children continues to remain significant and inequity in coverage remains very wide. EPI aims to reach the under-vaccinated and unvaccinated children in every part of the country with safe and potent vaccines through an effective and efficient supply chain system.

To further the commitment towards immunization, the Government of the Lao People's Democratic Republic passed the Law on Vaccination in 2018 as a comprehensive document encompassing all aspects of immunization. This law provides the legal underpinnings for the institutionalisation of major functions of NIP as well as for sustained domestic financial support for the immunization programme at all levels.

In 2018, the Ministry of Health (MOH), in consultation with UNICEF and other development partners conducted an inventory gap analysis to determine the need for cold chain equipment across the country. The recommendations from the analysis further fuelled the cold chain equipment optimization platform (CCEOP) augmentation plan in 2019-2020.

1.4 Immunization supply chain in the Lao People's Democratic Republic

To ensure that good quality and safe/potent vaccines reach the last beneficiary, the Lao People's Democratic Republic has a four-tier iSC (Figure 1). Vaccines from the manufacturers are received at the national or central vaccine store in Vientiane Capital. The central vaccine store (at NIP) includes an array of walk-in cold rooms,

In 2021-2022, CCEOP provided for a procurement of more than 123,751 litres of cold chain storage space (91,719 litres at +2° to +8° C and 32,032 litres at -15° to -25° C) through procurement of walk-in cold rooms, refrigerators, freezers and solar direct drive combo units for the Lao People's Democratic Republic. Through CCEOP, there was an augmentation of cold chain transportation space by 6,922 litres (through cold boxes, vaccine carriers and refrigerated vaccine transportation vehicles) across the country. With the ongoing implementation of the cold chain equipment optimization platform phase-2, an additional 73,778 litres of cold chain capacity will be further augmented in 2023.

The new cold chain equipment procured under CCEOP further supported the roll-out of COVID-19 vaccination drives, in addition to strengthening the routine immunization, in the country. More than 70 health centres received the cold chain storage equipment for the first time, thereby increasing the number of vaccine stores in the country. New vaccine stores have enabled the delivery of safe and potent vaccines closer to the communities, particularly in the hard-to-reach and under-served parts of the country. Each successful vaccination requires a strong immunization supply chain (iSC) to ensure that the right vaccine is administered at the right time, place and cost.

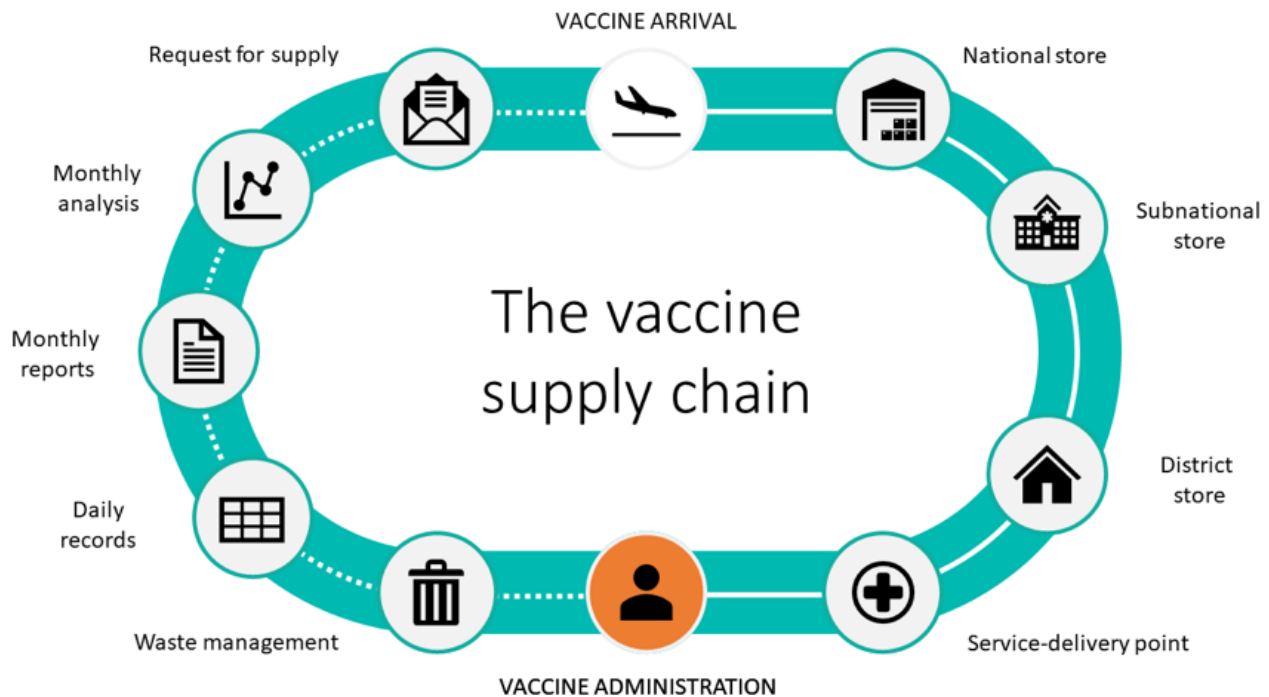
walk-in freezers and ultra-low temperature freezers to store the vaccine stock for the entire country. From the central vaccine store, vaccines are supplied to the provincial vaccine stores. There is a provincial vaccine store in each province, which further supplies vaccines to the district vaccine stores every two months. The

3 *Comprehensive Multi-Year Plan 2017-2023*

district vaccine stores supply vaccines to the health centres once a month. In addition to vaccine storage and transportation, other important elements of the vaccine supply chain include waste management, data recording, analysis and reporting, and vaccine supply and distribution.

Currently there is 1 national (or central) vaccine store, 18 provincial vaccine stores, 148 district vaccine stores and 1,180 health centres (with vaccine storage facilities) in the country.

Figure 1: Components of vaccine supply chain



1.5 About Effective Vaccine Management (EVM)

With an increase in the country’s cold chain capacity and the addition of newer expensive vaccines in the national immunization schedule, there is a need for better vaccine management practices across all levels of the immunization supply chain. The country must maintain lower stock levels, reduce vaccine wastage, accurately forecast vaccine requirements and prevent equipment breakdowns, to maintain an efficient and effective supply of vaccines.

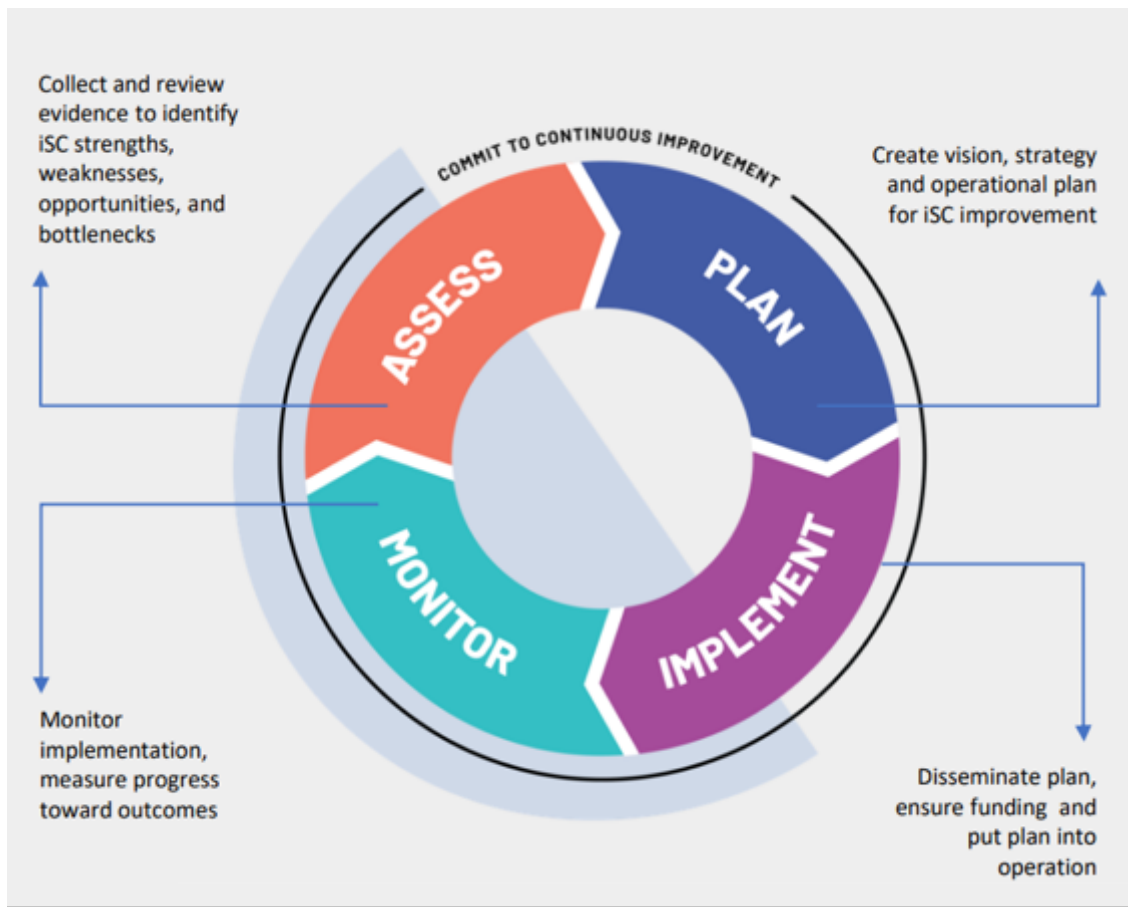
The Global Effective Vaccine Management Initiative, designed jointly by WHO and UNICEF, outlines a set

of gold standard practices which help to improve and maintain the quality of vaccine and cold chain management from the time when a vaccine arrives in the country to its last vaccine store (or the service delivery point).⁴

EVM is an ongoing process of continuous improvement from assessment to analysis to implementation of interventions and back to assessment again. There are four steps to the Effective Vaccine Management continuous improvement plan (cIP) approach: assess, plan, implement and monitor (Figure 2).

⁴ Effective Vaccine Management. World Health Organization. <https://evm2.who.int/Public>

Figure 2: Effective Vaccine Management (EVM) Process



EVM provides a set of tools, resources and guidance material to equip assessors and countries to assess their vaccine stores, analyse data and monitor improvements in supply chains. It helps to strengthen the country’s capacity and support improvements through an effective utilization and redirection of resources.

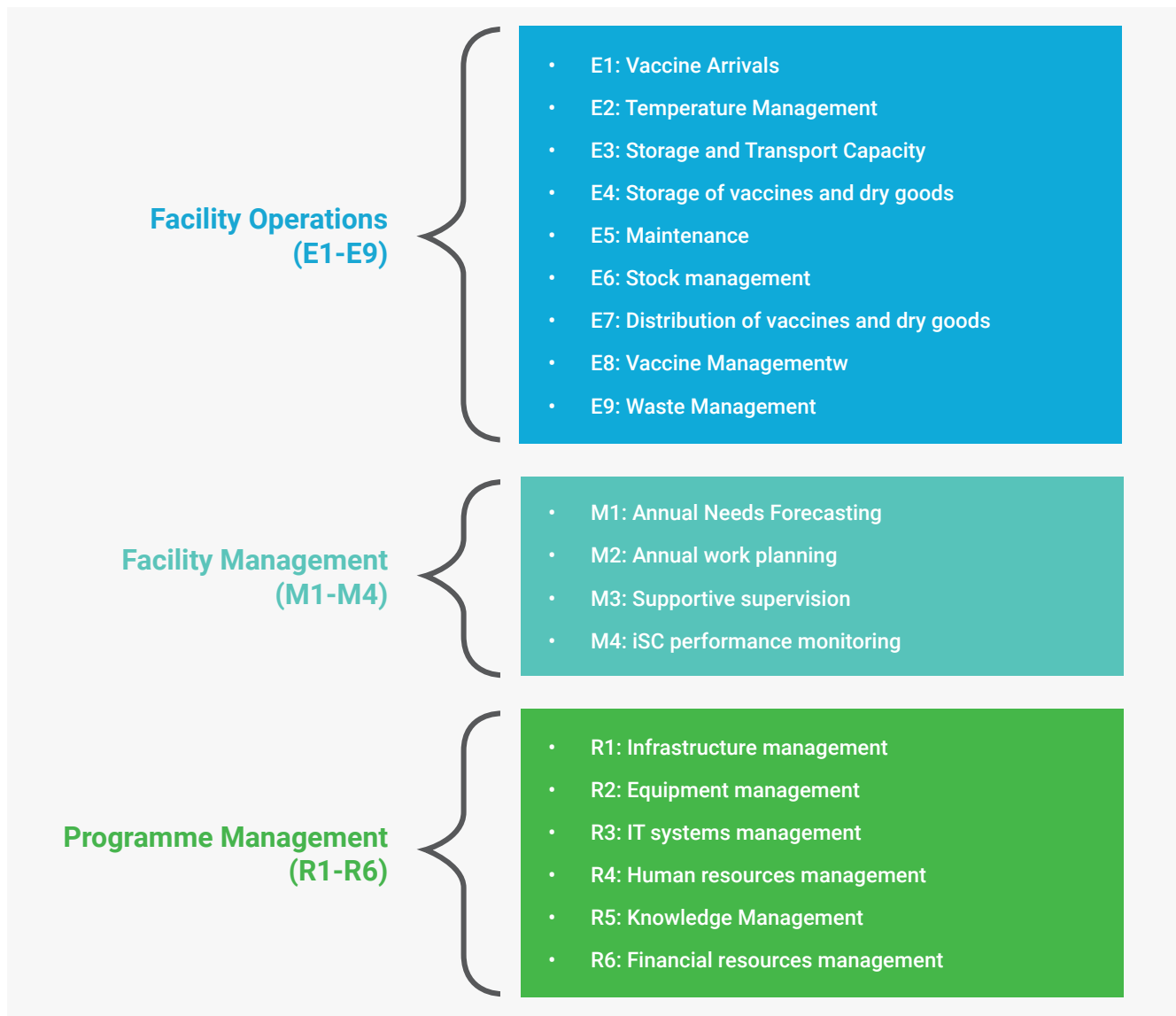
Since 2019, WHO and UNICEF have released the EVM 2.0, which builds upon the original Effective Vaccine Management assessment tool by providing countries with an agile and sustainable solution for engaging in a process of continuous improvement. It allows users to better identify the root cause of challenges, plan for improvements, implement the changes and then continuously monitor to make sure they are on the right track. The EVM 2.0 uses a redesigned questionnaire, paperless data collection and web-based automatic data analysis to undertake full or targeted Effective

Vaccine Management assessments at a national or sub-national level. It automates complex calculations, supports self-learning and helps to build national capacity of immunization managers to increase the accuracy and transparency of reporting and analysis.

In comparison to the 9 criteria in the old EVM, the EVM 2.0 assesses iSC on 19 different criteria across facility operations, facility management and programme management (Figure 3). The results of an Effective Vaccine Management assessment are defined across three main categories:

- Inputs: include six broad sub-categories – C1: Infrastructure, C2: Equipment, C3: Information and Technology, C4: Human Resources, C5: Policies and Procedures and C6: Financial Resources.
- Outputs, and
- Performance

Figure 3: EVM 2.0, criteria



1.6 EVM in the Lao People's Democratic Republic

The last National Effective Vaccine Management Assessment in the Lao People's Democratic Republic was conducted in June 2014. During the National Effective Vaccine Management Assessment 2014, 40 vaccine storage sites and 23 health centres were

assessed using the Effective Vaccine Management tool. In the assessment, three key areas were identified for improvement including staff, equipment and procedures. Maintenance, stock management, and MIS and supportive functions were the main areas of

weakness in iSC in the 2014 assessment (Figure 4 & 5).

Figure 4: Criteria scores, EVM 2014, the Lao People's Democratic Republic

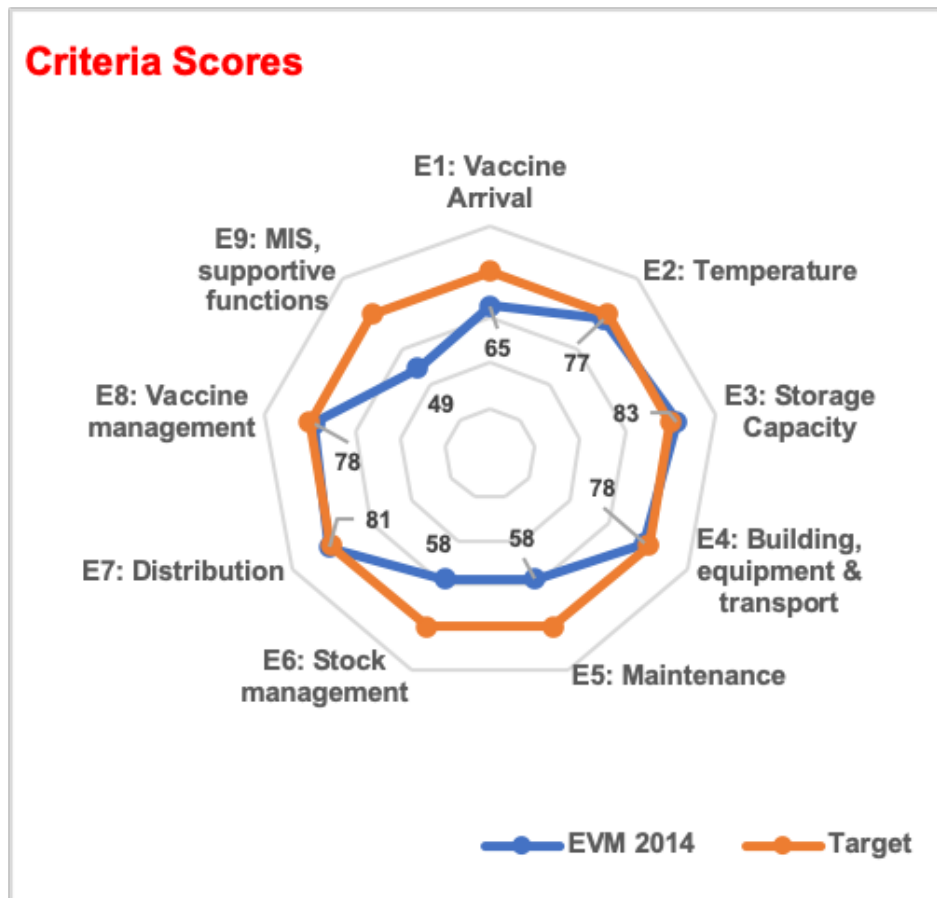
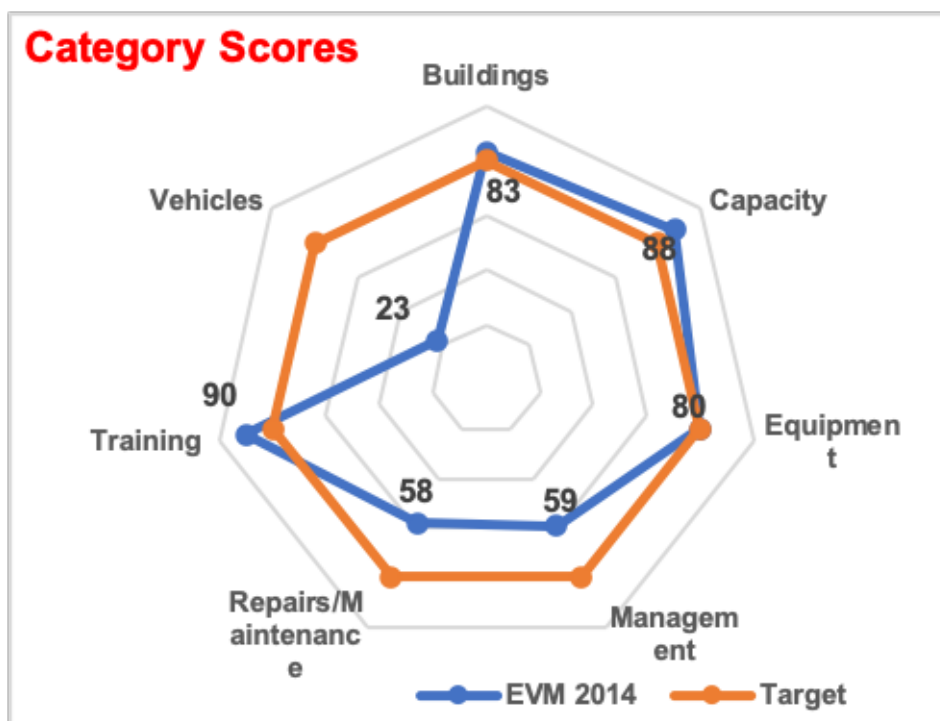


Figure 5: Category scores, EVM 2014, the Lao People's Democratic Republic



After the Effective Vaccine Management assessment in 2014, a five-year Effective Vaccine Management continuous improvement plan was developed for implementation between 2015 and 2020. The EVM

cIP 2015-2020 focused on five pillars of improvement: Policies and Procedures, Infrastructure Development, Human Resources and Capacity Building, Logistics Management System, and Distribution systems.

1.7 Rationale for National Effective Vaccine Management Assessment 2022

With the recent additions in new vaccines in routine immunization, the impact of the COVID-19 pandemic and a large-scale COVID-19 vaccine roll-out in the last few years, there has been a significant increase in the investment made in the immunization programme in the Lao People's Democratic Republic. The value and volume of vaccines handled across all levels of the supply chain have increased dramatically, which warrants that the vaccine supply chains must be prepared for increasing complexity, capacity and investment at every stage of the journey, from transport to storage and distribution.

Implementation of the Effective Vaccine Management improvement plan 2015-2020 also warranted a follow-up national Effective Vaccine Management assessment to assess the situation and identify persisting barriers to an efficient iSC in the Lao People's Democratic Republic. Due to the COVID-19 pandemic, certain activities from the cIP 2015-20 could not be completely implemented. While the progress of some activities

halted, the pandemic provided an opportunity to strengthen the cold chain capacity in the country through the contribution of multiple donors (including the cold chain equipment optimization platform of the Global Alliance for Vaccines and Immunization, and the United States Agency for International Development, among others). Initially the Effective Vaccine Management assessment was planned for 2020 (as recommended every five years). However, the pandemic delayed the assessment in the country by nearly two years. Hence, the augmentation of cold chain capacity and the introduction of newer technology and newer vaccines (including COVID-19 vaccines) warranted a comprehensive assessment of the functioning of the immunization supply chain using the standard Effective Vaccine Management guidelines. During this assessment, it is expected that the tremendous changes in iSC within the last two years of the COVID-19 pandemic have impacted the Effective Vaccine Management scores and findings obtained herewith.

2. Objective

The National Effective Vaccine Management Assessment 2022 was conducted with the objective to evaluate the existing performance of the immunization supply chain using the EVM 2.0 tool in order to identify key strengths, weaknesses and bottlenecks to utilize the findings and recommendations. The

assessment will help to translate the findings of the Effective Vaccine Management assessment into a comprehensive actionable plan to address the current and future challenges, and to monitor the progress of its implementation and the performance of the immunization supply chain.

3. Methodology

3.1 Preliminary groundwork

1. Creating country profile

Prior to conducting the National Effective Vaccine Management Assessment, the EVM 2.0 required a series of preliminary groundwork. On the EVM web portal, a country profile was created for the Lao People’s Democratic Republic. It included an entry of administrative units (list of provinces and districts) and a complete list of health facilities (including hospitals and health centres) in the country along with the population. The current immunization schedule along with vaccine details (manufacturer, dose, vial

presentation, applicability of multi-dose vial policy, etc.) was added to the country profile. The vaccine attributes added to the country profile, which were also used during this Effective Vaccine Management assessment, are as detailed in the Table 2 below. The supply chain cycles followed in the country for routine childhood vaccines were added to the profile. The complete country set up helped to calculate the sample size and sample sites for the Effective Vaccine Management assessment.

Table 2: Vaccines and their attributes for National Effective Vaccine Management Assessment 2022, the Lao People’s Democratic Republic

S. No.	Vaccine Antigen	Manufacturer	Presentation (Dose per vial)	Doses per recipient	Wastage Rate (%)	Target Population (%)	Estimate Coverage (%)
1	BCG	Japan BCG Laboratory	20	1	75	2.03	95
2	bOPV	GlaxoSmithKline Biologicals	10	3	10	2.03	95
3	DTwP-HepB-Hib (Pentavalent)	Serum Institute of India	1	3	5	2.03	95
4	Hepatitis B	Serum Institute of India	1	1	5	2.03	95
5	IPV	Bilthoven Biologicals	5	1	10	2.03	95
6	JE	Chengdu Institute of Biological Products Co., Ltd.	5	2	25	2.03	95
7	MR	Biological E Limited	5	2	25	2.03	95
8	PCV-13	Pfizer	4	3	5	2.03	95
9	Td	PT Bio Farma (Persero)	10	3	10	2.03	95
10	HPV	Merck Vaccines	1	2	5	3.05	95

2. Creating assessment and sample selection

After creating the country profile, a national assessment was created to determine the sample sites for the assessment. We selected a full-scope national assessment using a single random sample. A full scope

assessment includes assessment of all criteria across all levels of the supply chain. A random sample of 80 vaccine stores was generated using the EVM web portal which included 1 national (or primary) store, 11

provincial (or sub-national) vaccine stores, 23 district (or lowest distribution) stores, and 45 health centres (or service delivery points). The sample was selected randomly using the population proportion to size (or PPS) method. The 11 provinces included representation from the northern, central, and southern regions of the Lao People’s Democratic Republic (Figure 6). The

detailed list of sampled vaccine stores is given in Annex 1. A total of 18 sampled sites (including 1 district and 17 health centres) were swapped (Table 3 and Annex 2). The most common reasons for dropping the sampled sites were inaccessibility due to heavy rains (15 or 83 per cent), followed by closure/non-functional health centres for the remaining 3 sites.

