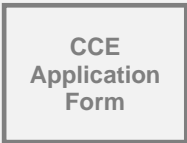





## Application Form for Cold Chain Equipment Optimisation Platform support in 2018

Document Dated: November 2017

	<p><b>Purpose of this document:</b></p> <p>This application form must be completed in order to apply for support related to the CCE Optimisation Platform.</p> <p>Applicants are required to read the <b>Application guidelines</b> and <b>How to request new Gavi support</b> documents. Thereafter, applicants should complete this CCE Application Form and submit by email to <a href="mailto:proposals@gavi.org">proposals@gavi.org</a>.</p>
  	<p><b>Resources to support completing this application form:</b></p> <p><b>Technology guide for equipment selection</b> for counties wishing to request CCE Optimisation Platform support is available here: <a href="http://www.gavi.org/support/hss/cold-chain-equipment-optimisation-platform/">www.gavi.org/support/hss/cold-chain-equipment-optimisation-platform/</a></p> <p><b>Extensive technical resources</b> relating to vaccine cold chain equipment management are available on TechNet-21: <a href="http://www.technet-21.org/en/resources/cold-chain-equipment-management">www.technet-21.org/en/resources/cold-chain-equipment-management</a></p>
<p><b>Weblinks and contact information:</b></p> <p>All application documents are available on the Gavi Apply for Cold Chain Equipment support webpage: <a href="http://www.gavi.org/support/process/apply/cceop/">http://www.gavi.org/support/process/apply/cceop/</a>. For any questions regarding the application guidelines please contact <a href="mailto:countryportal@gavi.org">countryportal@gavi.org</a> or your Gavi Senior Country Manager (SCM).</p>	
	<ul style="list-style-type: none"> <li>● Countries are informed that based on post IRC recommendations, <b>final approved amounts may be different</b> from what countries have requested.</li> <li>● <b>This final approved amount will be dependent on the availability of funding.</b></li> <li>● <b>Gavi will respect countries' equipment selection. However, countries could also receive their 2<sup>nd</sup> or 3<sup>rd</sup> preference based on their selection in the budget.</b></li> </ul>

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## 1. PART A: APPLICANT INFORMATION

1. Applicant information	
<b>Country</b>	Lao People's Democratic Republic
<b>Date</b>	16 September 2018
<b>Contact name</b>	Dr Anonh Xeuatvongsa
<b>Email address</b>	<a href="mailto:anonhxeuat@gmail.com">anonhxeuat@gmail.com</a>
<b>Phone number</b>	+856 20 91111 964
<b>Total funding requested from CCE Optimisation Platform (US \$)</b>	<i>This should correspond exactly to the budget requested in the embedded template.</i> \$2,523,102 (Country joint investment 50%: \$1,261,551 Country joint investment procurement fee: \$107,232 Estimated international freight fees: \$183,300
<b>Does your country have an approved Gavi HSS support on-going?</b>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
	Indicate the anticipated <b>final year</b> of the HSS: 2020
<b>Proposed CCE Optimisation Platform support start date</b> (please be informed the actual start date should be at least 8-10 months from application date):	Indicate the month and year of the planned start date of the support, based on the strategic deployment plan: October 2019
<b>Proposed CCE Optimisation Platform support end date:</b>	Indicate the month and year of the planned end date of the support, based on the strategic deployment plan: December 2020
<b>Signatures</b> Include signed (and official) CCE Optimisation Platform application endorsement by: a) Minister of Health and Minister of Finance (or <u>delegated authorities</u> ) b) Members of the Coordination	<i>We the undersigned, affirm the objectives and activities of the Gavi CCE Optimisation Platform proposal are fully aligned with the national health strategic plan (or equivalent) and that the funds for implementing all activities, including domestic funds and any needed joint investment, will be included in the annual budget of the Ministry of Health:</i>  <b>Minister of Health (or delegated authority)</b> <b>Minister of Health (or delegated authority)</b> Name: _____ Name: _____

<i>Forum (HSCC/ICC or equivalent body)</i>	Signature:	Signature:
	Date:	Date:

## 2. PART B: MANDATORY ATTACHMENTS: NATIONAL STRATEGIES AND PLANS

This section provides a list of national strategies, plans and documents relevant to supply chain and requested support, which must be attached as part of the application.

	All documents listed in the table below are <b>mandatory</b> , must be <b>attached</b> to your application, and they must be <b>final</b> and <b>dated</b> . Only <b>complete applications</b> will be assessed.
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2. Mandatory attachments					
No.	Strategy / Plan / Document	Attached Yes/No	Final version (dated)	Duration	Comments
1	Signature sheet for the Minister of Health and Minister of Finance, or their delegates				
2	Minutes of the Coordination Forum meeting (ICC, HSCC or equivalent) endorsing the proposal <sup>1</sup>	Yes	14 Sep 2018		
3	National Health Sector Development Plan/ Strategy (or similar)	Yes	2016-2025		
4	cMYP	Yes	2016-2020		
5	EVM Assessment	Yes	2014		
6	EVM Improvement Plan	Yes	2015		
7	EVM Annual Workplan <b>and</b>	Yes	2015-2020		

<sup>1</sup> In the case of HSS and CCE Optimisation Platform requests, minutes must reflect that both were discussed and endorsed.

	Progress Report on EVM Improvement Plan <sup>2</sup>				
8	WHO CCEI Tool/UNICEF IMT/PATH CCEM Tool/CHAI tool <sup>3,4</sup>	Yes	July 2018		
9	Inventory Report and Facilities segmentation	Yes	July 2018		
10	Comprehensive document on CCE needs: Chapter 1: Cold Chain Rehabilitation and Expansion Plan Chapter 2: Projected Coverage and Equity Improvements Chapter 3: Operational Deployment Plan, including deviation plan Chapter 4: Equipment Selection	Yes	July 2018		
11	Maintenance Plan with financing and source(s)	Yes	2019-2022		
12	Proof of status for CCE tariff exemptions waiver	Yes	2018		
13	Other relevant documents				

### 3. How do the above strategies, plans and documents inform the CCE Optimisation Platform support request (initial support and scale-up support)? (Maximum 1 page)

*Countries are encouraged to reference relevant sections of the above documents as much as possible.*

#### **Country background**

The Lao People's Democratic Republic (Lao PDR) is a landlocked country situated in Southeast Asia bordering China, Myanmar, Thailand, Cambodia and Vietnam. Geographic and historic conditions restrict both the quantity and quality of agricultural land and pose difficulties in the development of trade, social infrastructure, and transport and communication links. This is further compounded by a highly dispersed