Table 3: Sampled vaccine stores - summary, National Effective Vaccine Management Assessment 2022

	Site selection	Swapped	Assessed	Difference	% assessed
All locations	80	18	80	0	100.0 %
PR locations	1	0	1	0	100.0 %
SN locations	11	0	11	0	100.0 %
LD locations	23	1	23	0	100.0 %
SP locations	45	17	45	0	100.0 %

Figure 6: Provinces selected for the National Effective Vaccine Management Assessment 2022



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3. Translation of data collection tool

The EVM 2.0 uses a paperless mode of data collection through the EVM assessor app. The EVM assessor app is available for download in both android and iOS play stores. The EVM web portal and assessor application are both managed by the Global Effective Vaccine Management secretariat. The standard questionnaire is in English, which had to be translated into the Lao language before the Effective Vaccine Management assessment. Through a third-party agency, the questionnaire was translated into the Lao language and verified multiple times before sharing it with the Global Effective Vaccine Management secretariat. Once the Lao translated questionnaire was uploaded, it could be downloaded in local language for the assessors.

4. Preparation of route plans, teams and logistical arrangements

Prior to the orientation meeting, route plans were drafted for covering all 80 vaccine stores. In total, 18 teams were deployed across 11 provinces (Annex 3). The route plan was designed in a way that allocated one day for assessment of each vaccine store and sufficient time for travel to and within the sampled province. Based on the number of participants and the geographical terrain for the route, each of the 18 teams was allocated one or two vehicles for the field assessment based on the number of team members in each team.

5. Preparation of android tablets for data collection

The EVM 2.0 tool is a paperless tool hosted on the EVM assessor app. The EVM assessor app was downloaded onto android tablets which were used for orientation of the assessors and also for the data collection in the field assessment. During the orientation of the

assessors, each assessor was provided an individual android tablet with a test questionnaire for hands-on practice of the EVM 2.0 and familiarization with the EVM assessor app. During the field assessment, two tablets with preloaded EVM assessor apps and relevant questionnaires (for the allocated vaccine stores as per route plan) were provided to each team, where one tablet was the primary tablet and other a back-up device.

6. Development and translation of training materials

The field visits to sampled vaccine stores were preceded by an orientation of the assessors. Prior to the orientation of the assessors, the training material was developed for scenario-based learning (using the template from the Effective Vaccine Management regional ToT). The training materials were customized to the country context and later translated into the Lao language for the training. The translated material was verified and finalized prior to the orientation of the assessors.

7. Content review and preparedness workshop

Before conducting the national orientation of the assessors, a pool of trainers/facilitators from the National Immunization Programme participated in a content review workshop. The workshop was a medium to review the training material and questionnaire in the Lao language and practice the andragogical technique to increase the availability of facilitators for group work during the orientation of the assessors. The workshop helped to understand the applicability of some questions according to the country context. The presence of a team from NIP helped to verify and make final edits to the material (Figure 7).

Figure 7: Central team and UNICEF involved in the content review and preparedness workshop



8. Data review period

A review period of one year prior to data collection, i.e. from October 2021 to September 2022 was considered for the Effective Vaccine Management assessment. An exception to this rule was the vaccine stock records where one year data from January to December 2021 were considered for review and assessment.

9. Coordination with stakeholders

Throughout the preparation and execution of the National Effective Vaccine Management Assessment 2022, there was a close coordination between the Ministry of Health and the development partners. Nominations from the provinces were sought prior to the orientation of the assessors. In the EVM web portal, the assessors were assigned to the teams as their route plans were finalized.

3.2 National Effective Vaccine Management Assessment: Orientation of assessors

The National Effective Vaccine Management Assessment includes two main parts: the orientation of the assessors and the field assessment. The orientation of the assessors included a five-day training for the Effective Vaccine Management assessors from 3 to 7 October 2022. It was a scenario-based training which used a fictional district vaccine store data to fill and understand the questions in the EVM 2.0 tool. Since this was the first time that the paperless EVM 2.0 was used for an Effective Vaccine Management

assessment in the Lao People's Democratic Republic, it was important to orient the assessors with all the questions and make them comfortable to use the EVM assessor app in the field. Total 66 participants from the central and provincial EPI programme and the development partners were trained in EVM 2.0 (Annex 4). During the orientation, all participants were divided into multiple groups; each group was supported by a pre-trained facilitator to fill in the Effective Vaccine Management tool and use the EVM assessor app.

Throughout the orientation, we were supported by a resource person from the Global Effective Vaccine Management secretariat and the UNICEF East Asia and

Pacific Regional Office for any queries related to the questions and the EVM assessor app.

Figure 8: Dr. Kongxay (Head of National Immunization Programme) taking a session during the orientation of the assessors



Figure 9: Facilitators supporting the participants in the use of the EVM Assessor app during the orientation



During the orientation, participants were given individual tablets with a preloaded test questionnaire for hands-on training. To elevate the experience, all participants visited one of the three nearby health centres to interview their cold chain staff and observe and record the vaccine and cold chain management

practices using the Effective Vaccine Management tool. All participants were felicitated as trained Effective Vaccine Management assessors after five days of training. At the end, they were allocated android tablets with preloaded questionnaires according to their teams and route plans.

3.3 Field assessment

Field assessment was conducted directly after the orientation of the assessors from 10 to 16 October 2022. There were 18 teams each with a representation from the central and provincial EPI and a development partner. All teams departed as per their route plans from the training venue. Each team assessed 4-5 vaccine stores depending on their route plan. The teams were provided individual android tablets and their vehicles to facilitate the data collection in this

assessment.

A WhatsApp group was created on the first day of orientation of the assessors with all the facilitators/resource persons and assessors. It allowed for doubt sharing, quick resolution of queries, clarifications, and relevant updates while the teams were in the field. If any team faced accessibility issues due to poor weather or extreme geographical terrain, the sampled vaccine store was replaced with another one.

Figure 10: Team navigating through an unmotorable road to reach vaccine stores for assessment



During the field assessment, each team was required to send the completed questionnaires by uploading or emailing them. The progress of completion and sharing of filled questionnaires was tracked using an Excel-based tracker by the facilitators (Figure 11). Daily updates on the number of questionnaires received were shared with the teams through the WhatsApp group; the teams that were unable to share their filled questionnaires were supported through one-on-one calls.

Figure 11: Team conducting record review as part of EVM assessment at Phonhom Health Centre, Xay District, Oudomxay



Figure 12: Team inspecting the walk-in cold room at Champasak Provincial Vaccine Store



Figure 13: Microsoft Excel-based Effective Vaccine Management Assessment Tracker, National Effective Vaccine Management Assessment 2022, the Lao People's Democratic Republic

EVM Assessment Tracker														No. of files submitted per team	COMPLETED	
Lao PDR																
Total Sampled Sites = 80				Total files submitted = 79												
Team	Province	Contact Person	Site-1		Site-2		Site-3		Site-4		Site-5		Site-6			
			Place visited	File Submit	Place visited	File Submit	Place visited	File Submit	Place visited	File Submit	Place visited	File Submit	Place visited	File Submit		
1	VTE Capital	Dr. Vilaneth	DHO Hadxaifong	Yes	HC Home	Yes	HC Sithantay	Yes	DHO Xaysetha	Yes	HC Dung	Yes			5	Yes
2	VTE Capital	Dr. Phaymany	PHO	Yes	DHO Paknum	Yes	HC Naphai 1	Yes	HC Maknao	Yes					4	Yes
3	Phongsaly	Dr. Dasouk	HC Sewchayi	Yes	DHO Yot-Ou	Yes	HC Bantang	Yes							3	Yes
4	Phongsaly	Dr. Vannasone	HC Latsang	Yes	HC Bounphang	Yes	DHO Khua	Yes	PHO Phongsaly	Yes					4	Yes
5	Luang Namtha	Dr. Yommaha	PHO LN	Yes	DHO Vienhouk	Yes	HC Nam Kip	Yes	HC Namsingh	Yes					4	Yes
6	Oudomxay	Dr. Soumbone/Dr. Bou	PHO Oudomxay	Yes	DHO Xay	Yes	HC Chom-Ong	Yes	HC phonhom	Yes					4	Yes
7	LPB	Dr. Sanlom	PHO LPB	Yes	DHO Nan	Yes	HC Thongkhang	Yes	HC Thongchale	Yes					4	Yes
8	LPB	Dr. Kensy/Dr. Bangon	DHO Nambak	Yes	HC Namduan	Yes	DHO Ngoy	Yes	HC Sopkhing	Yes	HC Pakchim	Yes			5	Yes
9	LPB	Dr. Samphan	DHO Chompet	Yes	HC Banpakieum	Yes	HC Bannahiew	Yes	HC Namngha	Yes					4	Yes
10	Huaphanh	Mr. Somphong	DHO SopBao	Yes	HC meung hang	Yes	HC Sop hao	Yes	DHO Add	Yes	PHO Huaphan	Yes			5	Yes
11	Huaphanh	Dr. Chansamouth	HC Namat	Yes	HC Viengphan	Yes	DHO Xamtay	Yes	HC Xiengkhour	Yes	HC Naphieng	Yes			5	Yes
12	VTE province	Dr. Oudomsack	PHO VTE P.	Yes	DHO Viengkham	Yes	HC Done kuat	Yes	HC Pakkha yhu	Yes					4	Yes
13	Savannakhet	Dr. Thongkham	PHO Savannakhet	Yes	DHO Outhoump	Yes	HC Phondeua	Yes	HC Phoxay	Yes					4	Yes
14	Savannakhet	Dr. Houmpheng	DHO Songkhone	Yes	HC Sebanghieng	Yes	HC Nakala	Yes	HC Nakham	Yes	HC Dongdockr	Yes	DHO Xayphothor	Yes	6	Yes
15	Savannakhet	Dr. Latsamy	DHO Asthaphant	Yes	HC Dongnaxai	Yes	HC Chaelamon	Yes	DHO Chompho	Yes	HC thuat	Yes	HC Nakhun	Yes	6	Yes
16	Saravan	Dr. Souksavanh (NIP)	PHO Saravan	Yes	DHO LakhonePhu	Yes	HC Bouttaphan	Yes	HC Taphan	Yes					4	Yes
17	Sekong	Dr. Souilvan	DHO Dakcheung	Yes	HC Tatue	Yes	HC Xiengluang	Yes	PHO Sekong	Yes					4	Yes
18	Champasak	Dr. Souksavanh (MCHC)	PHO Champasak	Yes	DHO Pakxong	Yes	HC Chaxtan	Yes	HC thong ka Lo	Yes					4	Yes

At the end of the field assessment, a pre-designated member of the team was tasked with bringing the tablets back to Vientiane Capital and submitting it to the National Immunization Programme office. A

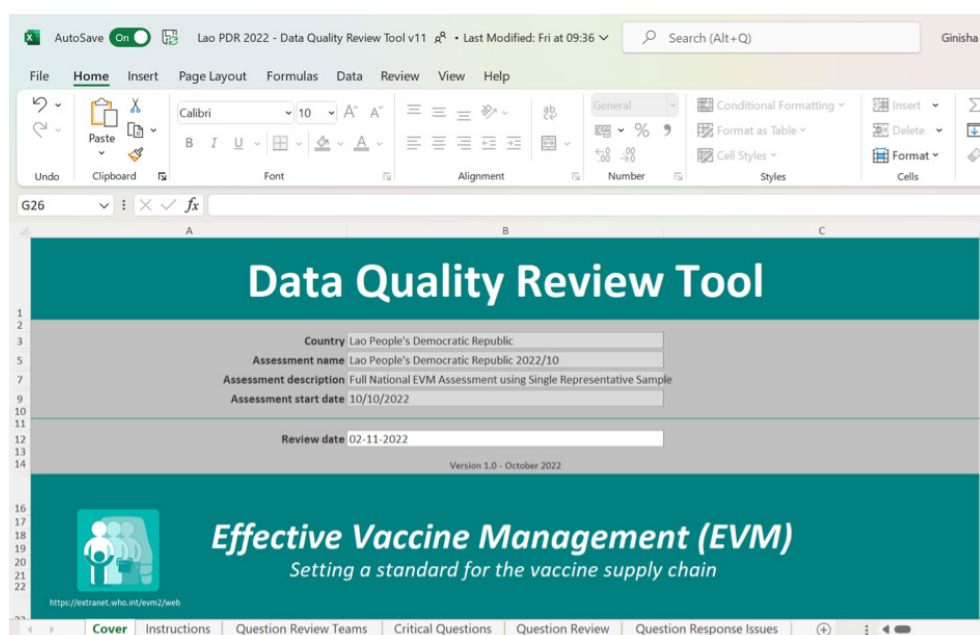
separate tracking sheet was used to track the allocation and submission of the android tablets during the orientation training and the field assessment.

3.4 Effective Vaccine Management Data Analysis

Once the data collection was completed and all the Effective Vaccine Management questionnaires were received, an Effective Vaccine Management data cleaning tool was used to review the 80 filled questionnaires (Figure 14 below). The data cleaning and analysis exercise was supported by the Global Effective Vaccine Management secretariat. A total of 268 errors, including missing data, incorrect translation and incorrectly entered data, were identified after reviewing all the 80 questionnaires. Once

the errors were identified, they were revalidated through phone calls with the respective teams and/or vaccine stores. The edits were then made onto the questionnaires through the Effective Vaccine Management app and the questionnaires were re-loaded on the web portal for analysis.

Figure 14: Microsoft Excel-based data Quality Review Tool



3.5 Interpretation of Data – Heat Maps

Heat maps were generated on the Effective Vaccine Management web portal to determine results for each health facility and across different levels of the immunization supply chain. In the heat maps, data are depicted in three colours: red, yellow and green (Figure 15). Red coloured cells indicate poor score, i.e., scores below 50 per cent. Yellow coloured cells indicate moderate score, i.e., scores between 50-79 per cent, whereas the green coloured cells indicate a good

score, i.e. 80 per cent and above. EVM uses a standard cut-off of 80 per cent. Red areas require maximum focus and efforts for improvement, followed by yellow. The green areas are above the standard cut-off yet the green scores must be improved/maintained at 100 per cent through sustaining activities. Blank cells indicate that the category is not applicable for that criterion at that level of supply chain. For example, there is no specific equipment required for stock management.

Figure 15: Sample Heat Map with red, yellow and green scores

		Infrastructure	Equipment	Information technology	Human resources	Policies & procedures	Financial resources			TOTAL
		C1	C2	C3	C4	C5	C6	OUTPUTS	PERFORMANCE	
Vaccine arrivals	E1			67	100	100		80		87
Temperature management	E2			64	85	79		65	94	76
Storage and transportation capacity	E3	100	68		97	72	79	71	97	77
Facility infrastructure and equipment	E4	72	74	95			73	79		77
Maintenance and repair	E5			38	92	88	72	56	88	74
Stock management	E6			90	85	93		73	19	77
Distribution of vaccines and dry goods	E7		91	9	75	37	75	69	88	68
Vaccine management	E8				92	81		20		87
Waste management	E9		24		89	88	62	81	94	82
Annual needs forecasting	M1				96	91		92	86	92
Annual work planning	M2				94	90	87	93	24	90
Supportive supervision	M3	98	98	80	65	97	73	83		84
iSC performance monitoring	M4			90	86	91		50		72
TOTAL		75	73	78	87	81	78	72	81	78

4. Results

The findings of the National Effective Vaccine Management Assessment 2022 were finalized and shared with the relevant stakeholders during the National Effective Vaccine Management Dissemination Workshop on 4 December 2022. During the workshop, there was participation from the central Expanded

Programme on Immunization team, provincial Expanded Programme on Immunization teams, development partners such as WHO, UNICEF, the Clinton Health Access Inc. (CHAI), the Asian Development Bank (ADB) and Gavi, and the Department of Planning and Investment.

Figure 16: Deputy Minister of Health Dr. Phaiyvanh chaired the National Effective Vaccine Management Dissemination Workshop on 4 December 2022



4.1 Overall score

After the assessment of 80 sampled vaccine stores, the National Effective Vaccine Management Assessment 2022 gave an overall score of 78 per cent. An immunization supply chain is an amalgamation of multiple input parameters such as infrastructure,

equipment, human resources, policies and procedures, finances, and information technology. All inputs contribute to the output and performance of the supply chain.

Table 4: Effective Vaccine Management score - Overall, National Effective Vaccine Management Assessment 2022

		Infrastructure	Equipment	Information technology	Human resources	Policies & procedures	Financial resources			TOTAL
		C1	C2	C3	C4	C5	C6	OUTPUTS	PERFORMANCE	
Vaccine arrivals	E1			67	100	100		80		87
Temperature management	E2			64	85	79		65	94	76
Storage and transportation capacity	E3	100	68		97	72	79	71	97	77
Facility infrastructure and equipment	E4	72	74	95			73	79		77
Maintenance and repair	E5			38	92	88	72	56	88	74
Stock management	E6			90	85	93		73	19	77
Distribution of vaccines and dry goods	E7		91	9	75	37	75	69	88	68
Vaccine management	E8				92	81		20		87
Waste management	E9		24		89	88	62	81	94	82
Annual needs forecasting	M1				96	91		92	86	92
Annual work planning	M2				94	90	87	93	24	90
Supportive supervision	M3	98	98	80	65	97	73	83		84
iSC performance monitoring	M4			90	86	91		50		72
TOTAL		75	73	78	87	81	78	72	81	78

4.2 Central or primary vaccine store (PR)

There is one primary or central vaccine store (also known as NIP or KM3) in the Lao People's Democratic Republic which is in Vientiane Capital. It is the only vaccine store in the country which receives vaccines directly from the manufacturers. The overall score for the primary level was 78 per cent.

Table 5: Heat Map, primary or central vaccine store, National Effective Vaccine Management Assessment 2022

		Infrastructure	Equipment	Information technology	Human resources	Policies & procedures	Financial resources			TOTAL
		C1	C2	C3	C4	C5	C6	OUTPUT	PERFORMANCE	
Vaccine arrivals	E1			67	100	100		80		87
Temperature management	E2			48	97	67		43	100	65
Storage & transportation capacity	E3	100	100		100	50		71		81
Facility infrastructure & equipment	E4	68	69	100				81		75
Maintenance & repair	E5			24	96	100	58	55	89	73
Stock management	E6			94	100	100		81	0	79
Distribution of vaccines & dry goods	E7		100	0	72	23	96	53		62
Vaccine management	E8				100	100				100
Waste management	E9		0		100			100		86
Annual needs forecasting	M1				100	100		100	100	100
Annual work planning	M2				99	100	100	100	0	97
Supportive supervision	M3	100	100	100	67	100	92	100		95
Immunisation supply chain performance monitoring	M4				100	100		25		67
TOTAL		73	81	72	95	83	87	68	72	78

Detailed findings for the primary store are as follows:

E1 (Vaccine Arrivals)

Code	Criterion	Score
E1	Vaccine arrivals	87%
E1.1	Inspection of shipments	65%
E1.2	Customs clearance & transit facilities	100%
E1.3	Transportation from port of entry to primary store	100%

Strengths	Weaknesses
<ul style="list-style-type: none"> Vaccine arrival report (VAR) has all recommended data fields. Two or more staff members are able to inspect vaccine shipments. Responsible staff members are trained on how to inspect vaccine shipments. MoU with port of entry and customs authorities exist to streamline vaccine arrival. Vaccine shipments are picked up within 24 hours of arrival. Customs clearance performance is monitored. Vaccine shipments are inspected and documented according to standard procedures. 	<ul style="list-style-type: none"> Product arrival report (PAR) is not used for documentation of arrival of products other than vaccines. Vaccine arrival reports are neither secure nor well organized. Complete VARs are not forwarded in a timely manner as per recommendation. Syringe shipments are neither inspected nor documented according to standard procedure.

E2 (Temperature management)

Code	Criterion	Score
E2	Temperature management	65%
E2.1	Temperature management in storage	52%
E2.2	Temperature management during transportation	64%

Strengths	Weaknesses
<ul style="list-style-type: none"> Walk-in cold rooms (WIC) and walk-in freezers (WIF) have backup temperature monitoring devices. Adequate staff to monitor temperature Responsible staff is trained in how to monitor vaccine temperatures. Responsible staff members are knowledgeable of key principles and procedures of temperature monitoring. Standard Operating Procedures (SOPs) for vaccine temperature monitoring during vaccine storage and transportation Vaccines are not exposed to damaging low and high temperatures during storage or transportation. Vaccine storage temperatures are systematically monitored. 	<ul style="list-style-type: none"> All deep freezers do not have backup temperature monitoring devices. The vaccine storage manual temperature monitoring form meets only minimum requirements. Not all WICs/WIFs are monitored by a computerised temperature monitoring system. SOPs for temperature mapping of WICs/WIFs are not available. WICs/WIFs are not temperature mapped. Temperature records (for the last three years) are neither secure nor well organized. Freeze indicators are incorrectly packed or not packed with freeze-sensitive vaccines when there is a risk of freezing.

E3 (Storage and transportation capacity)

Code	Criterion	Score
E3	Storage and transportation capacity	81%
E3.1	Capacity of infrastructure and equipment	100%
E3.2	Utilisation of available capacity	71%

Strengths	Weaknesses
<ul style="list-style-type: none"> • Facility has sufficient cold storage capacity to accommodate the expected maximum stock levels of vaccines and diluents. • Sufficient coolant pack storage capacity to accommodate the expected maximum daily demand for coolant packs • Sufficient insulated containers to accommodate the expected maximum load of vaccines • Staff is knowledgeable of key principles and procedures for vaccine and dry goods storage. • SOPs on vaccine storage are available. 	<ul style="list-style-type: none"> • Insufficient dry goods storage capacity to accommodate the expected maximum stock levels of diluents, syringes and safety boxes • Vaccine storage contingency plan is not available at the facility. • Vaccines and dry goods stock are neither well organized nor safely secure.

Figure 17: Well-maintained walk-in cold room at central vaccine store, NIP



E4 (Facility infrastructure and equipment)

Code	Criterion	Score
E4	Facility infrastructure and equipment	75%
E4.1	Quality of infrastructure	71%
E4.2	Quality of equipment	73%

Strengths	Weaknesses
<ul style="list-style-type: none"> • Facility receives at least eight hours of power supply, has functional WASH facilities, and functional means of communications. • Facility is secure. Store manager's office meets the minimum requirement. • Facility has mechanical handling equipment. • Most freezers and WICs/WIFs meet minimum requirements. • Facility's cold storage is appropriate to accommodate the maximum expected load of vaccines. • Insulated containers comply with performance quality standards (PQS) of the World Health Organization or the country. • Facility has a reliable computer and printer. • Buildings and facility equipment are clean and dry. 	<ul style="list-style-type: none"> • All WICs/WIFs do not meet minimum requirements (power loss alarms). • Packing and loading areas do not meet minimum requirements. • No fire or smoke alarms in the store • Fire extinguishers were not certified within the last year. • Insufficient guttering and drainage for rainwater in some parts • Dry stores do not meet minimum requirements. • No warm coat available for WIF • Not all refrigerated and other vaccine transportation vehicles comply with minimum fleet management requirements.

E5 (Maintenance and repair)

Code	Criterion	Score
E5	Maintenance and repair	73%
E5.1	Maintenance and repair of buildings	99%
E5.2	Maintenance and repair of cold chain equipment	79%
E5.3	Maintenance and repair of vehicles	43%

Strengths	Weaknesses
<ul style="list-style-type: none"> • At least one staff member assigned to carry out routine refrigeration tasks and maintain inventory of cold chain equipment (CCE) • Refrigeration technician is available to maintain and repair CCE. • Auto mechanics or repair services are available for repair of vehicles. • Staff is trained in preventive maintenance and maintaining inventory of cold chain equipment. • SOPs for routine preventive maintenance of cold chain equipment are available. • SOPs for maintaining cold chain equipment inventory are available. 	<ul style="list-style-type: none"> • Inventory of cold chain equipment not maintained as per recommendations • No inventory of vehicles available • No staff assigned to carry out routine preventive maintenance of vehicles • Funds for maintenance of vehicles are not received on time and in full. • CCE and vehicles are not maintained as per schedule. • Lack of standard fault reporting procedure for CCE • Not all vehicles are fully functional.

Strengths	Weaknesses
<ul style="list-style-type: none"> • Facility funds received for maintenance of vehicles are sufficient. • CCE and generator repair work is carried out promptly. Building is well maintained. • CCE and generator are fully functional and in good physical condition. • Delivery and quality of building repair work is as per standard. 	

E6 (Stock management)

Code	Criterion	Score
E6	Stock management	79%
E6.1	Replenishment	100%
E6.3	Inventory management	52%
E6.4	Release and dispatch	100%
E6.5	Managing returns, damaged and expired stock	0%

Strengths	Weaknesses
<ul style="list-style-type: none"> • Vaccine stock record and issue form have recommended fields. • Facility has a computerised vaccine stock management system. • Sufficient staff to manage vaccine stock management tasks • Responsible staff is trained in vaccine stock management. • Staff is knowledgeable of key principles and procedures of vaccine stock management. • SOPs available for managing vaccine stock transactions and on use of vaccine vial monitor (VVM) • Vaccine requests are complete and documented. • Vaccine and dry goods stock records are maintained and up-to-date. • Physical stock counts are done regularly. 	<ul style="list-style-type: none"> • Some of the recommended fields are missing from the computerised stock management system. • Reasons for vaccine losses are not documented. • Damaged or expired vaccines are neither clearly labelled nor stored outside of cold storage until final disposal. • Vaccine and diluent stocks do not match. • Vaccine and diluent stock records are not accurate (compared to physical stock).

E7 (Distribution of vaccines and dry goods)

Code	Criterion	Score
E7	Distribution of vaccines and dry goods	62%
E7.1	Distribution planning	55%
E7.2	Transportation of vaccines	52%

Strengths	Weaknesses
<ul style="list-style-type: none"> • Transport is available for scheduled vaccine distribution or collection. • Responsible staff is knowledgeable of key principles and procedures of vaccine distribution. • Funds budgeted for vaccine transportation are received in full or on time. Funds budgeted are sufficient for fuel for vehicles and vaccine transportation. • Insulated containers are stored, maintained and packed according to guidelines. • Coolant packs are prepared and used according to standard procedures. 	<ul style="list-style-type: none"> • Vaccine transportation vehicles do not meet minimum fleet requirements. • Inadequate staff assigned to carry out vaccine distribution tasks • Not all staff members are trained on how to carry out vaccine distribution tasks. • SOPs on vaccine distribution planning are not completely available. • Facility and vaccine transportation vehicles do not have a vaccine transport contingency plan. • Lack of a documented vaccine distribution plan • Vaccine transportation trips are not recorded. • No evidence of appropriate actions taken in response to vaccine transportation emergency

E8 (Vaccine management)

Strengths	Weaknesses
<ul style="list-style-type: none"> • Responsible staff is knowledgeable of key principles and procedures of vaccine management. • Facility has SOPs or guidelines for vaccine management. 	

E9 (Waste management)

Code	Criterion	Score
E9	Waste management	86%
E9.2	Storage of immunization waste	100%

Strengths	Weaknesses
<ul style="list-style-type: none"> • Responsible staff is knowledgeable of key principles and procedures of immunization waste management. • Waste is removed from the facility frequently. 	<ul style="list-style-type: none"> • Facility does not have suitable facilities and equipment for storing immunization waste.

M1 (Annual needs forecasting)

Strengths	Weaknesses
<ul style="list-style-type: none"> • At least one staff member is responsible for annual needs forecasting for vaccines and dry goods. • Responsible staff is trained on how to forecast needs for vaccines and dry goods. • Facility has guidance materials on vaccines and dry goods forecasting for managers. 	<ul style="list-style-type: none"> • Facility's vaccine needs forecast was not completely accurate.
<ul style="list-style-type: none"> • Facility has a standard method for vaccine and dry goods needs. • Facility has forecasts for vaccines and dry goods for the current year. 	

M2 (Annual work planning)

Strengths	Weaknesses
<ul style="list-style-type: none"> • At least one staff member is responsible for annual work planning. • Turnover of immunization supply chain staff is low. • Responsible staff is trained in annual work planning. • Facility has guidance materials on annual work planning for managers. • Funds budgeted for salaries are sufficient and received on time and in full. • Facility has a budgeted annual work plan. • Facility records its incomes and expenditures and monitors the implementation of the annual work plan. 	<ul style="list-style-type: none"> • Implementation of the annual work plan is not as per schedule.

M3 (supportive supervision)

Strengths	Weaknesses
<ul style="list-style-type: none"> • There is a reliable supply of fuel for vehicles for supportive supervision. • Transport is available for scheduled supportive supervision visits. • Supervisors use a standard checklist which includes key areas of vaccine management. • Facility has guidance material on supportive supervision for supervisors. • Funds budgeted for supportive supervision are received in full and on time. • Supervisory visits are arranged according to a fixed schedule, and all scheduled visits take place. • Supervisors maintain a record of visits and provide feedback to staff. 	<ul style="list-style-type: none"> • Not all supervisors are trained in supportive supervision.

M4 (immunization supply chain performance monitoring)

Strengths	Weaknesses
<ul style="list-style-type: none"> • Facility monitors the reporting rates. • Adequate staff to carry out the immunization supply chain performance monitoring tasks • Responsible staff is trained in carrying out the immunization supply chain performance monitoring tasks. • SOPs or guidance materials on the immunization supply chain performance monitoring are available and in local language. • Facility monitors its CCE functionality. 	<ul style="list-style-type: none"> • Facility does not monitor its temperature alarm rates, order timeliness and fill rates, and unopened wastage rates.

4.3 Province or sub-national vaccine store (SN)

During the National Effective Vaccine Management Assessment 2022, 11 provincial vaccine stores were assessed (Annex 1). An overall score of 77 per cent was recorded for the sub-national or provincial vaccine stores (Table 6).

Table 6: Heat Map, provincial vaccine stores, National Effective Vaccine Management Assessment 2022 (n=11)

		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			64	85	85		77	95	80
Storage & transportation capacity	E3	100	42		91	86	83	67	100	70
Facility infrastructure & equipment	E4	74	65	94			78	72		74
Maintenance & repair	E5			50	86	98	80	62	89	75
Stock management	E6			87	91	100		79	55	82
Distribution of vaccines & dry goods	E7		91	14	76	38	69	76	95	67
Vaccine management	E8				96	64		0		78
Waste management	E9		60		95		48	64		77
Annual needs forecasting	M1				100	91		85	76	89
Annual work planning	M2				99	91	82	94	73	91
Supportive supervision	M3	100	100	80	55	91	70	80		81
Immunization supply chain performance monitoring	M4			88	93	97		65		80
TOTAL		78	63	77	88	83	77	74	85	77

E2 (temperature management)

Code	Criterion	Score
E2	Temperature management	80%
E2.1	Temperature management in storage	81%
E2.2	Temperature management during transportation	78%

Strengths	Weaknesses
<ul style="list-style-type: none"> • Most refrigerators/freezers have a functional 30 DTR or equivalent temperature monitoring device. • More than 80% of WICs and refrigerators/freezers have backup temperature monitoring devices. • Staff trained on how to monitor vaccine temperature • Most of the staff is knowledgeable of key principles and procedures for temperature monitoring. • SOPs for vaccine temperature monitoring in storage are available. • Most WICs/WIFs are temperature mapped. • Vaccines are not exposed to damaging high or low temperatures during storage and transportation. 	<ul style="list-style-type: none"> • Not all WICs are monitored by remote temperature monitoring devices. • Vaccine temperature recording form does not fulfil minimum requirements. • In the refrigerated vehicles, temperatures are not monitored using the cabin mounted temperature monitoring system. • Computerised remote temperature monitoring device (RTMD) does not meet minimum requirements. • Inadequate staff assigned for temperature monitoring • SOPs for temperature mapping and temperature monitoring during transportation are not available in all stores. • Vaccine storage temperature is not systematically monitored. • Temperature and alarm events during vaccine transportation are neither recorded nor acknowledged. • Freeze-indicators are incorrectly packed or not packed with freeze-sensitive vaccines during transportation.

E3 (storage and transportation capacity)

Code	Criterion	Score
E3	Storage and transportation capacity	70%
E3.1	Capacity of infrastructure and equipment	54%
E3.2	Utilisation of available capacity	71%

Strengths	Weaknesses
<ul style="list-style-type: none"> • Facilities have sufficient dry store capacity to accommodate expected maximum stock levels of diluents, syringes and safety boxes. • Sufficient cold storage to accommodate maximum stock of vaccines • Most of the staff is knowledgeable of key principles and procedures for vaccine and dry goods storage. 	<ul style="list-style-type: none"> • Insufficient cool pack storage capacity • Insufficient vaccine transportation vehicle capacity to accommodate maximum load of vaccines and dry goods • Insufficient insulated container capacity to accommodate expected maximum load of vaccines • Dry goods and vaccines are not stored safely.

Strengths	Weaknesses
<ul style="list-style-type: none"> • Most facilities have a vaccine storage contingency plan. • Most facilities have SOPs for vaccine storage. • Sufficient funds budgeted for vaccine storage are received on time and in full. • Non-vaccine medical products are clearly labelled and segregated from the vaccines in the equipment. • Vaccine stocks are well organized. • Appropriate action is taken to protect vaccines in the event of a vaccine storage emergency such as power failure, equipment breakdown, etc. 	

Figure 18: Vaccines are stored by type in walk-in cold room at Champasak Provincial Vaccine Store



Figure 19: Lack of pallets and shelves for safe storage of dry goods at Phongsaly Provincial Vaccine Store



E4 (facility infrastructure and equipment)

Code	Criterion	Score
E4	Facility infrastructure and equipment	74%
E4.1	Quality of infrastructure	72%
E4.2	Quality of equipment	69%

Strengths	Weaknesses
<ul style="list-style-type: none"> • Facilities have access to at least eight hours of power supply, functional WASH facilities, and functional means of communications. • Vaccine cold stores meet minimum requirements, are secure. Vaccine packing and loading area and office manager's office meet minimum requirements. • Facilities' cold storage is appropriate to accommodate maximum expected load of vaccines. • Walk-in cold rooms and refrigerators/freezers meet minimum performance quality standards of the World Health Organisation. • Insulated containers comply with performance quality standards of the World Health Organization or that country. • Facilities have reliable computers and printers. • Funds budgeted for generator fuel are received on time and in full. • Building layout is well organized. • Buildings and facility equipment are clean and dry. 	<ul style="list-style-type: none"> • Some buildings do not have sufficient guttering and drainage for rainwater. • Dry stores do not meet minimum requirements. • Absence of functional certified fire extinguishers in the building • Lack of fire or smoke alarms in the vaccine stores • Not all facilities have a suitable back-up generator. • Not all facilities have mechanical handling equipment. • Not all refrigerated and other vaccine transportation vehicles comply with minimum fleet management requirements. • Funds budgeted for generator fuel are insufficient. • Facilities do not use a reliable means of communication.

E5 (maintenance and repair)

Code	Criterion	Score
E5	Maintenance and repair	75%
E5.1	Maintenance and repair of buildings	84%
E5.2	Maintenance and repair of cold chain equipment	77%
E5.3	Maintenance and repair of vehicles	65%

Strengths	Weaknesses
<ul style="list-style-type: none"> • At least one staff member is assigned to carry out routine maintenance tasks on cold chain equipment. • At least one staff member is assigned to maintain an inventory of cold chain equipment. • Auto-mechanics or services are available for repair of vehicles. • Refrigeration mechanics or services are available for repair of CCE. • Staff is trained in routine maintenance and inventory maintenance of CCE • SOPs/guidelines available for routine maintenance of refrigeration equipment and for maintenance of CCE inventory 	<ul style="list-style-type: none"> • Facilities do not maintain an inventory of their cold chain equipment and vaccine transportation vehicles. • Lack of staff assigned to carry out routine vehicle maintenance tasks • Insufficient funds budgeted for maintenance of buildings and vehicles • Lack of a standard fault reporting procedure in event of breakdown of CCE or vehicles • Preventive maintenance work done in buildings, CCE or vehicles is not documented. • Preventive maintenance schedules for CCE and vehicles are not followed.

Strengths	Weaknesses
<ul style="list-style-type: none"> • Sufficient funds available for routine maintenance of cold chain equipment • Repair work of the generator and CCE is carried out promptly. • Generators, CCE and vehicles are fully functional. 	<ul style="list-style-type: none"> • Performance of the maintenance contractor for CCE is not monitored. • Not all CCE are in good physical condition. • In some sites, the quality of building work does not meet facility requirements.

Figure 20: Secure generator housing at Luang Prabang Provincial Vaccine Store



E6 (stock management)

Code	Criterion	Score
E6	Stock management	82%
E6.1	Replenishment	91%
E6.2	Receipt and put-away	95%
E6.3	Inventory management	73%
E6.4	Release and dispatch	87%
E6.5	Managing returns, damaged and expired stock	32%

Strengths	Weaknesses
<ul style="list-style-type: none"> • Vaccine stock, request, issue and receipt forms have recommended fields. • Responsible staff is trained in vaccine stock management. • Staff is knowledgeable of key principles and procedures of vaccine stock management. • SOPs available for managing vaccine stock transactions and on use of vaccine vial monitors (VVM) • Vaccine requests are complete and documented. • Vaccine stock records are maintained and up-to-date. They are well organized and secure. • Physical stock counts are done regularly. 	<ul style="list-style-type: none"> • Facilities do not have access to the computerised stock management system. Also, recommended fields are missing from the computerised stock management system. • Insufficient staff to manage vaccine stock management tasks • Reasons for vaccine losses are not documented. • In some stores, the stock records for dry goods are not maintained. • Damaged or expired vaccines are neither clearly labelled nor stored outside of cold storage until final disposal. • Vaccine and diluent stocks do not match. • Vaccine and diluent stock records are not accurate (compared to physical stock).

E7 (distribution of vaccines and dry goods)

Code	Criterion	Score
E7	Distribution of vaccines and dry goods	67%
E7.1	Distribution planning	76%
E7.2	Transportation of vaccines	77%

Strengths	Weaknesses
<ul style="list-style-type: none"> • Transport is available for scheduled vaccine distribution or collection. • Responsible staff is knowledgeable of key principles and procedures of vaccine distribution. • Insulated containers are stored, maintained and packed according to guidelines. • Coolant packs are prepared and used according to standard procedures. • Refrigerated vehicles are loaded according to standard guidelines. • Vaccines are promptly put into cold storage after being unloaded from refrigerated vehicles. • Appropriate actions are taken in response to vaccine transportation emergencies. • During the review period, most scheduled vaccine distributions took place as per plan. 	<ul style="list-style-type: none"> • Vaccine transportation vehicles do not meet minimum fleet requirements. • Inadequate staff assigned to carry out vaccine distribution tasks • Not all staff are trained on how to carry out vaccine distribution tasks. • Not all facilities have SOPs or guidelines on vaccine distribution planning. • Facilities and vaccine transportation vehicles do not have a vaccine transport contingency plan. • Funds budgeted for vaccine transportation are not received in full or on time. Funds budgeted are insufficient for fuel for vehicle and vaccine transportation. • All facilities do not have a documented vaccine distribution plan. • Vaccine transportation trips are often not recorded.

Figure 21: Team inspecting the racks inside the refrigerated van for transportation of vaccine



E8 (vaccine management)

Code	Criterion	Score
E8	Vaccine management	78%
E8.1	The shake test	0%

Strengths	Weaknesses
<ul style="list-style-type: none"> Responsible staff is knowledgeable of key principles and procedures of vaccine management. 	<ul style="list-style-type: none"> Facilities do not have SOPs or guidelines for vaccine management. Facilities do not conduct a shake test in response to low temperature alarms.

E9 (waste management)

Code	Criterion	Score
E9	Waste management	77%
E9.2	Storage of immunization waste	64%

Strengths	Weaknesses
<ul style="list-style-type: none"> Responsible staff is knowledgeable of key principles and procedures of immunization waste management. 	<ul style="list-style-type: none"> Facilities do not have suitable facilities and equipment for storing immunization waste. Funds budgeted for waste management are not received in full and on time. Funds are insufficient. Waste is not removed from the facilities frequently.

Figure 22: Unsafe storage of waste including safety boxes prior to disposal at Oudomxay Provincial Vaccine Store



Figure 23: Inadequate waste segregation practices at Savannakhet Provincial Vaccine Store



M1 (annual needs forecasting)

Strengths	Weaknesses
<ul style="list-style-type: none"> At least one staff member is responsible for annual needs forecasting for vaccines and dry goods. Responsible staff is trained on how to forecast needs for vaccines and dry goods. Facilities have guidance materials on vaccines and dry goods forecasting for managers. Facilities have a standard method for vaccine and dry goods needs. Facilities have forecasts for vaccines and dry goods for the current year. 	<ul style="list-style-type: none"> Facilities' vaccine needs forecasts were not completely accurate.

M2 (annual work planning)

Strengths	Weaknesses
<ul style="list-style-type: none"> • At least one staff member is responsible for annual work planning. • Turnover of immunization supply chain staff is low in most provinces. • Responsible staff is trained in annual work planning. • Facilities have guidance materials on annual work planning for managers. • Funds budgeted for salaries and other operational costs are sufficient. • Facilities have budgeted annual work plans. • Facilities record their incomes and expenditures and monitor the implementation of annual work plans. 	<ul style="list-style-type: none"> • Funds for staff salaries and other operational costs are neither received in full nor on time. • Implementation of annual work plans is not as per schedule.

M3 (supportive supervision)

Strengths	Weaknesses
<ul style="list-style-type: none"> • There is a reliable supply of fuel for vehicles for supportive supervision. • Transport is available for scheduled supportive supervision visits. • Supervisors use a standard checklist in most provinces. • Most facilities have guidance material on supportive supervision for supervisors. • Funds budgeted for supportive supervision are received in full and on time. • Supervisory visits are arranged according to a fixed schedule. • Supervisors maintain records of visits and provide feedback to staff. 	<ul style="list-style-type: none"> • Supportive supervision checklists do not cover key areas of vaccine management. • Supervisors are not trained in supportive supervision. • Funds budgeted for supportive supervision is insufficient. • All scheduled supportive supervision visits do not take place.

M4 (immunization supply chain performance monitoring)

Strengths	Weaknesses
<ul style="list-style-type: none"> • Facilities monitor the reporting rates. • Adequate staff to carry out immunization supply chain performance monitoring tasks • Responsible staff is trained in carrying out immunization supply chain performance monitoring tasks. 	<ul style="list-style-type: none"> • Reporting form does not include essential supply chain data. • Not all reporting facilities report in full and on time. • Not all facilities monitor their order timeliness and fill rates, vaccine stock status indicators, temperature alarm rates and cold chain equipment functionality.

<ul style="list-style-type: none"> • SOPs or guidance materials on immunization supply chain performance monitoring are available and in local language. • Facilities monitor temperature alarm rates, cold chain equipment functionality and vaccine stock status indicators of lower stores. • Facilities review immunization supply chain performance indicators at least annually. 	<ul style="list-style-type: none"> • Facilities do not monitor their vaccine forecast accuracy and unopened wastage rates. • All KPIs are not displayed on one consolidated dashboard.
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4.4 District or lowest distribution vaccine store (LD)

A total of 23 district vaccine stores were sampled and assessed during the National Effective Vaccine Management Assessment 2022.

Table 7: Heat Map, district vaccine store, National Effective Vaccine Management Assessment 2022 (n=23)

		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			79	81	91		79	98	85
Storage & transportation capacity	E3	99	73		100	87	73	70	92	80
Facility infrastructure & equipment	E4	75	80	90			50	79		79
Maintenance & repair	E5			47	97	91	73	61	88	76
Stock management	E6			91	80	99		76	47	79
Distribution of vaccines & dry goods	E7		78	46	75	43	63	64	83	65
Vaccine management	E8				90	85		88		86
Waste management	E9		69		78	98	68	81	91	81
Annual needs forecasting	M1				93	96		87	82	89
Annual work planning	M2				96	96	86	91	59	91
Supportive supervision	M3	95	95	64	76	100	60	74		78
Immunization supply chain performance monitoring	M4			93	79	96		68		78
TOTAL		80	76	82	86	86	70	74	84	79

An overall score of 79 per cent was recorded for the lowest distribution or district level. Detailed findings are as follows:

E2 (temperature management)

Code	Criterion	Score
E2	Temperature management	85%
E2.1	Temperature management in storage	90%
E2.2	Temperature management during transportation	83%

Strengths	Weaknesses
<ul style="list-style-type: none"> • Most refrigerators/freezers have a functional 30 DTR or equivalent temperature monitoring device. • 80% of refrigerators/freezers have backup temperature monitoring devices. • Staff trained on how to monitor vaccine temperature • Most of the staff is knowledgeable of key principles and procedures for temperature monitoring. • SOPs for vaccine temperature monitoring in storage are available. • Vaccine storage temperatures are systematically monitored. • Temperature records for the last three years are well organised and secure. • Vaccines are not exposed to damaging high or low temperatures during storage and transportation. 	<ul style="list-style-type: none"> • Vaccine temperature recording form does not fulfil minimum requirements. • Inadequate staff assigned for temperature monitoring • Some facilities do not have SOPs on vaccine temperature monitoring in transportation. • Temperature and alarm events during vaccine transportation are not recorded or acknowledged. • Freeze-indicators are incorrectly packed or not packed with freeze-sensitive vaccines during transportation.

E3 (storage and transportation capacity)

Code	Criterion	Score
E3	Storage and transportation capacity	80%
E3.1	Capacity of infrastructure and equipment	80%
E3.2	Utilisation of available capacity	73%

Strengths	Weaknesses
<ul style="list-style-type: none"> • The facility has sufficient dry goods storage capacity to accommodate the expected maximum stock levels of diluents, syringes and safety boxes. • Sufficient vaccine storage capacity at +2° to +8° C • Sufficient quantity of insulated containers in most district vaccine stores to accommodate maximum expected load of vaccines • Staff is knowledgeable of key principles and procedures for vaccine and dry goods storage. • SOPs for vaccine and dry goods storage are available including vaccine storage contingency plan. • Funds budgeted for vaccine storage are received in full and on time. 	<ul style="list-style-type: none"> • Insufficient coolant pack storage capacity at -15° to -25° C • Funds budgeted for vaccine storage are insufficient. • Dry goods are neither stored safely nor securely as per guidelines.

Strengths	Weaknesses
<ul style="list-style-type: none"> • Vaccines are stored safely during immunization sessions. • Vaccine stocks are well organized and secure. • Appropriate action is taken to protect vaccines in event of breakdown of CCE, power loss, or other storage emergency. 	

Figure 24: Inadequately maintained dry store in Xamtay district, Huaphanh



E4 (facility infrastructure and equipment)

Code	Criterion	Score
E4	Facility infrastructure and equipment	79%
E4.1	Quality of infrastructure	74%
E4.2	Quality of equipment	84%

Strengths	Weaknesses
<ul style="list-style-type: none"> • The facilities receive at least eight hours of electricity supply, access to WASH facilities and have functional means of communication. • Facilities are secure. • Cold stores meet sufficient requirements. • Insulated containers comply with performance quality standard specifications of WHO. • Facilities have a computer and operational printer. • Facility buildings and equipment are clean and dry, and have a well-organized layout. 	<ul style="list-style-type: none"> • Store manager's offices do not always meet minimum requirements. • Some facilities do not have guttering and drainage for rainwater. • Dry stores are not as per recommended standards. • Not all buildings have functional certified fire extinguishers. • Facilities do not have a back-up generator. • Vaccine transportation vehicles do not meet minimum road safety requirements. • Not all vaccine refrigerators/freezers comply with performance quality standard specifications of WHO. • Some facilities do not have reliable means of communication.

E5 (maintenance and repair)

Code	Criterion	Score
E5	Maintenance and repair	76%
E5.1	Maintenance and repair of buildings	83%
E5.2	Maintenance and repair of cold chain equipment	81%
E5.3	Maintenance and repair of vehicles	31%

Strengths	Weaknesses
<ul style="list-style-type: none"> • At least one staff member is assigned to carry out routine refrigeration maintenance tasks. • Refrigeration technicians or services are available to maintain and repair cold chain equipment. • Auto mechanics or services are available to repair and maintain vaccine transportation vehicles. • Staff is trained in routine maintenance of cold chain equipment and in maintaining inventory of cold chain equipment. • SOPs available on maintenance of cold chain equipment and maintaining inventory. • CCE and generator repair work is carried out promptly. • There is visual evidence that the buildings are maintained. • CCE is fully functional. Most CCE are in good physical condition. 	<ul style="list-style-type: none"> • Facilities do not maintain an up-to-date inventory of cold chain equipment. • Staff is not always available for maintenance of buildings. • No staff is assigned for routine maintenance of vehicles. • Funds for maintenance and repair of cold chain equipment, buildings and vehicles are neither received on time nor in full. • Lack of documentation on preventive maintenance work on buildings, CCE and vehicles • Absence of standard fault reporting procedure for breakdown of cold chain equipment and vehicles • Preventive maintenance of cold chain equipment, vehicles and buildings do not follow a pre-decided schedule. • Not all vehicles are fully functional.

E6 (stock management)

Code	Criterion	Score
E6	Stock management	79%
E6.1	Replenishment	78%
E6.2	Receipt and put-away	83%
E6.3	Inventory management	63%
E6.4	Release and dispatch	70%
E6.5	Managing returns, damaged and expired stock	70%

Strengths	Weaknesses
<ul style="list-style-type: none"> • Vaccine request, receipt and issue form have all of the required fields. • Responsible staff is trained in vaccine stock management. • Staff is knowledgeable of key principles and procedures of vaccine stock management. • Facilities have SOPs for managing vaccine stock transactions and using vaccine vial monitors (VVM). • Vaccine requests are complete and documented; physical stock counts are conducted regularly. • Vaccine received is inspected upon arrival. 	<ul style="list-style-type: none"> • Facilities do not have a computerised vaccine stock management system. • Insufficient staff assigned to manage stocks • Vaccine issues and stock levels are not recorded with every transaction. • Vaccine losses (wastage rate and its reasons) are not recorded. • Stock levels for dry goods are not maintained. • Vaccine and diluent stock does not match for freeze-dried vaccines. • Vaccine and diluent stock records are inaccurate.

E7 (distribution of vaccines and dry goods)

Code	Criterion	Score
E7	Distribution of vaccines and dry goods	65%
E7.1	Distribution planning	81%
E7.2	Transportation of vaccines	65%

Strengths	Weaknesses
<ul style="list-style-type: none"> • Staff is knowledgeable of key principles and procedures of vaccine and dry goods distribution. • Funds budgeted for fuel of vehicles are received in full and on time. • Insulated containers are stored and packed according to standard procedures. • Coolant packs are prepared according to guidelines. • Facilities have a vaccine distribution plan. • Most of the planned outreach activities are conducted as scheduled. 	<ul style="list-style-type: none"> • Sometimes the vehicles or drivers are not available for vaccine transportation. • Vaccine transportation vehicles do not always meet minimum fleet requirements. • Inadequate staff to carry out vaccine distribution tasks • Not all staff is trained to carry out vaccine distribution tasks. • Not all facilities and vehicles have a vaccine transportation contingency plan. • Not all facilities have SOPs for vaccine distribution planning.

Strengths	Weaknesses
	<ul style="list-style-type: none"> • Funds for fuel of vehicles is insufficient. • Funds budgeted for vaccine distribution, collection or outreach are insufficient and neither received in full nor on time. • No evidence of preparedness to take action in response to vaccine transportation emergencies • No record maintained for vaccine transportation trips • Not all scheduled vaccine distributions take place as per plan.

E8 (vaccine management)

Code	Criterion	Score
E8	Vaccine management	86%
E8.1	The shake test	0%
E8.2	Use of freeze-dried vaccines	100%
E8.3	Multi-dose vial policy (MDVP)	40%

Strengths	Weaknesses
<ul style="list-style-type: none"> • Staff is knowledgeable of key principles and procedures of vaccine management. • Facilities have required SOPs/guidelines on vaccine management. • Correct diluents are used to reconstitute freeze-dried vaccines. • Diluents are stored in the cold chain for at least 12 hours prior to session. 	<ul style="list-style-type: none"> • Not all open vials are marked with time and date of opening. • A shake test is not conducted in response to low temperature alarms.

Figure 25: Open vials without written date and time of opening were kept in the refrigerator at Xay District Hospital, Oudomxay



Mixing Xai, Oudomxay Province 2022.10.11 10:07
By OnePlus

E9 (waste management)

Code	Criterion	Score
E9	Waste management	81%
E9.1	Handling of syringes after use	93%
E9.2	Storage of immunization waste	77%
E9.3	Disposal of immunization waste	70%

Strengths	Weaknesses
<ul style="list-style-type: none"> • Safety boxes used meet minimum standards. Facilities use recommended safety boxes and syringes. • There are suitable facilities and equipment for storing waste. • Staff is trained in immunization waste management. • Staff is aware of key principles and procedures of immunization waste management. • SOPs/guidelines for waste management are present at district facilities. • SOPs on safe injections are available at district facilities. • Waste disposal site (where present) was clean and maintained, free of used syringes, ampoules and vials. • Immunization room is clean and well maintained. • No history of needle stick injuries in past year 	<ul style="list-style-type: none"> • Limited availability of functional incinerator and waste burial pits as per minimum recommended standards. • Inadequate staff is assigned to manage immunization waste. • Funds budgeted for waste management are insufficient and are neither received in full nor on time. • The frequency of waste removal from the facility is irregular and infrequent. • Immunization waste disposal methods are not as per recommended guidelines, safe for the environment.

Figure 26: Waste lying in the open near incinerator at Sopbao District



M1 (annual needs forecasting)

Strengths	Weaknesses
<ul style="list-style-type: none"> • At least one staff member is involved in forecasting vaccine and dry goods needs. • Responsible staff is trained in how to do annual needs forecasting for vaccines and dry goods. • Guidance material available for vaccine and dry goods needs forecasting. • Districts use a standard method to forecast the needs for vaccines and dry goods. 	<ul style="list-style-type: none"> • Vaccine needs forecasts were inaccurate in roughly 20% of facilities.

M2 (annual work planning)

Strengths	Weaknesses
<ul style="list-style-type: none"> • At least one staff member is responsible for annual work planning. • Responsible staff is trained in annual work planning. • Facilities have annual work planning guidance materials for managers. • Facilities have budgeted annual work plans. • Facilities record their income and expenditure and monitor the implementation status of work plan activities. 	<ul style="list-style-type: none"> • In some districts, there is a high turnover of immunization supply chain facility staff. • Only in some districts, funds for staff salaries and other operational costs are received in full and on time. • Implementation of annual work plans is not as per schedule.

M3 (supportive supervision)

Strengths	Weaknesses
<ul style="list-style-type: none"> • There is a reliable supply of fuel for vehicles for supportive supervision. • Transport is usually available for scheduled supportive supervision visits. • Facilities have supportive supervision guidance material for supervisors. • There is a schedule for supportive supervision visits. • Most supervisors provide feedback to the staff and keep a record of their visits and findings. 	<ul style="list-style-type: none"> • Supervisors do not use standard supportive supervision checklists. • Supervision checklists do not cover all key areas of vaccine management. • Not all supervisors are trained in supportive supervision. • Funds budgeted for supportive supervision are insufficient and usually not received in full or on time. • Not all scheduled visits are conducted as per plan.

M4 (immunization supply chain performance monitoring)

Strengths	Weaknesses
<ul style="list-style-type: none"> • Most facilities monitor their reporting rates and essential supply chain data. 	<ul style="list-style-type: none"> • There is not enough staff who is able to carry out immunization supply chain performance monitoring tasks.

<ul style="list-style-type: none"> Responsible staff is trained in immunization supply chain performance monitoring tasks. Facilities have up-to-date guidance material on immunization supply chain performance monitoring for managers, and all SOPs are in local language. In most districts, they monitor functionality of cold chain equipment of their lower facilities. Reporting facilities report on time. Facilities review immunization supply chain performance at least annually. Facilities monitor their vaccine stock status and also for the lower facilities. 	<ul style="list-style-type: none"> Not all districts monitor their vaccine accuracy forecasts, order timeliness and fill rates, unopened wastage rates, functionality of their cold chain equipment, temperature alarm rates. KPIs are not displayed onto one consolidated dashboard.
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4.5 Health centres or service delivery point (SP)

A total of 45 health centres were assessed across 23 districts and 11 provinces.

Table 8: Effective Vaccine Management scores, health centres, National Effective Vaccine Management Assessment 2022 (n=45)

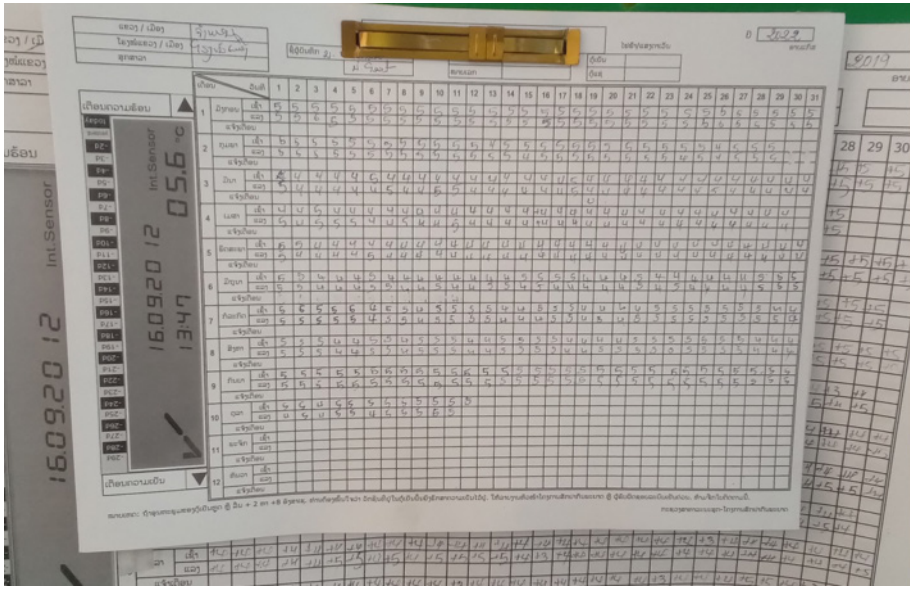
		Infrastructure	Equipment	Information technology	Human resources	Policies & procedures	Financial resources			TOTAL
		C1	C2	C3	C4	C5	C6	OUTPUT	PERFORMANCE	
Vaccine arrivals	E1									
Temperature management	E2			71	78	76		66	85	76
Storage & transportation capacity	E3		64		98	70	81	78	100	75
Facility infrastructure & equipment	E4	70	82	96			100	83		78
Maintenance & repair	E5				89	67	77	46	86	72
Stock management	E6			87	74	76		58	49	67
Distribution of vaccines & dry goods	E7		98		75	51	75	91	86	79
Vaccine management	E8				84	78		88		85
Waste management	E9		75		85	79	71	82	96	83
Annual needs forecasting	M1				90	81		99	87	92
Annual work planning	M2				83	76	81	86	74	82
Supportive supervision	M3							82		82
Immunization supply chain performance monitoring	M4				75	76		56		66
TOTAL		70	72	83	82	72	80	73	82	76

E2 (temperature management)

Code	Criterion	Score
E2	Temperature management	76%
E2.1	Temperature management in storage	80%
E2.2	Temperature management during transportation	63%

Strengths	Weaknesses
<ul style="list-style-type: none"> • Most refrigerators/freezers have a functional 30 DTR or equivalent temperature monitoring device. • Staff trained on how to monitor vaccine temperature • Most staff is knowledgeable of key principles and procedures for temperature monitoring. • Vaccine storage temperatures are systematically monitored. • Vaccines are not exposed to damaging high or low temperatures during storage. 	<ul style="list-style-type: none"> • Inadequate number of back-up temperature monitoring devices at health centres • Vaccine temperature recording form does not fulfil minimum requirements. • Inadequate staff assigned for temperature monitoring • Some facilities do not have SOPs for temperature monitoring in storage. • Temperature records for the last three years are neither well organised nor secure. • Temperature and alarm events during vaccine transportation are neither recorded nor acknowledged. • Temperature alarm events during vaccine storage are not recorded. • Freeze-indicators are not packed with freeze-sensitive vaccines during transportation. • Vaccines may be exposed to damaging high or low temperatures during transportation.

Figure 27: Up-to-date temperature record for refrigerator at health centre



E3 (storage and transport capacity)

Code	Criterion	Score
E3	Storage and transportation capacity	75%
E3.1	Capacity of infrastructure and equipment	64%
E3.2	Utilisation of available capacity	79%

Strengths	Weaknesses
<ul style="list-style-type: none"> • Sufficient capacity of cold chain storage equipment (refrigerators) and insulated containers (cold boxes and vaccine carriers) at +2° to +8° C • Staff is knowledgeable about key principles of vaccine and cold chain management. • Non-vaccine medical products are segregated from vaccines and clearly labelled. • Appropriate action is taken for vaccine storage in the event of an emergency. 	<ul style="list-style-type: none"> • Insufficient capacity of cold chain equipment (freezers) at -15° to -25° C. • Some health centres (HC) do not have SOPs for vaccine storage. • Most HCs do not have vaccine storage contingency plans. • In nearly 1/3 health facilities, funds budgeted for vaccine storage are neither received in full nor on time. • Vaccine stocks are neither well organized nor safely stored.

E4 (facility infrastructure and equipment)

Code	Criterion	Score
E4	Facility infrastructure and equipment	78%
E4.1	Quality of infrastructure	72%
E4.2	Quality of equipment	86%

Strengths	Weaknesses
<ul style="list-style-type: none"> • The facilities receive at least eight hours of grid electricity each day. • Facilities have functional means of communication and access to WASH services. • Insulated containers (cold boxes and vaccine carriers) are WHO PQS certified. • Facility buildings and equipment are clean and dry. 	<ul style="list-style-type: none"> • Storage facilities do not have a functional certified fire extinguisher. • Some vaccine refrigerators/freezers are not WHO PQS certified.

E5 (maintenance and repair)

Code	Criterion	Score
E5	Maintenance and repair	72%
E5.1	Maintenance and repair of buildings	81%
E5.2	Maintenance and repair of cold chain equipment	75%
E5.3	Maintenance and repair of vehicles	0%

Strengths	Weaknesses
<ul style="list-style-type: none"> • At least one staff member is available to carry out routine maintenance tasks for buildings and equipment. • Staff is trained in routine maintenance of cold chain equipment. • Funds budgeted for maintenance of CCE are sufficient. • Cold chain equipment repair work is carried out promptly. • Cold chain equipment and buildings are clean and well maintained. 	<ul style="list-style-type: none"> • Not all staff is trained on maintaining a cold chain equipment inventory. • Facilities do not have SOPs for routine maintenance of cold chain equipment. • Funds budgeted for maintenance of cold chain equipment, buildings and vehicles are neither received on time nor in full. • Maintenance of cold chain equipment and vehicles is not done as per documented schedule. • Lack of standard fault reporting procedure for cold chain equipment and vehicle breakdown

Figure 28: Poorly maintained ceiling at a health centre in Phongsaly



E6 (stock management)

Code	Criterion	Score
E6	Stock management	67%
E6.1	Replenishment	62%
E6.2	Receipt and put-away	61%
E6.3	Inventory management	56%
E6.5	Managing returns, damaged and expired stock	41%

Strengths	Weaknesses
<ul style="list-style-type: none"> • Vaccine request and receipt forms are as per recommendation. • Staff is knowledgeable of key principles and procedures of vaccine stock management. • Vaccine requests are complete and up-to-date. 	<ul style="list-style-type: none"> • Inadequate staff for vaccine stock management • Not all staff is trained in vaccine stock management. • Lack of SOPs on vaccine stock management were present at health centres.

Strengths	Weaknesses
	<ul style="list-style-type: none"> • Stock records for vaccine and dry goods are neither complete, well organized, secure, nor up-to-date. • Physical stock counts are not conducted regularly. • Reasons for vaccine losses are not recorded. • Damaged or expired vaccines are not clearly labelled or stored outside of cold storage until final disposal. • Vaccine and diluent stocks do not match. • Vaccine and diluent stock records are not accurate (do not match physical stocks).

E7 (distribution of vaccines and dry goods)

Code	Criterion	Score
E7	Distribution of vaccines and dry goods	79%
E7.1	Distribution planning	98%
E7.2	Transportation of vaccines	87%

Strengths	Weaknesses
<ul style="list-style-type: none"> • Transport is available for scheduled vaccine distribution, collection and outreach. • Staff is knowledgeable of key principles and procedures of vaccine distribution. • Health centres have documented outreach plans. • Insulated containers are well maintained and coolant packs are prepared as per standard country guidelines. • Majority outreach activities are conducted as planned. 	<ul style="list-style-type: none"> • Inadequate staff assigned to carry out vaccine distribution tasks • Not all staff is trained to carry out vaccine distribution tasks. • Lack of SOPs on vaccine distribution planning • Insufficient funds for vaccine distribution are neither received on time nor in full.

Figure 29: Use of freeze-free vaccine carrier at a session site



E8 (vaccine management)

Code	Criterion	Score
E8	Vaccine management	85%
E8.2	Use of freeze-dried vaccines	99%
E8.3	Multi-dose vial policy (MDVP)	35%

Strengths	Weaknesses
<ul style="list-style-type: none"> • Staff is knowledgeable of key principles and procedures of vaccine management. • Diluents are stored at least 12 hours prior to the reconstitution. • Correct diluents are used to reconstitute freeze-dried vaccines. 	<ul style="list-style-type: none"> • Inadequate staff assigned to carry out vaccine distribution tasks • Lack of SOPs on vaccine management in some health centres • Lack of marking of date/time of opening on open vials under multi-dose vial policy

Figure 30: Expired vaccines were kept in the refrigerator at a health centre



E9 (waste management)

Code	Criterion	Score
E9	Waste management	83%
E9.1	Handling of syringes after use	96%
E9.2	Storage of immunization waste	85%
E9.3	Disposal of immunization waste	61%

Strengths	Weaknesses
<ul style="list-style-type: none"> • Syringes and safety boxes used are as per recommended standards. • Most health centres have equipment for waste storage. • Staff is knowledgeable about key principles of immunization waste management. • SOPs on waste management present in 80% of health centres. • Safe injection practices are followed as per guidelines. • Waste disposal site is free of used syringes, vials and ampoules. • Facilities did not report needlestick injuries or risk to the environment. 	<ul style="list-style-type: none"> • Lack of waste burial facilities and functional incinerators at many health centres • Inadequate staff assigned and trained in immunization waste management • Funds for waste management are neither received in full nor on time. • Lack of a safe waste disposal method at health centres

Figure 31: Colour coded waste bins at a session site in health centre



Figure 32: Inadequate waste disposal practices at a health centre in Huaphanh



M1 (annual needs forecasting)

Strengths	Weaknesses
<ul style="list-style-type: none"> • At least one staff member is responsible for forecasting vaccine and dry goods needs. • Staff is trained in how to forecast vaccine and dry goods needs. 	<ul style="list-style-type: none"> • Nearly 20% of health centres did not have guidance material on vaccine and dry goods needs forecasting.

M2 (annual work planning)

Strengths	Weaknesses
<ul style="list-style-type: none"> • At least one staff member is responsible for annual work planning. • Staff is trained on annual work planning. • Funds for staff salaries are received in full and on time. • Funds for electricity are sufficient. • Facilities record their income and expenditure, and monitor the implementation of annual work plans (AWPs). 	<ul style="list-style-type: none"> • High turnover of immunization supply chain staff • Lack of guidance material on annual work planning across all health centres • Funds for electricity and internet connection neither received in full nor on time • Some activities of AWP are not implemented as per schedule.

M3 (supportive supervision)

Strengths	Weaknesses
<ul style="list-style-type: none"> • Staff receives feedback from supervisors. 	

M4 (immunization supply chain performance monitoring)

Strengths	Weaknesses
<ul style="list-style-type: none"> • Almost 80% of staff trained on how to carry out immunization supply chain performance monitoring tasks • SOPs, where available, are in the local language. • Facilities monitor their vaccine forecast accuracy. 	<ul style="list-style-type: none"> • Not enough staff to carry out immunization supply chain performance monitoring tasks • Lack of SOPs on immunization supply chain performance monitoring at all health centres • Facilities do not monitor their vaccine stock status, unopened vaccine wastage or temperature alarm rates. • Facilities do not monitor their immunization supply chain performance indicators annually.

4.6 Programme management score

A separate questionnaire at the programme level assesses key management areas such as infrastructure management, equipment management, IT systems management, human resources management, etc. The programme management questionnaire assesses the immunization programme at the national managerial level.

The overall score for programme management of 47 per cent is well below the Effective Vaccine Management (EVM) target score of 80 per cent. The scores are as depicted in Table 9.

Table 9: Programme Management Scores, National EVM Assessment 2022

	C4 Human resources	C5 Policies & procedures	C6 Financial resources	O Output	P Performance	All Categories
R1 Infrastructure management		0%			74%	37%
R2 Equipment management	100%	0%	100%		73%	75%
R3 IT systems management		0%		0%	78%	26%
R4 Human resources management		0%	100%	51%	87%	56%
R5 Knowledge management	0%	3%		25%	81%	23%
R6 Financial resources management		0%		100%	79%	60%
ST Strategic planning	64%	67%		50%		61%
All Criteria	65%	14%	100%	38%	79%	47%

R1: Infrastructure management

There is no policy documentation available which provides a comprehensive, detailed description of the policies, regulations, roles and responsibilities for immunization supply chain infrastructure management. The immunization supply chain infrastructure, including buildings, compounds, access roads and utilities (electricity, water, sanitation and telecommunications links) of vaccine stores and immunization facilities, are up to recommended standards.

R2: Equipment management

Strengths:

- The post of cold chain technician is well established, and filled by a suitable candidate with required qualification and experience.
- Program funds budgeted for new equipment are received in full and on time.
- More than 75% of immunization supply chain equipment (cold/freezer rooms, refrigerators, freezers, transportation vehicles, insulated containers, generators, incinerators, etc. at the vaccine stores and immunization facilities) is in compliance with the performance quality standards of the World Health Organization. Old but functional equipment is in use until phased out.

Limitations: Updated policies, roles and responsibilities for the management of cold chain equipment are not clearly documented. Minimum requirements for documentation describing the cold chain equipment include:

- Policy/strategy for the procurement of cold chain equipment (i.e., roles, responsibilities, regulations, funding sources, selection, installation, introduction of new technology, etc.)
- Policy/strategy for the decommissioning or condemnation of cold chain equipment (i.e. roles, responsibilities, regulations, funding sources, preferred mode of disposal, recycling, resale, etc.)
- Policy/strategy for the maintenance of cold chain equipment (i.e., roles, responsibilities, regulations, funding sources, planned preventive maintenance checklists, etc.)
- Description of the scope and functionality of the cold chain equipment inventory management system (i.e., coverage [which facilities], scope [which types of equipment], data [which information for facilities, equipment type], life of equipment, functionality, breakdown and response time monitored, etc.)
- Policy/strategy for the selection, procurement, installation, inventory management, maintenance, decommissioning of vaccine transportation vehicles.

R3: Information technology systems management

- Remote temperature monitoring system meets minimum Effective Vaccine Management standards.
- Policies, roles and responsibilities for the management of the program's information technology systems are not documented. Policies on selection, procurement, installation, testing, maintenance, support (general information technology support and specific system support), decommissioning and standard forms management (e.g., reviewing, printing, distribution) were not available for review.
- Technical description of the immunization supply chain data management systems (vaccine arrival data management system, vaccine stock management system, cold chain inventory management system, and immunization supply chain performance monitoring system) was not available. All such descriptions should include related policies and procedures, roles and responsibilities and hardware, software and recording/reporting forms.

R4: Human resources management

Strengths:

- Organizational charts for the Public Health-Expanded Programme on Immunization including iSC is available and displayed at the national vaccine store.
- Programme funds budgeted for staff development were received in full and on time.
- There is an up-to-date record of staff training.
- The key roles for the management of the immunization supply chain are the Expanded Programme on Immunization manager, the immunization supply chain manager, the national cold chain technician, the immunization supply chain data manager/analyst, and immunization supply chain standard operating procedures manager. Recruitment, training and knowledge of more than 80 per cent of the immunization supply chain staff meet the Effective Vaccine Management standards.

Limitations:

- Human resource policy, particularly working conditions, attendance, career building opportunities, recruitment, compensation, incentives, training, supportive supervision, overtime, vacation, leaves, etc., neither updated nor available for review
- Lack of an updated immunization supply chain training curriculum
- Immunization supply chain training material does not completely conform to the Effective Vaccine Management standards, and is not available for staff on the website of the Ministry of Health or of the Expanded Programme on Immunization.
- A position or role with the overall responsibility for managing SOPs is not established.
- A position or role with the overall responsibility for monitoring the performance of the immunization supply chain is not established.
- Positions or roles of cold chain technicians at regional cold chain hubs are not completely filled; funds for these positions are not maintained on a long-term basis.

R5: Knowledge management

Strengths:

- There are model SOPs for temperature monitoring in storage, routine maintenance of refrigeration equipment, use of vaccine vial monitors, packing insulated containers and burial of sharps waste.

Limitations:

- There are no model SOPs for any of the other routine vaccine management tasks such as vaccine arrivals procedures, temperature monitoring during transportation, storage of vaccines and dry goods, vaccine stock management, and safe injection practices.
- The model SOPs are not user friendly. SOPs should be easily accessible to staff who need them.
- There are no model guidance or training materials for immunization managers (for annual work planning, needs forecasting, supportive supervision and supply chain performance monitoring).

R6: Financial resources management

Strengths:

- Expenditure and receipts for immunization supply chain programme development are recorded.
- In most cases, funds budgeted for immunization supply chain operations and development are received in full and on time at all levels.

Limitations:

- Funding sources for immunization supply chain operations and development are not clearly documented.
- Some facilities reported not receiving funds budgeted for immunization supply chain operational activities in full or on time.

ST: Strategic planning

Strengths:

- Role and position of Expanded Programme on Immunization manager, immunization supply chain manager is well established and suitably filled by an experienced person.
- Functional National Logistics Working Group (NLWG) is established.
- Some strategic planning documents are available (comprehensive multi-year plan, multi-year vaccine needs forecast, multi-year vaccine procurement budget) and were updated within the last five years.
- Activities in the previous improvement plan were budgeted.

Limitations:

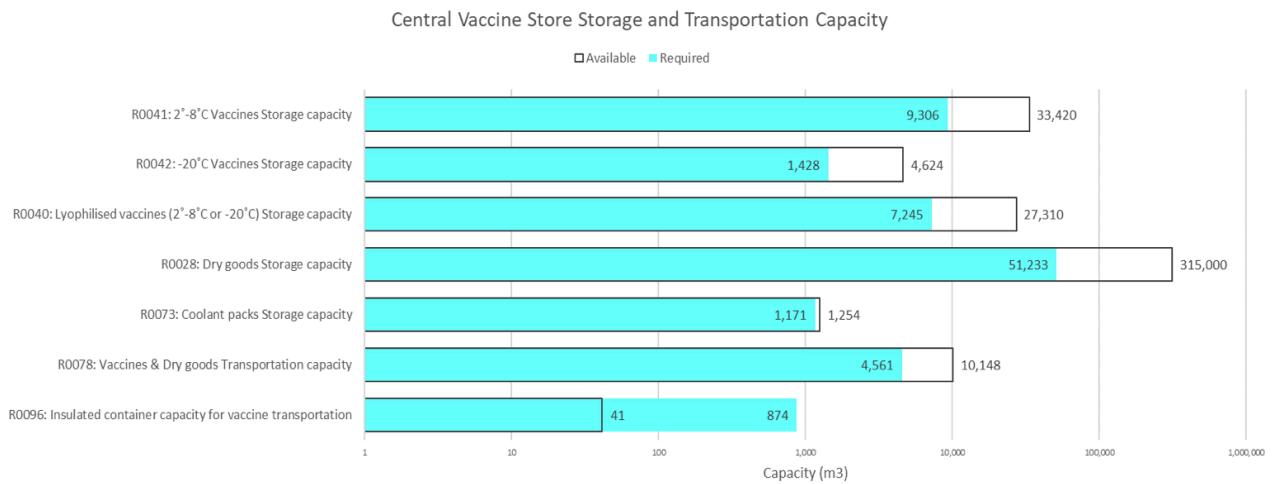
- A position or role with the overall responsibility for monitoring the performance of the immunization supply chain is not established.
- Post or role of the immunization supply chain data analyst is not established.
- NLWG does not have updated ToR.
- Certain strategic planning document is not available or updated within the last five years such as cold chain equipment rehabilitation plan, waste management plan, eHealth strategy, and electronic logistics management information system (eLMIS) strategy
- Following documents have not been generated within the last five years: temperature monitoring study during storage and major transportation routes in the country, immunization supply chain network design study, human resource assessment report and immunization programme data quality audit.
- Implementation of the immunization supply chain improvement plan is not monitored.

4.7 Storage and transportation capacity analysis

Primary store

- The facility has sufficient positive and negative cold storage capacity to accommodate the expected maximum stock levels of vaccines (including the lyophilized vaccines).
- Dry store capacity is sufficient (if the Xiengda Warehouse is considered) but does not have sufficient standard shelves and pallets to store the dry goods.
- The facility's vaccine transportation vehicles have sufficient capacity to accommodate the expected maximum load of vaccines and dry goods.

Figure 33: Storage and transportation capacity analysis at central vaccine store

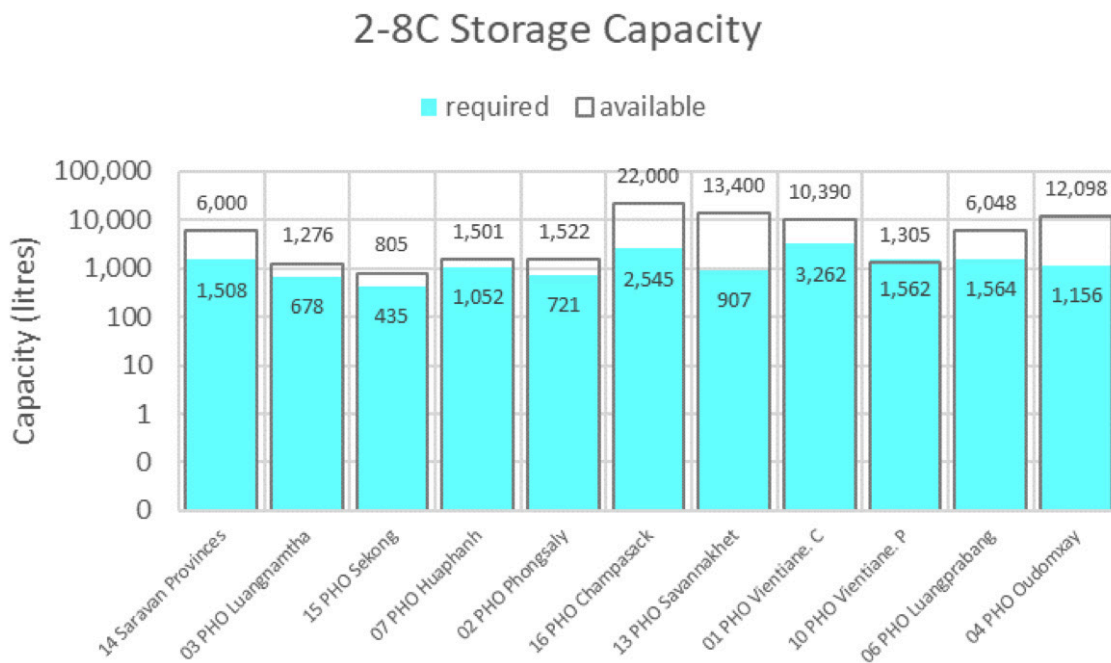


Provincial (or sub-national) vaccine stores

+2° to +8° C temperature range

All provincial vaccine stores (n=11) have sufficient capacity to store vaccines at +2° to +8° C.

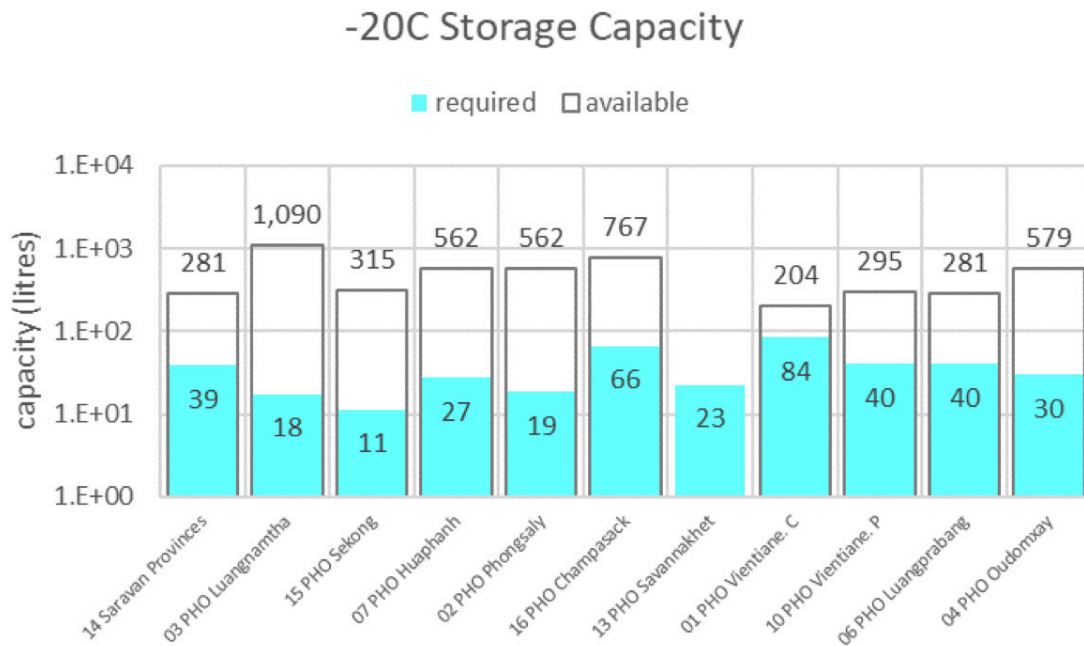
Figure 34: Storage capacity analysis at +2° to +8° C, provincial vaccine stores (n=11)



-15° to -25° C temperature range

All provincial vaccine stores have sufficient freezer space (-15° to -25° C) to store vaccines. In the Savannakhet Provincial Store, the freezers are available but not used to store vaccines.

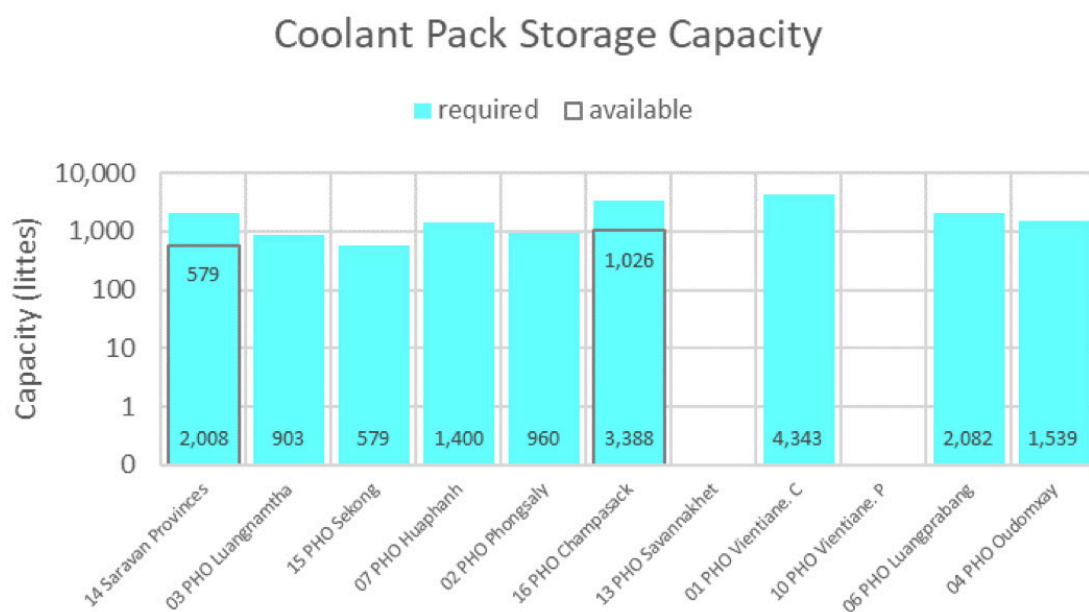
Figure 35: Storage capacity analysis, -15° to -25° C, provincial vaccine stores (n=11)



Coolant packs storage capacity

All provincial vaccine stores (except Vientiane province) use refrigerated vehicles for vaccine transport, hence do not need coolant packs for vaccine transportation. Yet, the capacity of coolant packs remains fulfilled at all stores.

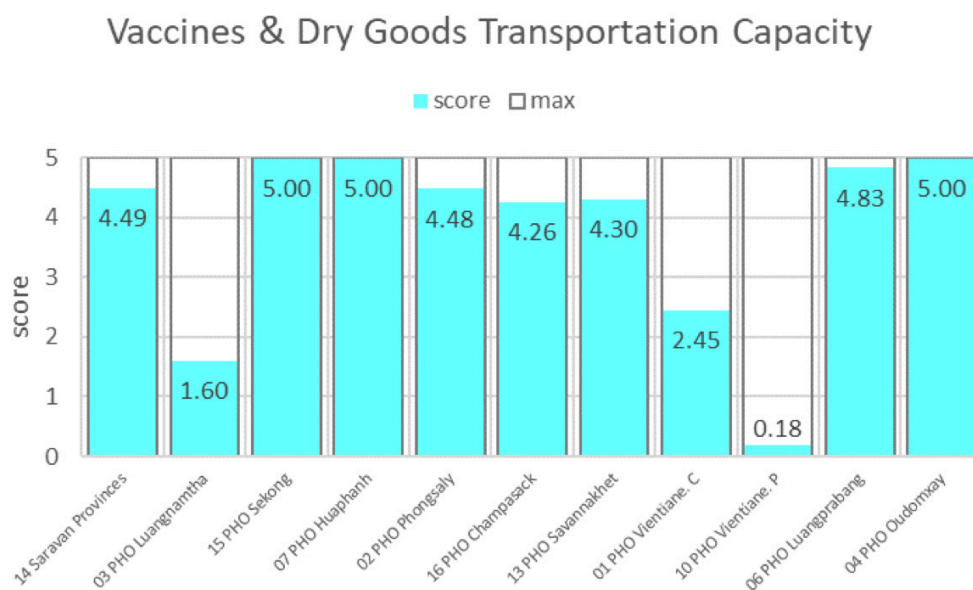
Figure 36: Coolant pack storage capacity, provincial vaccine stores (n=11)



Vaccine transportation capacity

Three stores do not have sufficient capacity for vaccine transportation (Sekong, Huaphanh and Oudomxay) as seen in Figure 37. Breakdown of vehicles is a common reason for insufficient vaccine transportation capacity to accommodate the largest load of vaccines and dry goods on its largest distribution route, which needs further review.

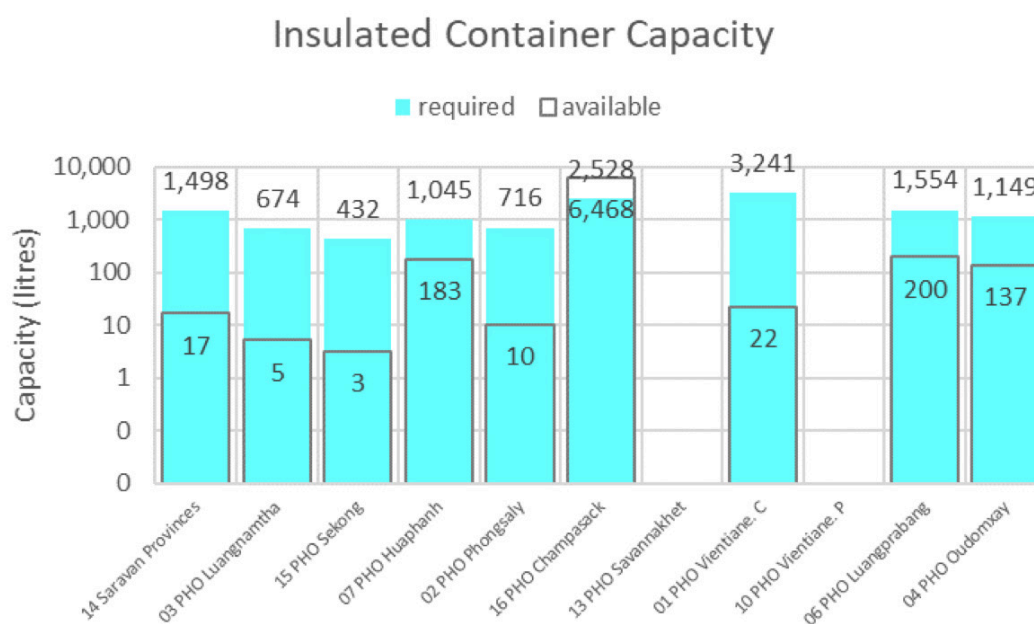
Figure 37: Vaccine and dry goods transportation capacity, provincial vaccine stores (n=11)



Insulated containers capacity

In most provinces, the available insulated containers capacity is less than the required capacity. However, all sampled stores (except Vientiane province) have refrigerated vehicles, which will then reduce the overall need for insulated containers for vaccine transportation.

Figure 38: Insulated containers capacity, provincial vaccine stores (n=11)

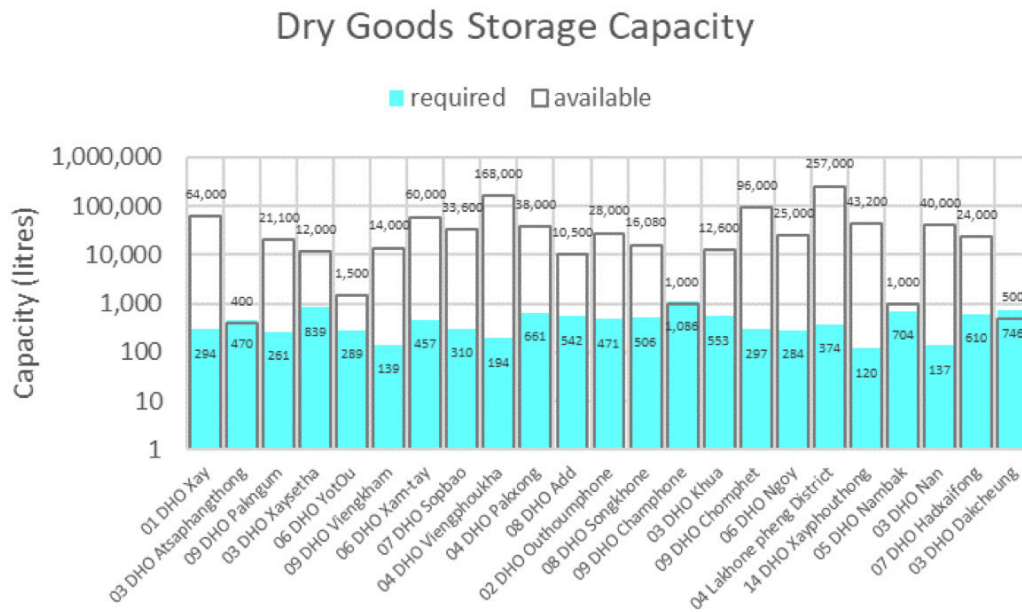


Lowest distribution (or district) vaccine stores

Dry goods storage

Three of the 23 district vaccine stores show a lower dry goods storage capacity than required. The difference in the capacity available versus required is much less.

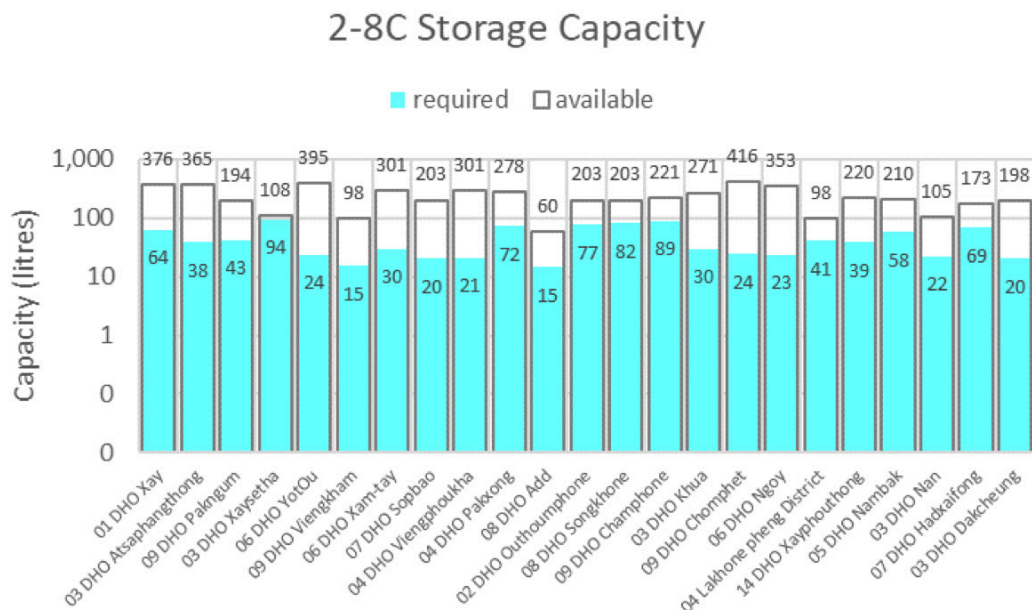
Figure 39: Dry goods storage capacity, district vaccine stores (n=23)



+2° to +8° C temperature range

All 23 district stores have enough vaccine storage capacity.

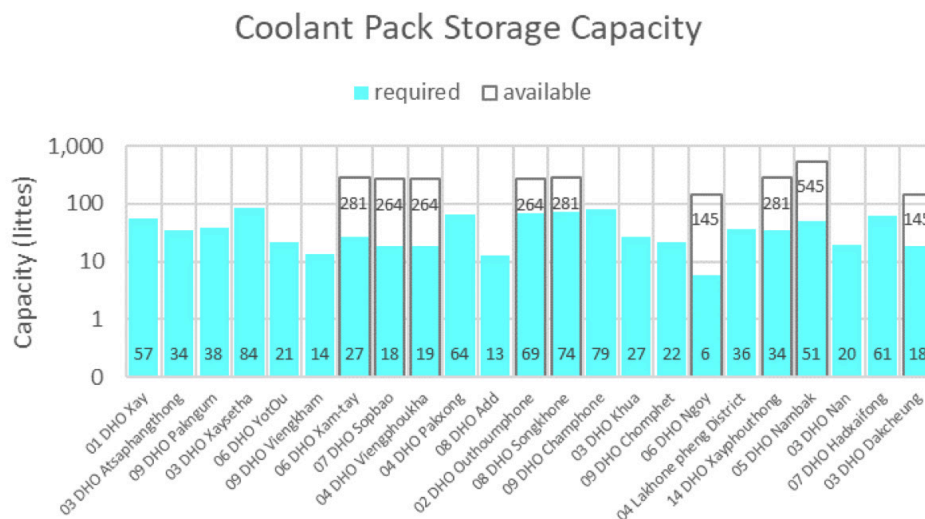
Figure 40: Cold storage capacity (+2° to +8° C), district vaccine stores (n=23)



Coolant pack storage capacity

Out of 23 sampled district vaccine stores, only nine reported having ice pack freezers for storing the coolant packs for vaccine collection, distribution or outreach. All those nine stores have sufficient coolant pack storage space (Figure 41). It is assumed that in other stores where there is no ice pack freezer, the coolant packs preparation is not in the freezer compartment of the domestic refrigerator of the health facility. It is further recommended to explore the need and availability of freezers for both ice pack preparation and for storage of oral poliovirus vaccines (OPV) at district stores.

Figure 41: Coolant pack storage capacity, district vaccine stores (n=23)

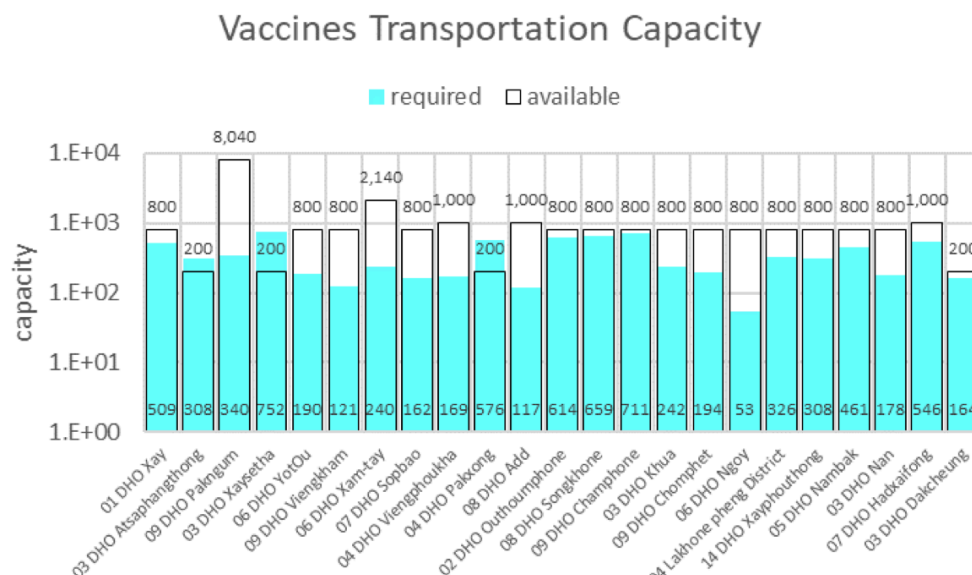


Transportation capacity

Out of the 23 district vaccine stores assessed, four have motorbikes only, whereas others have pickup trucks or vans for vaccine collection, distribution or outreach. A motorbike or bicycle is considered to have enough capacity to hold one large cold box (no stacking), with a total external volume of 200 litres. Among the four stores with motorbikes only, three are considered to not have sufficient capacity for vaccine transportation.

The remaining 19 stores with pickup vans or trucks have sufficient capacity compared to the requirement as on average a pickup can hold four large cold boxes in one go (without stacking) with a total external volume of 800 litres.

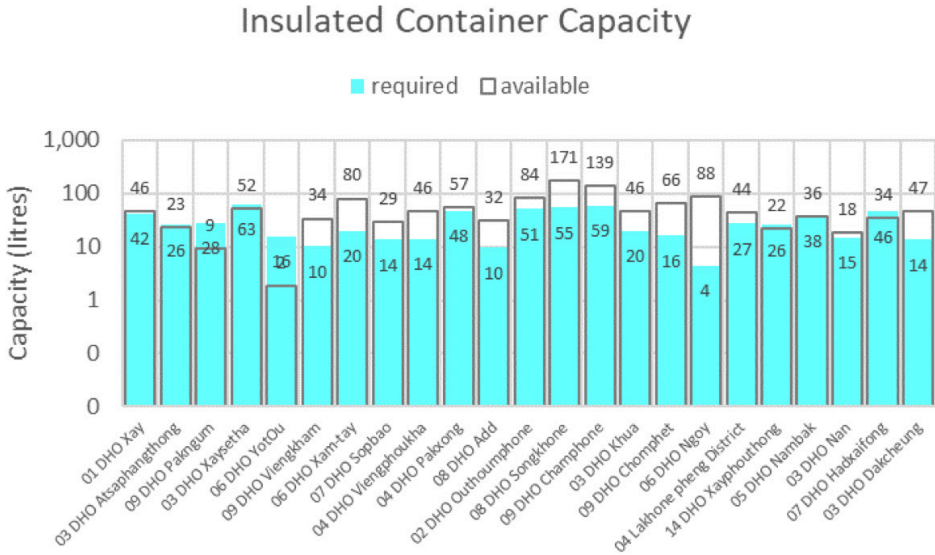
Figure 42: Vaccine transportation capacity, district vaccine stores (n=23)



Insulated containers

Seven of the 23 district stores do not have enough insulated container capacity.

Figure 43: Insulated container capacity, district vaccine stores (n=23)



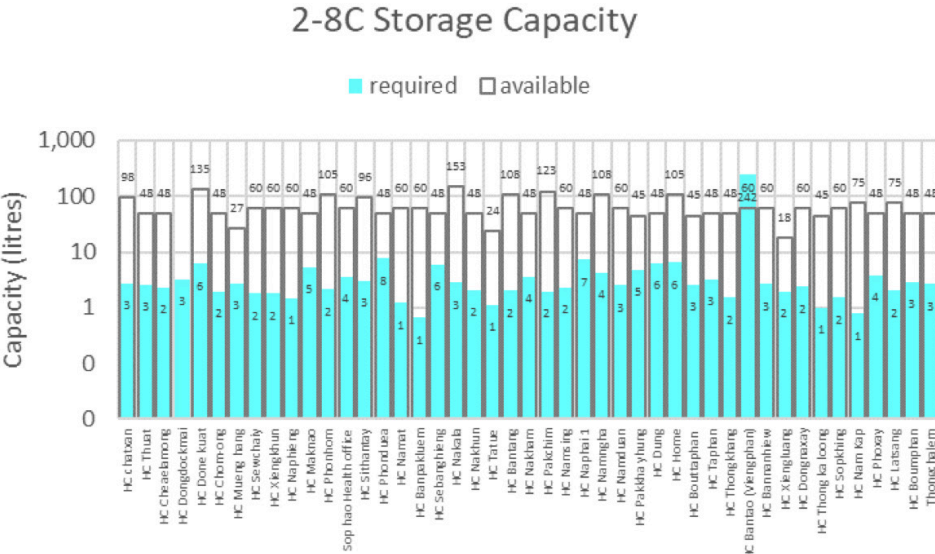
Health centres (or service provider) level

According to the Government of the Lao People’s Democratic Republic guidelines, all vaccines are stored at +2° to +8° C at the health centre level. No freezers (-15° to -25° C) are provided for use at the health centre level. For coolant packs preparation, most health centres use the freezer compartment of a domestic refrigerator.

Storage (ice-lined refrigerator) capacity at +2° to +8° C

Only 1 of the 45 health facilities does not have enough vaccine storage capacity. However, the required capacity is very high, which warrants a re-calculation of the capacity based on functional equipment present and the status of non-functional refrigerators in the health centre.

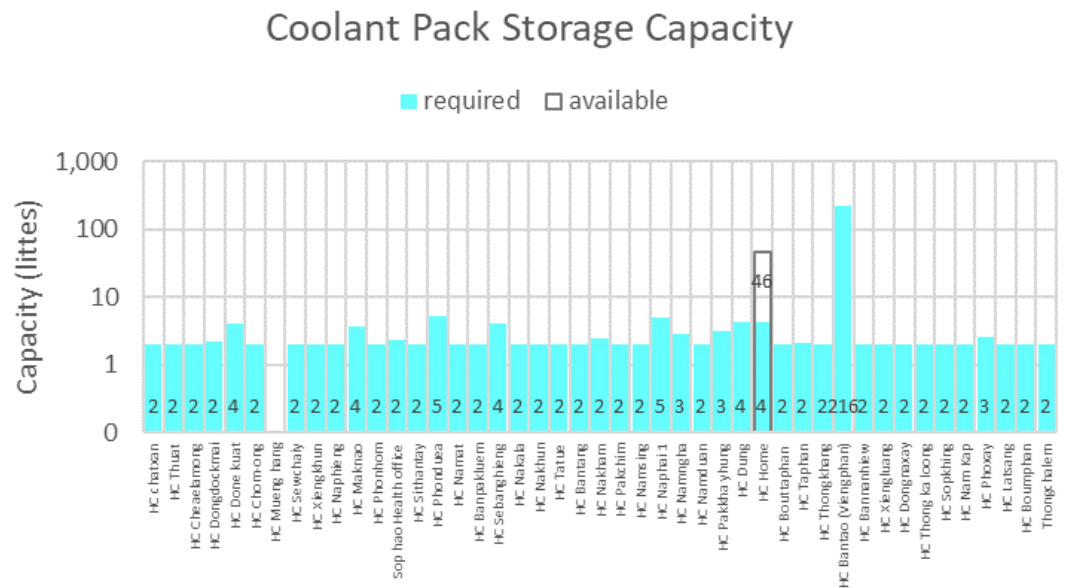
Figure 44: Refrigerator storage capacity, health centres (n=45)



Coolant packs storage capacity

Only one facility reported the use of a deep freezer for coolant pack storage. The remaining health centres use domestic refrigerators for coolant pack preparation, which was not recorded in this Effective Vaccine Management assessment. Findings on the coolant packs storage capacity are hence mis-represented here in the Effective Vaccine Management assessment 2022.

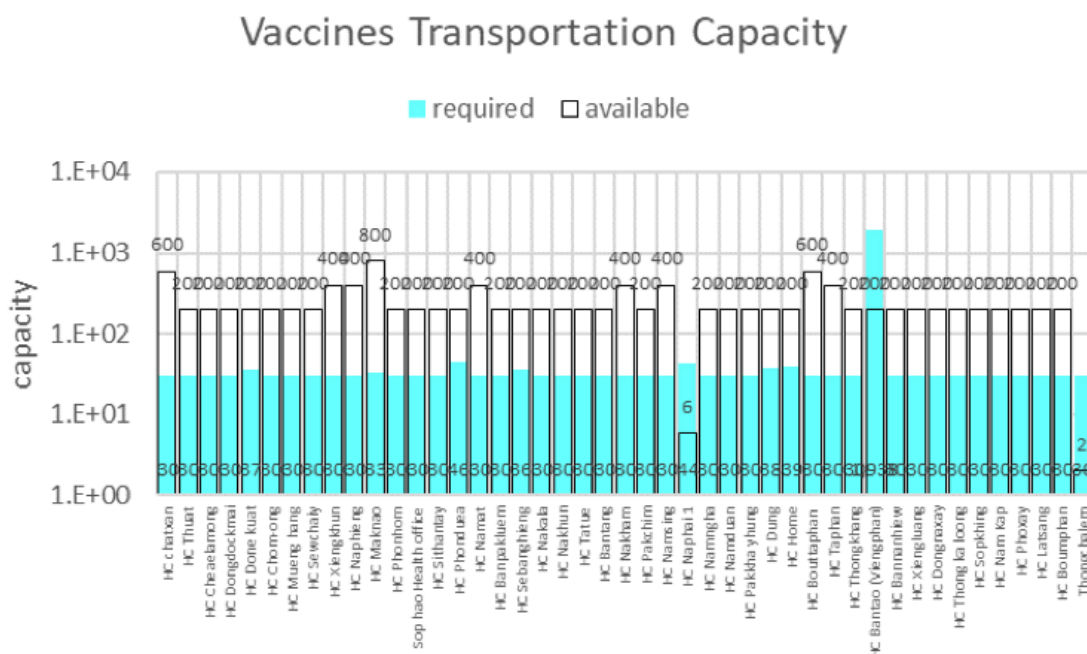
Figure 45: Coolant pack storage capacity, health centres (n=45)



Transportation capacity

Most health centres have motorbikes for vaccine transport; they are enough to meet the demands of transportation of vaccine carriers for outreach sessions.

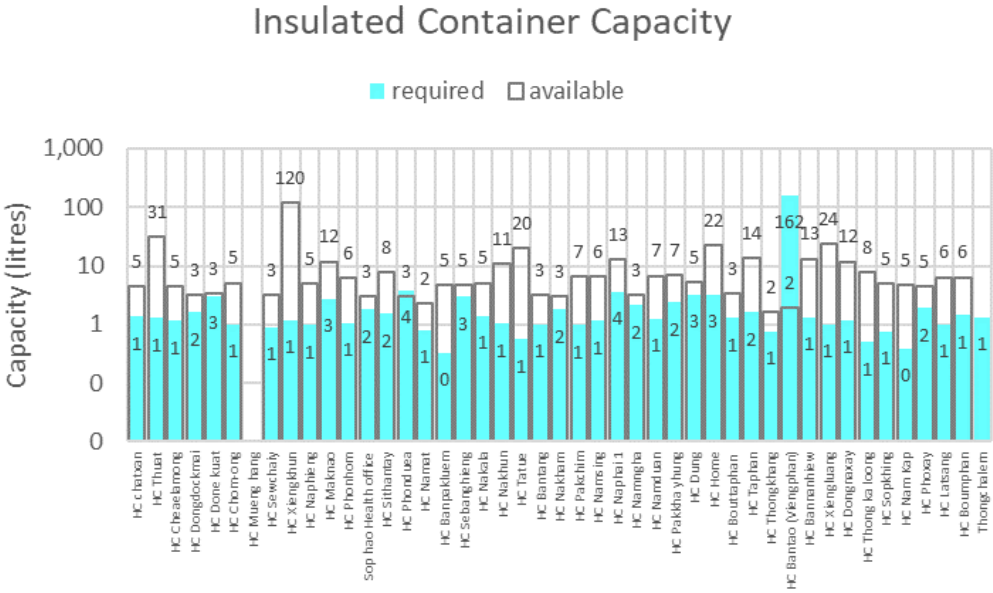
Figure 46: Vaccine transportation capacity, health centres (n=45)



Insulated container capacity

Most health centres have sufficient capacity of insulated containers for vaccine outreach services.

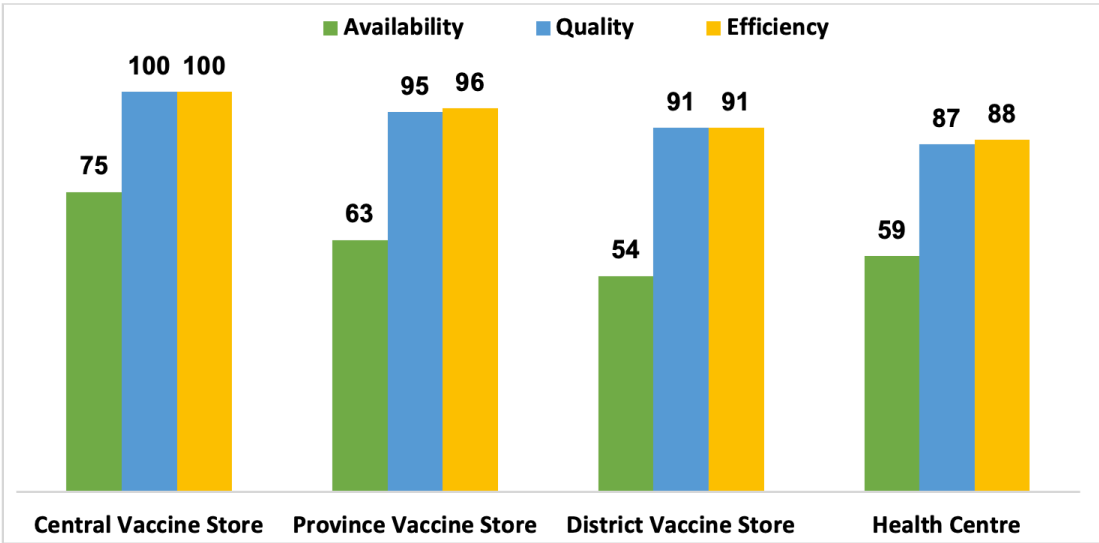
Figure 47: Insulated container capacity, health centres (n=45)



4.8 System indicators (availability, quality, efficiency)

The productivity of the immunization supply chain and hence the immunization programme is measured in the form of the availability of vaccines, quality of services provided and the efficiency of the immunization programme. Based on the assessment of input parameters, the availability, quality and efficiency (AQE) score of the immunization supply chain in the Lao People’s Democratic Republic is depicted in Figure 48 below. Despite the poor availability of vaccines, the programme is efficient and able to maintain the quality of services provided. However, targeted efforts are required at health centres and district vaccine stores to improve certain key indicators in quality and efficiency of the supply chain.

Figure 48: Availability, quality and efficiency score across all levels of immunization supply chain, National Effective Vaccine Management Assessment 2022



Across all levels of the supply chain, there is a persistent low score for availability of vaccines which is attributed to inaccurate vaccine forecasts (leading to vaccine shortage/stock outs) and incomplete supply of vaccines (against the demand). The availability of vaccines is more challenging at the district and sub-district level as compared to the central and provincial vaccine stores. One of the primary reasons for inaccurate vaccine forecasts and vaccine stock outs at districts and health centres is the lack of updated vaccine stock status of the health centres and districts. The vaccine stock management system (mSupply) has not been rolled out in districts and health centres; the access to mSupply at the provinces is also not available with the provincial Expanded Programme on Immunization manager or her/his team. mSupply, which is used for vaccine forecasting at the planning level, is not transparent up to the grass root level, and leads to inaccurate vaccine forecasts and vaccine losses predominantly.

At the district and health centres, there was a presence of expired vials and/or open multi-dose vials older than 28 days within the refrigerator which contributed to lower scores for quality of services provided at different levels of the supply chain.

Figure 49: Unusable vaccine vials kept inside refrigerator at a health centre in Phongsaly and Huaphanh



5. Continuous improvement plan 2023-2026

5.1 National continuous improvement plan workshop

Under the leadership of the Director of the Department of Health and Hygiene Promotion, Government of the Lao People’s Democratic Republic, a three-day National Continuous Improvement Plan Workshop was organized from 13 to 15 February 2023. The workshop witnessed an active participation by the members from the NIP, provincial health and Expanded Programme on Immunization department, development partners (including WHO, UNICEF, ADB, CHAI and Gavi) and the Ministry of Planning and Investment. The workshop included a recap of the Effective Vaccine Management findings, followed by group work on root cause analysis for low scores, discussion on the strengths and weaknesses of different aspects of the immunization supply chain in the Lao People’s Democratic Republic, formulation of targets, priorities and an implementation timeline for an effective and efficient iSC.

Figure 50: Group Work during National cIP Workshop, February 2023



Figure 51: National Continuous Improvement Plan Workshop with representation from central, provincial, and development partners



5.2 Continuous improvement plan (cIP) 2023-2026

A list of 244 activities is compiled to achieve 54 targets set out in the EVM cIP 2023-2026. The list of activities encompasses 10 key domains of the immunization supply chain, including Infrastructure, Temperature Monitoring, Vaccine Storage and Transportation, Repair and Maintenance, Supportive Supervision, Research, Human Resources and Training, Policy Making and Documentation, Waste Management, and Funds/Annual Work Planning. The continuous improvement plan assigns responsibilities to various development partners to support the government and complete the activities in strengthening iSC. A summary of the activities covered in this improvement plan is given in the table below.

Table 10: Summary of activities in the Continuous Improvement Plan 2023-2026

Domains	Number of Activities Planned				TOTAL
	2023	2024	2025	2026	
Infrastructure	2	15	9	1	27
Vaccine Storage & Transportation	20	6	7	1	34
Temperature Monitoring	8	4	2	-	14
Repair & Maintenance	1	9	5	-	15
Supportive Supervision	3	12	1	-	16
Policy Making & Documentation	13	28	11	-	52
Research	9	8	4	5	26
Waste Management	-	9	-	-	9
HR & Training	1	20	-	-	21
Funds/Annual Work Planning	2	-	-	-	2
TOTAL	59	111	39	7	216

Detailed list of activities proposed under the cIP 2023-2026 are given in Annex 6.

5.3 Monitoring the implementation of cIP 2023-2026

Effective monitoring of the implementation of activities under the EVM cIP 2023-2026 will be conducted as part of the quarterly meetings of the national cold chain and logistics technical working group and mid-year and annual reviews by the Government. The Effective Vaccine Management continuous improvement plan tool maintained by NIP and UNICEF will be used for monitoring of the targets and the activities undertaken to fulfil those targets. During the regular review meetings, any bottleneck in the implementation of activities will be identified to take mid-course action.

6. Way forward

6.1 Budgeting and implementation of continuous improvement plan activities

As the activities and targets are finalized and roles defined for different stakeholders for the EVM cIP 2023-2026, it is required by each stakeholder to assign priorities to different activities, develop a more detailed timeline of implementation (within that particular year), secure funds (as required) and coordinate with other stakeholders to implement the activity. The regular updates on the implementation and any bottlenecks will be identified and discussed as described below.

6.2 Assessing impact of cIP 2023-2026

Going forward, the impact of the implementation of these activities can be judged through smaller targeted sub-national or national assessments as and when required. The EVM 2.0 tool (on the EVM web portal) can be accessed by the country's Effective Vaccine Management managers at NIP or UNICEF to plan and conduct targeted assessments as required. Using the same tool will help to gauge the impact generated in iSC because of the continuous improvement plans activities.

After five years, as recommended, a full-scope national follow-up Effective Vaccine Management assessment can be planned for 2027 to determine the overall impact and status of the immunization supply chain in the Lao People's Democratic Republic.

7. Annexes

Annex 1: Sampled vaccine stores, National Effective Vaccine Management Assessment 2022, the Lao People's Democratic Republic

National	Province	District	Health Centre
1. Central vaccine storeat NIP	1. Vientiane Capital	03 DHO Xaysetha	HC Dung
		07 DHO Hadxaifong	HC Home
			HC Sithantay
		09 DHO Pakngum	HC Naxon
	HC Naphai 1		
	2. Phongsaly	03 DHO Khua	HC Sanlard
			La hang area
		06 DHO YotOu	HC Sewchaiy
			HC Phadeng
	3. Luang Namtha	04 DHO Viengphoukha	HC Nam Kap
			HC Namsing
	4. Oudomxay	01 DHO Xay	HC Chom-ong
			HC Phonhom
	5. Luang Prabang	03 DHO Nan	HC Thongkhang
			Thongchalern
		05 DHO Nambak	HC Namduan
			HC Muengteng
		06 DHO Ngoy	HC Hatsa
			HC Hardkhip
	09 DHO Chomphet	HC Banpakluem	
		HC Bannanhiew	
	6. Huaphanh	07 DHO Sopbao	HC Pahang
			Sob bao Health office
		08 DHO Add	HC Nakai
			Aed Health office
		09 DHO Kuan	HC Thakuay
	Meuang Kuan Health office		
	7. Vientiane Province	09 DHO Viengkham	HC Done kuat
HC Pakkha yhung			

National	Province	District	Health Centre
1. Central vaccine storeat NIP	8. Savannakhet	02 DHO Outhoumphone	Khet Ban Na health office
			HC Phoxay
		03 DHO Atsaphangthong	Atsaphangthong District health office
			HC Cheaelamong
		08 DHO Songkhone	HC Sebanghieng
			HC Nakala
	09 DHO Champhone	HC Thuat	
		HC Nakhun	
	14 DHO Xayphouthong	HC Dongdockmai	
		HC Nakham	
	9. Saravan	04 Lakhone pheng District	HC Bouttaphan
			HC Taphan
	10. Sekong	03 DHO Dakcheung	HC Ayoun
			HC Pao
	11. Champasak	04 DHO Pakxong	HC Thong ka loong
HC chatxan			

Annex 2: Dropped locations and their reasons

Dropped location	New Swapped Location	Reasons for Swapping
HC Hatsa	HC Sopkhing	Inaccessible due to rains
HC Hardkhip	HC Pakchim	Inaccessible due to rains
HC Muengteng	HC Namngha	Inaccessible due to rains
HC Naxon	HC Maknao	Health centre closed
HC Phadeng	HC Bantang	Inaccessible due to rains
HC Sanlard	HC Latsang	Inaccessible due to rains
La hang area	HC Boumphan	Inaccessible due to rains
09 DHO Kuan	06 DHO Xam-tay	Inaccessible due to rains
HC Thakuay	HC Bantao (Viengphan)	Inaccessible due to rains
Meuang Kuan Health Office	HC Namat	Inaccessible due to rains
HC Pahang	HC Mueng hang	Inaccessible due to rains
Sob bao Health Office	Sop hao Health office	Inaccessible due to rains
HC Nakai	HC Xiengkhun	Inaccessible due to rains
Aed Health Office	HC Naphieng	Inaccessible due to rains
Atsaphangthong District Health Office	HC Dongnaxay	Not a health centre
Khet Ban Na Health Office	HC Phonduea	Not a health centre
HC Ayoun	HC Xiengluang	Inaccessible due to rains
HC Pao	HC Tatue	Inaccessible due to rains

Annex 3: Team deployment plan

Team #	Members	Day-1	Day-2	Day-3	Day-4	Day-5	Day-6	Day-7	Day-8	Day-9
1	1. Dr. Chanpheng (Phongsaly EPI) 2. Dr. Vilaneth (NIP)	Travel	DHO Hadxaifong	HC Home	HC Sithantay	DHO Xaysetha	HC Dung	Travel		
2	1. Dr. Phaymany (Luangnamtha EPI) 2. Dr. Valerie (WHO)	Travel	PHO Vientiane C.	DHO Pakgnum	HC Naphai 1	HC Maknao	Travel			
3	1. Dr. Dasouk (Xekong EPI) 2. Dr. Panthoulath (UNICEF)	Travel	Travel	HC Sewchayi	DHO Yot-Ou	HC Bantang	Travel	Travel		
4	1. Dr. Vannasone (Attapeau EPI) 2. Dr. Kongluck (NIP)	Travel	Travel	HC Latsang	HC Bounphang	DHO Khua	PHO Phongsaly	Travel	Travel	
5	1. Dr. Yommaha (Attapeau EPI) 2. Dr. Viengkhone (Khammouane EPI) 3. Dr. Thipsavanh (NIP) 4. Ms. Souksavanh (CHAI)	Travel	Travel	PHO Luang Namtha	DHO Vienphoukha	HC Nam Kip	HC Namsingh	Travel	Travel	
6	1. Dr. Somboune (Khammouane EPI) 2. Dr. Bounkong (Saravan EPI) 3. Mr. Sengla (NIP) 4. Dr. Ginisha (UNICEF) 5. Ms. Vanida (UNICEF) 6. Mr. Phasit (CHAI)	Travel	PHO Oudomxay	DHO Xay	HC Chom-Ong	HC Phonhom	Travel			
7	1. Dr. Sanlom (Champasak EPI) 2. Mr. Luke (GAVI) 3. Dr. Phouvanh (GAVI)	Travel	PHO LPB	DHO Nan	HC Thongkhang	HC Thongchalern	Travel			
8	1. Dr. Kensy (Bolikhamsay EPI) 2. Dr. Bangon (MCHC)	Travel	DHO Nambak	HC Namduan	DHO Ngoy	HC Sopkhing	HC Pakchim	Travel		
9	1. Dr. Keosomsavan (Vientiane P. EPI) 2. Dr. Samphan (UNICEF)	Travel	DHO Chompet	HC Banpakleum	HC Bannahiew	Travel	HC Namngha	Travel		

Team #	Members	Day-1	Day-2	Day-3	Day-4	Day-5	Day-6	Day-7	Day-8	Day-9
10	1. Dr. Khamvang (Savannakhet EPI) 2. Mr. Somphong (NIP)	Travel	Travel	DHO SopBao	HC Meung hang	HC Sop hao	DHO Add	PHO Huaphanh	Travel	Travel
11	1. Dr. Chansamouth (Saiyanbouli EPI) 2. Mr. Bounmy (ADB)	Travel	Travel	HC Namat	HC Viengphan	DHO Xamtay	HC Xiengkhou	HC Naphiang	Travel	Travel
12	1. Dr. Oudomsack (Bokeo EPI) 2. Dr. Tuaher (Xengkhuang EPI) 3. Dr. Kongxay (NIP)	Travel	PHO Vientiane P.	DHO Viengkham	HC Done kuat	HC Pakkha yhung	Travel			
13	1. Dr. Phonemany (Huaphanh EPI) 2. Dr. Thongkham (MCHC)	Travel	PHO Savannakhet	DHO Outhoumphone	HC Phondeua	HC Phoxay	Travel			
14	1. Dr. Houmpheng (Oudomxay EPI) 2. Dr. Bounsouk (Xaysomboun EPI)	Travel	DHO Songkhone	HC Sebanghieng	HC Nakala	HC Nakham	HC Dongdockmai	Travel		
15	1. Dr. Xaiyasin (Saiyanbouli EPI) 2. Dr. Latsamy (UNICEF) 3. Dr. Rabindra (WHO)	Travel	DHO Asthaphanthong	HC Dongnaxai	HC Chaelamong	DHO Chomphone	HC thuat	Travel		
16	1. Dr. Soulin (LuangPrabang EPI) 2. Dr. Chintana (Bokeo EPI) 3. Dr. Souksavanh (NIP)	Travel	PHO Saravan	Travel	DHO LakhonePheng	HC Bouttaphan	HC Taphan	Travel		
17	1. Dr. Soulivan (Xengkhuang EPI) 2. Dr. Yersong (Xaysomboun EPI) 3. Mr. Kapkeo (NIP)	Travel	Travel	DHO Dakcheung	HC Tatue	HC Xiengluang	PHO Sekong	Travel	Travel	
18	1. Dr. Soulinthone (VTE capital EPI) 2. Dr. Sengousa (Bolikhamsay EPI) 3. Dr. Souksavanh Sisamai (MCHC) 4. Mr. Bayliab (CHAI)	Travel	Travel	PHO Champasak	Travel	DHO Pakxong	HC Chaxtan	HC thong ka Loong	Travel	Travel

Annex 4: List of participants trained in the orientation of assessors, the National Effective Vaccine Management Assessment 2022

S. No.	Affiliation	Name of participant
1	Central Expanded Programme on Immunization Team	Dr. Kongxai Phounphenghack
2		Mr. Senglar Sengouthai
3		Dr. Vilaneth Buakhasit
4		Dr. Konglack Vongsamphan
5		Mr. Kabkeo Thipduangchai
6		Mr. Souksavanh Phommanyvong
7		Dr. Souksavanh Sysamay
8		Dr. Bungon Tannavong
9		Dr. Thongkham Phathavong
10		Mrs. Thipsavanh Souliyavong
11		Mr. Somphong Khotavan
12	Attapeu	Mr. Yommaha Kommameuang
13		Mrs. Vannasone Airniphon
14	Bokeo	Mrs. Chintana Xayyavong
15		Mr. Oudomsuck Keovanxai
16	Bolikhambxai	Mr. Sengoutsa Phonsavatdy
17		Mr. Kensy Navongsa
18	Champasack	Mrs. Senlom Koethongku
19		Mrs. banthalay Ketmala
20	Houaphan	Mrs. Phonmany Phondy
21		Mr. Kevin Phommasy
22	Khammuane	Mr. Somboun Khamphithoun
23		Mr. Viengkhone Xayyaseng
24	Luangnamtha	Mrs. Lumphai Lathsavaon
25		Mr. Phamany Xayyalath
26	Luangprabang	Mr. Souline Sitthiphanthong
27		Mr. Bounmeuang Sikhot
28	Oudomxai	Mr. Vixai Dalasavan
29		Mr. Houmpheng Yotairphanh
30	Phongsaly	Mr. Khamsarn Inthahoung
31		Mr. Chanpheng Soulipao

S. No.	Affiliation	Name of participant
32	Salavan	Mr. Bounkong Xaysombath
33		Mr. Xaysomphone Phimmasone
34	Savannakhet	Mrs. Vongsone Vongphachan
35		Mrs. Khamvung Thorlatha
36	Sekong	Mrs. Dasong Vongvaengouk
37		Mrs. Latdavan Thongphanheuangsy
38	Vientiane Capital	Mrs. Vongchan Phanouvong
39		Mr. Soulithone Phimmasarn
40	Vientiane Province	Mrs. Keosomsavanh Phameuang
41		Mrs. Boualien Phonarsa
42	Xiengkhouang	Mrs. Soulivun Keomany
43		Mr. Touaher Yiathai
44	Xaisomboun	Mr. Yerxiong Kanou
45		Mr. Bounsouk Yaxaoxaihua
46	Xaiyabouly	Mrs. Xaiyasin
47		Mrs. Alouna
48	WHO	Dr. Valerie Daw Tin Shwe
49		Dr. Rabindra Prasad Karna
50	UNICEF	Mr. Hendrikus Raaijmaders
51		Dr. Shukhrat Rakhimdjanov
52		Mr. Dheeraj Bhatt
53		Dr. Samphan Khamsingsavath
54		Dr. Ginisha Gupta
55		Dr. Abdullahel Hadi
56		Ms. Vanida Souvannarith
57		Dr. Phanthoulath Insisiengmay
58		Dr. Latsamy Thammavong
59	CHAI	Ms. Eleanor Lynch
60		Mr. Phasit Soulimoungkhoun
61		Mr. Bayliab Ketsophaphone
62		Ms. Souksavanh Phimmasone
63	ADB	Mr. Bounmy Duangpraseuth
64	Gavi	Mr. Phouvanh Vonglokham
65		Mr. Luke Tatnell
66	World Bank	Ms. Phonethipsavanh

Annex 5: Effective Vaccine Management scores for individual vaccine stores

Province	District	Name of Vaccine Store	Parent/Supplying Store	Level	Score
Vientiane C.		Central Vaccine Store (NIP)		PR	78%
Vientiane C.	01 DHO Chanthabouly	01 PHO Vientiane. C	Central Vaccine Store (NIP)	SN	75%
Vientiane C.	03 DHO Xaysetha	03 DHO Xaysetha	01 PHO Vientiane. C	LD	87%
Vientiane C.	03 DHO Xaysetha	HC Dung	03 DHO Xaysetha	SP	81%
Vientiane C.	07 DHO Hadxaifong	07 DHO Hadxaifong	01 PHO Vientiane. C	LD	86%
Vientiane C.	07 DHO Hadxaifong	HC Home	07 DHO Hadxaifong	SP	84%
Vientiane C.	07 DHO Hadxaifong	HC Sithantay	07 DHO Hadxaifong	SP	87%
Vientiane C.	09 DHO Pakngum	09 DHO Pakngum	01 PHO Vientiane. C	LD	68%
Vientiane C.	09 DHO Pakngum	HC Maknao	09 DHO Pakngum	SP	65%
Vientiane C.	09 DHO Pakngum	HC Naphai 1	09 DHO Pakngum	SP	63%
Phongsaly	01 DHO Phongsaly	02 PHO Phongsaly	Central Vaccine Store (NIP)	SN	71%
Phongsaly	03 DHO Khua	03 DHO Khua	02 PHO Phongsaly	LD	81%
Phongsaly	03 DHO Khua	HC Boumphan	03 DHO Khua	SP	72%
Phongsaly	03 DHO Khua	HC Latsang	03 DHO Khua	SP	78%
Phongsaly	06 DHO YotOu	06 DHO YotOu	02 PHO Phongsaly	LD	73%
Phongsaly	06 DHO YotOu	HC Bantang	06 DHO YotOu	SP	75%
Phongsaly	06 DHO YotOu	HC Sewchaiy	06 DHO YotOu	SP	70%
Luang Namtha	01 DHO Namtha	03 PHO Luangnamtha	Central Vaccine Store (NIP)	SN	82%
Luang Namtha	04 DHO Viengphoukha	04 DHO Viengphoukha	03 PHO Luangnamtha	LD	80%
Luang Namtha	04 DHO Viengphoukha	HC Nam Kap	04 DHO Viengphoukha	SP	79%
Luang Namtha	04 DHO Viengphoukha	HC Namsing	04 DHO Viengphoukha	SP	86%
Oudomxay	01 DHO Xay	04 PHO Oudomxay	Central Vaccine Store (NIP)	SN	74%
Oudomxay	01 DHO Xay	01 DHO Xay	04 PHO Oudomxay	LD	65%
Oudomxay	01 DHO Xay	HC Chom-ong	01 DHO Xay	SP	76%
Oudomxay	01 DHO Xay	HC Phonhom	01 DHO Xay	SP	68%
Luangprabang	01 DHO Luangprabang	06 PHO Luangprabang	Central Vaccine Store (NIP)	SN	70%
Luang Prabang	03 DHO Nan	03 DHO Nan	06 PHO Luangprabang	LD	73%

Province	District	Name of Vaccine Store	Parent/Supplying Store	Level	Score
Luang Prabang	03 DHO Nan	HC Thongkhang	03 DHO Nan	SP	70%
Luang Prabang	03 DHO Nan	Thongchalern	03 DHO Nan	SP	74%
Luang Prabang	05 DHO Nambak	05 DHO Nambak	06 PHO Luangprabang	LD	79%
Luang Prabang	05 DHO Nambak	HC Namduan	05 DHO Nambak	SP	68%
Luang Prabang	05 DHO Nambak	HC Namngha	05 DHO Nambak	SP	55%
Luang Prabang	06 DHO Ngoy	06 DHO Ngoy	06 PHO Luangprabang	LD	88%
Luang Prabang	06 DHO Ngoy	HC Pakchim	06 DHO Ngoy	SP	83%
Luang Prabang	06 DHO Ngoy	HC Sopkhing	06 DHO Ngoy	SP	68%
Luang Prabang	09 DHO Chomphet	09 DHO Chomphet	06 PHO Luangprabang	LD	74%
Luang Prabang	09 DHO Chomphet	HC Bannanhiew	09 DHO Chomphet	SP	59%
Luang Prabang	09 DHO Chomphet	HC Banpakluem	09 DHO Chomphet	SP	61%
Houaphanh	01 DHO Xamneua	07 PHO Houaphanh	Central Vaccine Store (NIP)	SN	88%
Houaphanh	06 DHO Xam-tay	06 DHO Xam-tay	07 PHO Houaphanh	LD	87%
Houaphanh	06 DHO Xam-tay	HC Bantao (Viengphan)	06 DHO Xam-tay	SP	79%
Houaphanh	06 DHO Xam-tay	HC Namat	06 DHO Xam-tay	SP	87%
Houaphanh	07 DHO Sopbao	07 DHO Sopbao	07 PHO Houaphanh	LD	91%
Houaphanh	07 DHO Sopbao	HC Mueng hang	07 DHO Sopbao	SP	87%
Houaphanh	07 DHO Sopbao	Sop hao Health office	07 DHO Sopbao	SP	87%
Houaphanh	08 DHO Add	08 DHO Add	07 PHO Houaphanh	LD	86%
Houaphanh	08 DHO Add	HC Naphieng	08 DHO Add	SP	85%
Houaphanh	08 DHO Add	HC Xiengkhun	08 DHO Add	SP	74%
Vientiane. P	01 DHO Phonhong	10 PHO Vientiane. P	Central Vaccine Store (NIP)	SN	76%
Vientiane. P	09 DHO Viengkham	09 DHO Viengkham	10 PHO Vientiane. P	LD	76%
Vientiane. P	09 DHO Viengkham	HC Done kuat	09 DHO Viengkham	SP	82%
Vientiane. P	09 DHO Viengkham	HC Pakkha yhung	09 DHO Viengkham	SP	81%
Savannakhet	01 DHO Kaysone	13 PHO Savannakhet	Central Vaccine Store (NIP)	SN	80%
Savannakhet	02 DHO Outhoumphone	02 DHO Outhoumphone	13 PHO Savannakhet	LD	84%
Savannakhet	02 DHO Outhoumphone	HC Phonduea	02 DHO Outhoumphone	SP	76%
Savannakhet	02 DHO Outhoumphone	HC Phoxay	02 DHO Outhoumphone	SP	80%
Savannakhet	03 DHO Atsaphangthong	03 DHO Atsaphangthong	13 PHO Savannakhet	LD	86%

Province	District	Name of Vaccine Store	Parent/Supplying Store	Level	Score
Savannakhet	03 DHO Atsaphangthong	HC Cheaelamong	03 DHO Atsaphangthong	SP	82%
Savannakhet	03 DHO Atsaphangthong	HC Dongnaxay	03 DHO Atsaphangthong	SP	87%
Savannakhet	08 DHO Songkhone	08 DHO Songkhone	13 PHO Savannakhet	LD	73%
Savannakhet	08 DHO Songkhone	HC Nakala	08 DHO Songkhone	SP	81%
Savannakhet	08 DHO Songkhone	HC Sebanghieng	08 DHO Songkhone	SP	70%
Savannakhet	09 DHO Champhone	09 DHO Champhone	13 PHO Savannakhet	LD	88%
Savannakhet	09 DHO Champhone	HC Nakhun	09 DHO Champhone	SP	84%
Savannakhet	09 DHO Champhone	HC Thuat	09 DHO Champhone	SP	83%
Savannakhet	14 DHO Xayphouthong	14 DHO Xayphouthong	13 PHO Savannakhet	LD	76%
Savannakhet	14 DHO Xayphouthong	HC Dongdockmai	14 DHO Xayphouthong	SP	56%
Savannakhet	14 DHO Xayphouthong	HC Nakham	14 DHO Xayphouthong	SP	75%
Saravan	01 Saravan District	14 Saravan Provinces	Central Vaccine Store (NIP)	SN	73%
Saravan	04 Lakhone pheng District	04 Lakhone pheng District	14 Saravan Provinces	LD	63%
Saravan	04 Lakhone pheng District	HC Bouttaphan	04 Lakhone pheng District	SP	76%
Saravan	04 Lakhone pheng District	HC Taphan	04 Lakhone pheng District	SP	71%
Sekong	01 DHO Lamarm	15 PHO Sekong	Central Vaccine Store (NIP)	SN	80%
Sekong	03 DHO Dakcheung	03 DHO Dakcheung	15 PHO Sekong	LD	82%
Sekong	03 DHO Dakcheung	HC Tatue	03 DHO Dakcheung	SP	80%
Sekong	03 DHO Dakcheung	HC Xiengluang	03 DHO Dakcheung	SP	89%
Champasak	01 DHO Pakse	16 PHO Champasack	Central Vaccine Store (NIP)	SN	82%
Champasak	04 DHO Pakxong	04 DHO Pakxong	16 PHO Champasack	LD	76%
Champasak	04 DHO Pakxong	HC chatxan	04 DHO Pakxong	SP	73%
Champasak	04 DHO Pakxong	HC Thong ka loong	04 DHO Pakxong	SP	76%

*PR=Primary, SN=Sub-national, LD=Lowest Distribution, SP=Service Provider

Annex 6: Continuous Improvement Plan 2023-2026

#	Cat.	Targets	Activities	Domain	Level of Implementation	Timeline (Year)	Responsible Organization
1	C1	The national cold store (room containing cold rooms) is properly ventilated.	1. Assess the situation of ventilation at the cold store in NIP	Infrastructure	Central	2024	NIP, UNICEF
			2. Identify funds for refurbishment of cold store	Infrastructure	Central	2024	NIP
			3. Contract an agency for refurbishment of cold store	Infrastructure	Central	2024	NIP, UNICEF
2	C1	The national store has a spacious packing area.	1. Identify and clear out the area in the store for expanding packing area	Infrastructure	Central	2024	NIP
3	C1	The national store and all regional stores have functional fire alarms and smoke alarms.	1. Assess the situation of presence and functionality of smoke and fire alarms at CVS and PVS	Infrastructure	Centre & Province	2024	NIP, UNICEF
			2. Determine the need for replacement and procurement of fire and smoke alarms	Infrastructure	Centre & Province	2024	NIP, UNICEF
			3. Identify the funds for replacement and procurement of fire and smoke alarms	Infrastructure	Centre & Province	2024	NIP
			4. Coordinate with the Fire Department or relevant agency for installation of fire and smoke alarms	Infrastructure	Centre & Province	2024	NIP
			5. Plan (and contract if necessary) for periodic maintenance and testing of the fire and smoke alarms	Repair & Maintenance	Centre & Province	2024	NIP, UNICEF
4	C1	All vaccine stores and health centres have functional certified fire extinguishers.	1. Assess the presence and functionality of fire extinguishers at all vaccine stores and health centres	Infrastructure	All	2024	NIP, UNICEF
			2. Determine the need for recertification, replacement and procurement of fire extinguishers	Infrastructure	All	2024	NIP, UNICEF
			3. Identify and secure funds for replacement and procurement of fire extinguishers	Infrastructure	All	2024	NIP
			4. Coordinate with fire department or relevant agency for recertification, replacement and installation of fire extinguishers as required, to be completed in a phased manner till 2025	Infrastructure	All	2024	NIP, UNICEF
			5. Develop a mechanism for regular maintenance and annual certification of fire extinguishers at all vaccine stores	Repair & Maintenance	All	2024	NIP, UNICEF

#	Cat.	Targets	Activities	Domain	Level of Implementation	Timeline (Year)	Responsible Organization
5	C1	All regional stores have 24 hour guard/surveillance.	1. Assess the need and best possible option for security measures at the PVS	Infrastructure	Province	2025	NIP
			2. Identify and secure funds for contracting relevant agencies for installation of CCTV cameras where required	Infrastructure	Province	2025	NIP
			3. Install CCTV cameras as per plan	Infrastructure	Province	2025	NIP
6	C1	<p>1. Dry goods in national, regional and district stores are not stored on the floor, but on shelves, pallets or pallet racks.</p> <p>2. Dry goods in national, regional and district stores are not exposed to direct sunlight.</p>	1. Analyze the requirement for dry storage (based on target population and currently available options for dry store) across NIP, PVS and DVS	Infrastructure	All except HC	2023	NIP, UNICEF
			2. Based on global guidelines, adapt them to develop the country's guidance document for model dry stores	Policy Making & Documentation	Central	2023	NIP, All DPs
			3. Classify all vaccine stores in different categories based on the level of investment required in the dry store: shelves/pallets/racks only, minor refurbishment/expansion of existing dry store and construction of new dry store, to determine a plan of action for the development of dry store across central, province and district levels	Infrastructure	All except HC	2024	NIP, UNICEF
			4. Identify secure areas for expansion or construction of dry stores as required	Infrastructure	All except HC	2024	NIP, UNICEF
			5. Identify and secure funds for development of dry stores	Infrastructure	All except HC	2024	NIP, UNICEF
			6. Engage relevant departments or agencies for refurbishment and construction of dry stores and procurement of shelves/racks/pallets	Infrastructure	All except HC	2025	NIP, UNICEF
			7. Develop the dry store of desired size and with minimum recommended standards across NIP, PVS and DVS as per the outlined plan of action	Infrastructure	All except HC	2025	NIP, UNICEF
7	C2	All vaccine cold rooms in regional stores have cooling unit duty sharing systems, manual or automatic.	1. Assess the number of WIC across the country and stratify by age, manufacturer, applicable warranty/AMC and the functional automatic or manual cooling unit duty sharing mechanism	Vaccine Storage & Transportation	Centre & Province	2023	NIP, UNICEF
			2. In the new WIC, identify the reason for faulty automatic duty sharing mechanism through the refrigeration mechanic, equipment warranty or AMC as applicable	Vaccine Storage & Transportation	Centre & Province	2023	NIP, UNICEF
			3. For aged WIC (more than 10 years of age), continue manual duty sharing of cooling units as per protocol and plan a phase out of equipment	Vaccine Storage & Transportation	Centre & Province	2023	NIP, UNICEF

#	Cat.	Targets	Activities	Domain	Level of Implementation	Timeline (Year)	Responsible Organization
8	C2	All vaccine cold/freezer rooms at the national store and all regional stores have voltage regulators/stabilizers.	1. Assess the need for voltage stabilizers at the national and provincial vaccine stores	Vaccine Storage & Transportation	Centre & Province	2023	NIP, UNICEF, ADB
			2. Identify the need for repair and procurement of voltage stabilisers (considering the equipment recently procured or delivered but not installed at the consignee stores)	Vaccine Storage & Transportation	Centre & Province	2023	NIP, UNICEF, ADB
			3. Secure funds for repair and procurement of voltage stabilizers as per the final plan of action	Vaccine Storage & Transportation	Central	2023	NIP, UNICEF, ADB
			4. Procure voltage stabilizers or relevant spare parts as per requirement	Vaccine Storage & Transportation	Central	2023	NIP, UNICEF, ADB
			5. Incorporate regular maintenance of voltage stabilizer in the planned preventive maintenance checklist	Vaccine Storage & Transportation	Central	2023	NIP, UNICEF, ADB
9	C2	All vaccine cold/freezer rooms at the national store have power loss alarms.	1. Assess the need for power loss alarms or RTMD generated alarms for temperature excursions or power failure at central and provincial vaccine stores	Temperature Monitoring	Centre & Province	2023	NIP, UNICEF
			2. Develop a plan of action for implementation of alarm system and identify and secure funds (as required)	Temperature Monitoring	Central	2023	NIP, UNICEF
			3. Coordinate with RTMD manufacturer to introduce SMS-based alarm notification system (to alert in the event of temperature excursion or power failure) for all installed equipment	Temperature Monitoring	Central	2023	NIP, UNICEF
			4. Incorporate regular maintenance and check for a functional alarm system on a bi-annually basis	Temperature Monitoring	Central	2023	NIP, UNICEF

#	Cat.	Targets	Activities	Domain	Level of Implementation	Timeline (Year)	Responsible Organization
10	C2	All vaccine refrigerators and freezers have voltage regulators.	1. Analyse the situation and need for voltage stabilizers by type for refrigerators/freezers across all stores	Vaccine Storage & Transportation	All	2023	NIP, UNICEF
			2. Classify the stores based on the need for repair and procurement of voltage stabilisers (considering the equipment recently procured or delivered but not supplied to the consignee stores) and quantify the need for VS	Vaccine Storage & Transportation	All	2023	NIP, UNICEF
			3. Incorporate regular maintenance of voltage stabilizer in the planned preventive maintenance checklist	Vaccine Storage & Transportation	Central	2023	NIP, UNICEF
			4. Secure funds for repair and procurement of voltage stabilizers as per the final plan of action	Vaccine Storage & Transportation	Central	2024	NIP, UNICEF
			5. Procure voltage stabilizers or relevant spare parts as per requirement	Vaccine Storage & Transportation	Central	2025	NIP, UNICEF
11	C2	There is adequate space for air circulation around all vaccine refrigerators and freezers in regional and district stores and health centres.	1. Incorporate the correct placement of refrigerators/freezers in the vaccine store as part of the planned preventive and supportive supervision checklists	Vaccine Storage & Transportation	Central	2023	NIP, UNICEF
			2. Develop a job aid or SOPs on correct placement of refrigerator/freezer (individually or part of other guidelines) and place them at every vaccine store	Vaccine Storage & Transportation	Central	2023	NIP, UNICEF

#	Cat.	Targets	Activities	Domain	Level of Implementation	Timeline (Year)	Responsible Organization
12	C2	All regional and district stores have suitable standby generators (see sub-requirements for details).	1. Assess the need and functionality of generator sets (based on type of equipment and duration of reliable electricity supply) at all vaccine stores	Vaccine Storage & Transportation	All	2023	NIP, UNICEF
			2. Classify the vaccine stores based on their requirement for new generators or for repair of existing generator sets to set up a final plan of action	Vaccine Storage & Transportation	All	2023	NIP, UNICEF
			3. Identify and secure funds for generator sets as per the plan of action	Vaccine Storage & Transportation	Central	2023	NIP, UNICEF
			4. Incorporate regular maintenance of the generator set in the planned preventive maintenance checklist	Vaccine Storage & Transportation	Central	2023	NIP, UNICEF
			5. Procure and install a new generator set as per the requirement	Vaccine Storage & Transportation	Central	2025	NIP, UNICEF
13	C2	All regional and district stores and health centres have sufficient coolant pack storage capacity.	1. Incorporate the maintenance of freezers in the planned preventive maintenance checklist	Repair & Maintenance	Central	2023	NIP, UNICEF
			2. Assess the need for coolant pack storage or freezer based on the requirement of all PVS/DVS and the proposed supply cycle of vaccines	Vaccine Storage & Transportation	Province & District	2024	NIP, UNICEF
			3. Identify and secure funds for repair and procurement of freezers as required	Vaccine Storage & Transportation	Central	2025	NIP, UNICEF
			4. Procure new freezers as per requirement	Vaccine Storage & Transportation	Central	2026	NIP, UNICEF
14	C2	All regional cold chain hubs have sufficient spare parts for repair and maintenance of equipment.	1. Assess the need for toolkits and spare parts after IGA based on the make, model, life and number of equipment	Repair & Maintenance	Central	2024	NIP, UNICEF
			2. Identify and secure funds for procurement of spare parts/toolkits	Repair & Maintenance	Central	2024	NIP, UNICEF
			3. Procurement of toolkits or spare parts for regional cold chain hubs as per requirement	Repair & Maintenance	Central	2025	NIP, UNICEF

#	Cat.	Targets	Activities	Domain	Level of Implementation	Timeline (Year)	Responsible Organization
15	C2	All regional vaccine stores have suitable mechanical handling equipment, where required.	1. Assess the need and functionality of suitable mechanical handling equipment in the PVS	Infrastructure	Province	2023	NIP, UNICEF
			2. Identify and secure funds for procurement or repair or mechanical handling equipment	Infrastructure	Central	2025	NIP, UNICEF
			3. Procure new mechanical handling equipment as required	Infrastructure	Central	2025	NIP, UNICEF
16	C2	Vehicles are always available for scheduled vaccine distribution, collection or outreach at national, provincial and district stores.	1. Prepare and approve a vaccine distribution plan for the entire year for all vaccine stores at national and province stores	Vaccine Storage & Transportation	Centre & Province	2023	NIP, UNICEF, CHAI
			2. Assess the availability and need for vaccine distribution, collection or outreach based on pre-existing vaccine distribution plans	Vaccine Storage & Transportation	Centre & Province	2023	NIP, UNICEF, CHAI
			3. Through coordination with PHO, ensure availability of vaccine transportation vehicles and drivers based on the pre-approved vaccine distribution plan	Vaccine Storage & Transportation	Centre & Province	2023	NIP, UNICEF, CHAI
			4. Include the funds for vaccine distribution, collection or outreach in the annual work plan	Vaccine Storage & Transportation	All except HC	2024	NIP
17	C2	All regional stores have vaccine transportation vehicles with sufficient capacity to accommodate the expected maximum load of vaccines and dry goods.	1. Assess the need for an exclusive vaccine transportation vehicle (for both vaccines and dry store) at provincial stores	Vaccine Storage & Transportation	Province	2024	NIP, UNICEF
			2. Develop and implement planned preventive maintenance of vaccine transportation vehicles	Repair & Maintenance	Province	2024	NIP, UNICEF
			3. Procure a new vaccine transportation vehicle as per requirement	Vaccine Storage & Transportation	Province	2025	NIP, UNICEF
18	C2	All vaccine transportation vehicles meet the minimum road safety requirements (see sub-requirements for details).	1. Develop the SOPs for vaccine transportation vehicles based on the road safety requirements	Policy Making & Documentation	Central	2024	NIP, UNICEF
			2. Assess the need for repair or refurbishment of vehicles to meet the minimum road safety requirement	Repair & Maintenance	Centre & Province	2024	NIP, UNICEF
			3. Identify and secure funds as required	Repair & Maintenance	Central	2025	NIP, UNICEF
			4. Plan refurbishment of vehicles to meet the minimum road safety requirement	Repair & Maintenance	Centre & Province	2025	NIP, UNICEF

#	Cat.	Targets	Activities	Domain	Level of Implementation	Timeline (Year)	Responsible Organization
19	C2	The refrigeration systems in all refrigerated vehicles meet the minimum requirements (see sub-requirements for details).	1. Develop the SOPs for refrigerated vehicles based on minimum requirements	Policy Making & Documentation	Central	2024	NIP, UNICEF
			2. Incorporate refrigerated vehicle as part of the planned preventive maintenance checklist	Repair & Maintenance	Central	2024	NIP, UNICEF
			3. Assess the need for repair or refurbishment of refrigerated vehicles	Repair & Maintenance	Centre & Province	2024	NIP, UNICEF
			4. Identify and secure funds as required	Repair & Maintenance	Central	2025	NIP, UNICEF
			5. Plan refurbishment of vehicle to meet minimum requirement for refrigerated vehicles	Repair & Maintenance	Centre & Province	2025	NIP, UNICEF
20	C2	All regional vaccine stores have insulated containers with sufficient capacity to accommodate the expected maximum load of vaccines.	1. Assess the need for insulated containers (cold boxes) across all provincial vaccine stores based on their vaccine distribution plans and target population on the largest distribution route	Vaccine Storage & Transportation	Province	2024	NIP, UNICEF
			2. Incorporate maintenance of insulated containers as per the regular planned preventive maintenance checklist	Repair & Maintenance	Central	2024	NIP, UNICEF
			3. Prepare a plan for re-allocation, repair and procurement of insulated containers	Vaccine Storage & Transportation	Central	2025	NIP, UNICEF
			4. Procure insulated containers as per the plan	Vaccine Storage & Transportation	Central	2025	NIP, UNICEF

#	Cat.	Targets	Activities	Domain	Level of Implementation	Timeline (Year)	Responsible Organization
21	C2	<p>1. All waste burial sites at district vaccine stores and health centres are secured (e.g. with a fence) and have clear warning signs.</p> <p>2. All needle burial pits at district vaccine stores and health centres have suitable covers and access tubes and are not subject to flooding.</p> <p>3. All immunization waste incinerators meet the minimum requirements.</p> <p>4. Incinerator operators at all district stores and health centres are equipped with suitable personal protective equipment (see sub-requirements for details).</p>	1. Based on the new guidelines by DHHP, prepare guidance notes and SOPs on biomedical waste management for immunization waste; include guidance on correct site, usage, and closure of burial sites	Waste Management	Central	2024	NIP, WHO, ADB
			2. Develop warning signs in local language with appropriate logos and cliparts to warn of biomedical waste disposal	Policy Making & Documentation	Central	2024	NIP, WHO, ADB
			3. In vaccine stores with no waste disposal site, prepare a plan for regular waste pick-up for transportation to the final disposal site. Funds for the waste transportation must be included in the annual budget for such stores.	Policy Making & Documentation	Central	2024	NIP, WHO, ADB
			4. Ensure permanent closure of unsafe waste disposal sites to avoid any injury or harm to the people and environment according to the guidelines	Waste Management	All	2024	NIP, WHO, ADB
			5. All health facilities to maintain waste collection, segregation and disposal facilities (if applicable)	Waste Management	All	2024	NIP, WHO, ADB
			6. Incorporate the immunization waste management as part of the supportive supervision checklist (with at least a bi-annual inspection of waste disposal sites)	Supportive Supervision	Central	2024	NIP, WHO, ADB
22	C2	<p>All vaccine stores and health centres have suitable facilities and equipment for storing different types of waste (hazardous, recyclable, general, etc.).</p>	1. Assess the need for replacement or provision of waste bins and waste liners (continuous supply expected) at all vaccine stores	Waste Management	District & HC	2024	NIP, WHO, ADB, WB
			2. Identify the source and secure funds for waste bins and waste liners (including recurring budget)	Waste Management	Central	2024	NIP, WHO, ADB, WB
			3. Develop SOPs, relevant signage and job aids on waste management guidelines for safe collection, segregation, and disposal of different types of immunization waste	Waste Management	Central	2024	NIP, WHO, ADB, WB
			4. Procure waste segregation bins and waste liners and other relevant equipment for storing different types of wastes	Waste Management	Central	2024	NIP, WHO, ADB, WB
			5. Supply the procured equipment to all vaccine stores	Waste Management	Central	2024	NIP, WHO, ADB, WB
			6. Incorporate waste segregation and disposal as part of the supportive supervision checklist at all vaccine stores	Waste Management	Central	2024	NIP, WHO, ADB, WB

#	Cat.	Targets	Activities	Domain	Level of Implementation	Timeline (Year)	Responsible Organization
23	C3	All computers in the regional and district stores are equipped with anti-virus software.	1. Assess the need for updated anti-virus softwares in the computers at regional and district stores	Infrastructure	All except HC	2025	NIP
			2. Identify the source and secure funds (recurring budget) for purchase of antivirus software	Infrastructure	Central	2025	NIP
			3. All computers at regional and district vaccine stores to be secured using anti-virus software	Infrastructure	Province & District	2026	NIP
24	C3	The product arrival report (PAR) has all of the required data fields.	1. Ensure the availability of standard product arrival report form for the arrival of all syringes and other relevant dry store consignments	Policy Making & Documentation	Central	2023	NIP, UNICEF
			2. Incorporate the correct use of PAR in the existing SOPs on vaccine arrival procedures	Policy Making & Documentation	Central	2023	NIP, UNICEF
25	C3	All vaccine stores and health centres are equipped with manual temperature monitoring forms that meet the minimum requirements.	1. Review the current temperature monitoring form to see if it matches the minimum requirement (graphical records, AM/PM fields, alarm events, supervisor remarks and sign)	Policy Making & Documentation	Central	2024	NIP, UNICEF
			2. Develop a standard template for manual temperature monitoring form/ logbook, keeping in mind the minimum requirements and any other relevant country context in local language	Policy Making & Documentation	Central	2024	NIP, UNICEF
			3. Identify funds for printing and supply of temperature monitoring form/ logbook to all vaccine stores	Policy Making & Documentation	Central	2025	NIP, UNICEF
			4. Print and supply standard temperature monitoring form/logbook to all vaccine stores	Policy Making & Documentation	Central	2025	NIP, UNICEF
26	C3	The national store and all regional stores are equipped with a remote temperature monitoring system (RTMD) that meets the minimum requirements.	1. Assess the need for a remote temperature monitoring system in all national and regional stores	Temperature Monitoring	Centre & Province	2023	NIP, UNICEF
			2. Identify the source of funds for procurement, installation and training of staff on remote temperature monitoring systems	Temperature Monitoring	Central	2023	NIP, UNICEF
			3. Procure new remote temperature monitoring device as per requirement	Temperature Monitoring	Central	2023	NIP, UNICEF
			4. Train the staff on use and maintenance of remote temperature monitoring devices, and access and review the temperature data for action	Temperature Monitoring	Central	2023	NIP, UNICEF
			5. Incorporate the review of remote temperature monitoring records as part of supportive supervision (to be monitored for alarm events at least once a month)	Supportive Supervision	Central	2023	NIP, UNICEF
			6. Develop SOPs or job aids on the use of remote temperature monitoring systems	Temperature Monitoring	Central	2024	NIP, UNICEF

#	Cat.	Targets	Activities	Domain	Level of Implementation	Timeline (Year)	Responsible Organization
27	C3	All vaccine refrigerators/freezers at the national store have backup temperature monitoring devices.	1. Assess the need for a backup temperature monitoring device (or stem thermometer) across all stores, including a buffer stock for both storage CCE and transportation vehicles	Temperature Monitoring	All	2024	NIP, UNICEF
			2. Develop a safe plan to discard broken thermometers/30 DTR or other temperature monitoring devices	Temperature Monitoring	Central	2024	NIP, UNICEF
			3. Develop SOPs and job aids on correct use of thermometers, 30 DTR or other used temperature monitoring devices	Temperature Monitoring	Central	2024	NIP, UNICEF
			4. Identify and secure funds for procurement of new thermometers as per needs	Temperature Monitoring	Central	2025	NIP, UNICEF
			5. Procure and supply new thermometers to all vaccine stores, keeping a buffer at each store and a larger buffer at district/provincial vaccine stores	Temperature Monitoring	Central	2025	NIP, UNICEF
28	C3	The national store and all regional and district stores are equipped with a web-based cold chain equipment inventory management system that meets the minimum requirements.	1. Develop a proposal for Inventory Gap Analysis (IGA) to determine the current number, age, and functionality of cold chain equipment across all stores	Research	Central	2023	NIP, UNICEF, WHO
			2. Identify and secure funds for conducting IGA in the Lao People's Democratic Republic	Research	Central	2023	NIP, UNICEF, WHO
			3. Develop standard data collection formats on mobile application and a data analysis plan for IGA	Research	Central	2023	NIP, UNICEF, WHO
			4. Train the data collection teams to conduct IGA across the country	Research	Central	2023	NIP, UNICEF, WHO
			5. Conduct the IGA	Research	Central	2023	NIP, UNICEF, WHO
			6. Conduct data cleaning, verification and analysis with recommendations after the IGA	Research	Central	2023	NIP, UNICEF, WHO
			7. Prepare a recommendation plan for repair maintenance and procurement of CCE based on the IGA	Research	Central	2023	NIP, UNICEF, WHO
			8. Identify and secure funds to implement the recommendations	Vaccine Storage & Transportation	Central	2024	NIP, UNICEF, WHO
			9. Procure new CCE as per the recommendation plan	Vaccine Storage & Transportation	Central	2025	NIP, UNICEF, WHO
			10. Incorporate the regular update and use of cold chain inventory across the central, provincial and district levels	Policy Making & Documentation	Central	2025	NIP, UNICEF, WHO

#	Cat.	Targets	Activities	Domain	Level of Implementation	Timeline (Year)	Responsible Organization
29	C3	All health centres are equipped with vaccine request and receipt forms, and a vaccine stock record form (paper or electronic) that have all of the required fields.	1. Review the existing vaccine request, receipt, stock and distribution forms to meet the minimum requirements	Policy Making & Documentation	Central	2024	NIP, UNICEF
			2. Develop all forms according to the recommended standards	Policy Making & Documentation	Central	2024	NIP, UNICEF
			3. Identify funds for printing and supply of all relevant forms/booklets to all vaccine stores	Policy Making & Documentation	Central	2024	NIP, UNICEF
			4. Print and supply standard forms/booklets to all vaccine stores	Policy Making & Documentation	Central	2024	NIP, UNICEF
			5. Develop a guidance note (written or video) or SOPs on correct filling of these forms	Policy Making & Documentation	Central	2024	NIP, UNICEF
			6. Train staff on how to fill these forms through cascade mode	Policy Making & Documentation	Central	2024	NIP, UNICEF
			7. Incorporate the compliance to use and correctly fill these forms as part of supportive supervision	Supportive Supervision	Central	2024	NIP, UNICEF
30	C3	The national store and all regional and district stores are equipped with a web-based vaccine stock management system that meets the minimum requirements.	1. Assess the strengths and weaknesses of the existing web-based vaccine stock management system (mSupply) across all levels of supply chain including data fields, accessibility, data quality and implementation challenges	Policy Making & Documentation	Central	2023	NIP, UNICEF, CHAI, FDD
			2. Develop an operational matrix in conjunction with the Ministry of Planning and Investment to strengthen the mSupply, its data quality, transparency, and accessibility	Policy Making & Documentation	Central	2023	NIP, UNICEF, CHAI, FDD
			3. Develop an ideal form with relevant data fields as per the recommended standards	Policy Making & Documentation	Central	2023	NIP, UNICEF, CHAI, FDD
			4. Determine the accuracy of vaccine forecasts and vaccine stock outs through newly developed/upgraded vaccine stock management systems to make corrections to the form/system	Policy Making & Documentation	Central	2024	NIP, UNICEF, CHAI, FDD
			5. Develop a mobile-based platform for real-time data entry of vaccine stocks to track vaccine stock status at the health centre level; develop a mechanism to link the data collected here on to a display dashboard and mSupply	Policy Making & Documentation	Central	2025	NIP, UNICEF, CHAI, FDD

#	Cat.	Targets	Activities	Domain	Level of Implementation	Timeline (Year)	Responsible Organization
31	C3	All vaccine transportation vehicles are equipped with a standard trip reporting form with all of the required fields.	1. Develop a standard trip reporting form with recommended fields for transportation of vaccines and dry goods	Policy Making & Documentation	Central	2024	NIP, TWG
			2. Determine the need for booklets with trip reporting form (TRF) based on the number of vaccine transportation vehicles at the national, provincial and district vaccine stores	Policy Making & Documentation	Central	2024	NIP, TWG
			3. Develop SOP/guidance material (video and written) to orient store managers on how to fill the trip reporting format	Policy Making & Documentation	Central	2024	NIP, TWG
			4. Incorporate the review of trip reporting form booklets as part of supportive supervision to ensure completeness and compliance	Supportive Supervision	Central	2024	NIP, TWG
			5. Identify and secure funds for printing and distribution of trip reporting form booklets to provinces	Policy Making & Documentation	Central	2025	NIP, TWG
			6. Print and distribute trip reporting form booklets to provinces/districts	Policy Making & Documentation	Central	2025	NIP, TWG

#	Cat.	Targets	Activities	Domain	Level of Implementation	Timeline (Year)	Responsible Organization
32	C3	All supervisors in regional and district stores are equipped with a standard supportive supervision checklist covering the key areas of vaccine management.	1. Review the existing supportive supervision checklists and supportive supervision delivery mechanism (DHIS2, need for another platform) used in the Lao People's Democratic Republic	Supportive Supervision	Central	2023	NIP, UNICEF, WHO
			2. Revise and update the supportive supervision checklists in coordination with the development partners to finalize new checklists, for all domains of immunization	Supportive Supervision	Central	2023	NIP, UNICEF, WHO
			3. Identify suitable platform for hosting the supportive supervision checklists	Supportive Supervision	Central	2024	NIP, UNICEF, WHO
			4. Digitalize the supportive supervision checklists to upload on a suitable platform	Supportive Supervision	Central	2024	NIP, DPs
			5. Develop an automated data analysis mechanism for the supportive supervision data collected from field visits	Supportive Supervision	Central	2024	NIP, UNICEF, WHO
			6. Develop a standard display dashboard with key performance indicators to allow for evaluation of scores for different vaccine stores	Supportive Supervision	Central	2024	NIP, UNICEF, WHO
			7. Allow for accessibility of findings of supportive supervision dashboard, key findings and previous reports to relevant stakeholders through a password protected access for monitoring	Supportive Supervision	Central	2024	NIP, UNICEF, WHO
			8. Develop SOPs and training material for the use of supportive supervision delivery platform (Mobile app) and checklists for partners and supervisory staff	Supportive Supervision	Central	2024	NIP, UNICEF, WHO
			9. Pilot launch the SS mobile application; identify and remove bugs	Supportive Supervision	Central	2024	NIP, UNICEF, WHO
			10. Develop a template for standard quarterly dashboard to be shared with the provinces and development partners highlighting key supportive supervision results and findings	Supportive Supervision	Central	2024	NIP, UNICEF, WHO
			11. Train the supervisors at the provinces and districts on the use of SS app and supportive supervision checklists, development of supportive supervision visit plans and integration of the same onto the annual budgets and AWP	Supportive Supervision	Central	2024	NIP, UNICEF, WHO
			12. Expand the use of supportive supervision delivery platform (mobile application) and checklists to the entire country	Supportive Supervision	All	2025	NIP, UNICEF, WHO

#	Cat.	Targets	Activities	Domain	Level of Implementation	Timeline (Year)	Responsible Organization
33	C4	1. At least two staff members at each regional and district vaccine store and each health centre are formally designated responsible for: vaccine temperature monitoring (in storage and transport), vaccine stock management, packing insulated containers (where applicable) and immunization waste management (where applicable). 2. Responsible staff at vaccine stores and each health centre are formally trained in vaccine temperature monitoring in storage and transportation, routine refrigeration maintenance, cold chain equipment inventory management, vaccine stock management and packing insulated containers.	1. Assess the human resource status (including their training need) working at regional and district vaccine stores and at health centres	HR and Training	Central	2023	NIP, PATH
			2. Develop/update comprehensive training modules for health staff curated to meet the requirements of cold chain staff and refrigeration mechanics	HR and Training	Central	2024	NIP, UNICEF, PATH
			3. Assign and train a health staff as an alternate cold chain staff (vaccine handler) at every vaccine store	HR and Training	All	2024	NIP, UNICEF, PATH
			4. Provide refresher trainings for staff at health centres and other vaccine stores on key aspects of vaccine and cold chain management	HR and Training	Central	2024	NIP, UNICEF, PATH
			5. Launch and implement an e-learning course on key aspects of vaccine and cold chain management for health staff in the country in a phased manner (2023-2024)	HR and Training	Central	2024	NIP, UNICEF, PATH
34	C4	At least one staff member at each vaccine store and health centre is formally designated responsible for routine maintenance of vaccine transportation vehicles (where operated).	1. Assess the availability of a designated staff member for regular planned preventive maintenance of vaccine transportation vehicles at national and provincial vaccine stores	HR and Training	Central	2024	NIP, UNICEF
			2. Assign one person for regular planned preventive maintenance of vehicles	HR and Training	Central	2024	NIP, UNICEF
			3. Train the assigned person on the planned preventive maintenance checklist for vehicles	HR and Training	Central	2024	NIP, UNICEF
35	C4	1. All supervisors are formally trained in supportive supervision. 2. Responsible staff at each regional and district vaccine store and each health centre is formally trained in monitoring the performance of iSC.	1. Develop proposal for supervisors' training on SS app, supportive supervision checklists, monitoring of key performance indicators and key aspects of vaccine and cold chain management (can be combined with other aspects of immunization: session, AEFI, waste management)	HR and Training	Central	2024	NIP, UNICEF
			2. Develop training material, SOPs for supervisor's training on SS app, supportive supervision checklists, monitoring of key performance indicators and key aspects of vaccine and cold chain management	HR and Training	Central	2024	NIP, UNICEF
			3. Train the supervisors through a cascade mode of training	HR and Training	Central	2024	NIP, UNICEF
			4. Develop a facilitator's guide for national and provincial ToT for supervisor's training	HR and Training	Central	2024	NIP, UNICEF
36	C4	The role of immunization programme data analyst is formally established and assigned to a suitably qualified and experienced person.	1. Review and revise the ToR for immunization programme data analyst	HR and Training	Central	2024	NIP
			2. Identify and secure funds for the position	HR and Training	Central	2024	NIP
			3. Hire a suitable person based on experience and qualification	HR and Training	Central	2024	NIP

#	Cat.	Targets	Activities	Domain	Level of Implementation	Timeline (Year)	Responsible Organization
37	C4	Cold chain technicians should be available at the national and regional cold chain hubs.	1. Prepare/update the ToR for cold chain technicians at the national and regional stores	HR and Training	Central	2024	NIP
			2. Identify and secure funds (recurring) for the positions	HR and Training	Central	2024	NIP
			3. Hire a suitable person for cold chain technician based on experience and qualification	HR and Training	Central	2024	NIP
38	C4	The role of manager of immunization supply chain standard operating procedures is formally established and assigned to a suitably qualified and experienced person.	1. Review the ToR for current staff and incorporate the development of immunization supply chain standard operating procedures in the same	HR and Training	Central	2024	NIP
			2. Assign the revised ToR to the said personnel	HR and Training	Central	2024	NIP
39	C4	1. The terms of reference of the national logistics working group (NLWG) cover the main functions of supply chain management (see sub-requirements for details). 2. The National Logistics Working Group is functional (see sub-requirements for details).	1. Conduct a review of the current status of the national logistics working group (composition, activities over the past three years, frequency of meeting, documentations so far, relevant policy decisions, etc.)	Policy Making & Documentation	Central	2023	NIP, All DPs
			2. Review and revise the composition and ToR of all members of the national logistics work group as required	Policy Making & Documentation	Central	2023	NIP, All DPs
			3. Re-define role of the national logistics working group in consultation with all development partners, its accountability and relevance to iSC and EPI in the country	Policy Making & Documentation	Central	2023	NIP, All DPs
			4. Hold the first meeting of revised NLWG with delineation of roles and responsibilities of members and prepare a fixed meeting schedule (quarterly) for the NLWG	Policy Making & Documentation	Central	2023	NIP, All DPs
			5. Draft key mandatory and additional agenda points for the discussion and update in each national logistics working group meeting and a draft presentation template as well	Policy Making & Documentation	Central	2023	NIP, All DPs

#	Cat.	Targets	Activities	Domain	Level of Implementation	Timeline (Year)	Responsible Organization
40	C5	All vaccine stores and health facilities have up to date guidance materials for each of the management tasks: forecasting vaccine needs, annual work planning, supportive supervision (where applicable) and monitoring the performance of iSC.	1. Review the current SOPs or guidance material (if any) available on vaccine forecasting, annual work planning, supportive supervision and key performance indicator monitoring	Policy Making & Documentation	Central	2024	NIP, UNICEF
			2. In consultation with the development partners, prepare/revise relevant SOPs on vaccine forecasting, AWP, SS and key performance indicator monitoring	Policy Making & Documentation	Central	2024	NIP, UNICEF
			3. Identify and secure funds for development, design, printing and supply of guidance materials	Policy Making & Documentation	Central	2024	NIP, UNICEF
			4. Design, print and supply relevant guidance material to all vaccine stores	Policy Making & Documentation	Central	2024	NIP, UNICEF
			5. Identify a mechanism to regularly update and add annex/addendums to the SOPs as required (through Manager for iSC SOPs)	Policy Making & Documentation	Central	2024	NIP, UNICEF
			6. Ensure availability of soft copies of all the guidance material on the website of the Ministry of Health, with link available and accessible to all.	Policy Making & Documentation	Central	2024	NIP, UNICEF
41	C5	All vaccine stores and health facilities have up to date standard operating procedures for each of the routine vaccine management tasks: vaccine arrivals procedures, vaccine temperature monitoring in storage and transport, storage of vaccines and dry goods, routine preventive maintenance of cold chain equipment, vaccine stock management, packing insulated containers (where applicable), outreach planning, safe injection and immunization waste management.	1. Review the current SOPs, job aids or guidance material (if any) available on all routine vaccine management tasks	Policy Making & Documentation	Central	2024	NIP, WHO, UNICEF
			2. In consultation with the development partners, prepare/revise relevant SOPs on all routine vaccine management tasks	Policy Making & Documentation	Central	2024	NIP, WHO, UNICEF
			3. Identify and secure funds for development, design, printing and supply of guidance materials	Policy Making & Documentation	Central	2024	NIP, WHO, UNICEF
			4. Design, print and supply relevant guidance material to all vaccine stores	Policy Making & Documentation	Central	2024	NIP, WHO, UNICEF
			5. Identify a mechanism to regularly update and add annex/addendums to the SOPs as required (through Manager for iSC SOPs)	Policy Making & Documentation	Central	2024	NIP, WHO, UNICEF
			6. Ensure availability of soft copies of all guidance material on the website of the Ministry of Health, with link available and accessible to all.	Policy Making & Documentation	Central	2024	NIP, WHO, UNICEF

#	Cat.	Targets	Activities	Domain	Level of Implementation	Timeline (Year)	Responsible Organization
42	C5	All vaccine transportation vehicles have vaccine transport emergency contingency plans.	1. Develop a standard template for vaccine transport contingency plan for all vaccine stores, keeping in mind the geographical terrain, common vehicle emergency situations, etc.	Policy Making & Documentation	Central	2025	NIP, UNICEF
			2. Train the store managers at the provincial and district levels (with vaccine transportation vehicles) on how to prepare the contingency plan for their respective vaccine stores and vaccine distribution routes	Policy Making & Documentation	Central	2025	NIP, UNICEF
			3. All vaccine stores to finalize and approve their vaccine transport contingency plans	Policy Making & Documentation	All	2025	NIP, UNICEF
			4. Provide copies of approved vaccine transport contingency plans, one in each vehicle and one at the vaccine stores	Policy Making & Documentation	All	2025	NIP, UNICEF
			5. Ensure orientation of drivers on vaccine transport contingency plan as part of their training on vaccine management during transportation	Policy Making & Documentation	All	2025	NIP, UNICEF
43	C5	Deep Dive Study on eLMIS situation in the country	1. Plan and prepare a proposal for the deep dive study on eLMIS situation in the Lao People's Democratic Republic	Research	Central	2024	NIP, UNICEF
			2. Identify and secure funds for the study	Research	Central	2024	NIP, UNICEF
			3. Conduct a deep dive study on eLMIS situation in the Lao People's Democratic Republic	Research	Central	2024	NIP, UNICEF
			4. Based on the findings, implement a plan of action to support the eLMIS in the Lao People's Democratic Republic	Research	Central	2024	NIP, UNICEF
44	C5	An up-to-date temperature monitoring study is available.	1. Plan and prepare a proposal for the temperature monitoring study during storage and transportation of vaccines as a follow-up to the last study	Research	Central	2025	NIP, UNICEF
			2. Identify and secure funds for a TMS	Research	Central	2025	NIP, UNICEF
			3. Conduct a TMS	Research	Central	2025	NIP, UNICEF
			4. Based on findings, implement corrective measures to vaccine transportation and storage practices.	Research	Central	2025	NIP, UNICEF

#	Cat.	Targets	Activities	Domain	Level of Implementation	Timeline (Year)	Responsible Organization
45	C5	An up-to-date immunization supply chain network design study is available.	1. Conduct a desk analysis to determine the cost-efficient mechanism for vaccine storage and transportation within the country	Research	Central	2026	NIP, UNICEF
			2. Plan and prepare a proposal for the immunization supply chain network design study	Research	Central	2026	NIP, UNICEF
			3. Identify and secure funds for the immunization supply chain network design study	Research	Central	2026	NIP, UNICEF
			4. Conduct an immunization supply chain network design study	Research	Central	2026	NIP, UNICEF
			5. Based on findings, implement corrective measures for more efficient vaccine distribution practices	Research	Central	2026	NIP, UNICEF
46	C5	An up-to-date cold chain equipment replacement/rehabilitation plan is available (s part of the Inventory Gap Analysis).	1. Assess the current age and functionality of electrical cold chain equipment across the country through a lifespan analysis	Research	Central	2024	NIP, UNICEF
			2. Determine the need for equipment through an inventory gap analysis	Research	Central	2024	NIP, UNICEF
			3. Prepare a plan for a re-allocation/distribution, repair, replacement and procurement of cold chain equipment to determine the type and size of equipment required	Research	Central	2024	NIP, UNICEF
			4. Develop comprehensive guidelines for condemnation of beyond repair equipment	Research	Central	2024	NIP, UNICEF
47	C5	An up-to-date waste management plan is available.	1. Assess the current waste management practices and gaps in waste management in the country	Research	Central	2023	NIP, ADB, WHO, DHHP
			2. Develop waste management guidelines for collection, segregation and disposal of immunization waste in the most sustainable environment-friendly manner	Research	Central	2023	NIP, ADB, WHO, DHHP
			3. Train health staff on the waste management practices	HR and Training	Central	2024	NIP, ADB, WHO, DHHP
48	C5	A new vaccine introduction plan is available.	1. Review the existing new vaccine introduction guidelines in the Lao People's Democratic Republic	Policy Making & Documentation	Central	2023	NIP, NITAG, DPs
			2. In consultation with partners, revise the new vaccine introduction guidelines, keeping in mind the new type of equipment, revised storage and transportation capacity, etc.	Policy Making & Documentation	Central	2023	NIP, NITAG, DPs
49	C6	Funds for staff salaries at regional and district stores and health centres are received in full and on time.	1. Fund requests to be placed well in advance as per defined timeline (timeline to be communicated with districts and provinces)	Funds/AWP	All except HC	2023	NIP

#	Cat.	Targets	Activities	Domain	Level of Implementation	Timeline (Year)	Responsible Organization
50	C6	Funds budgeted for immunization supply chain operations (fuel, electricity, internet) at regional and district stores and health centres are sufficient and received in full and on time.	1. MCHC to identify and communicate a timeline for submission of fund requests for all provinces. Fund requests for immunization supply chain operations are planned and submitted as per defined timeline.	Funds/AWP	All	2023	NIP



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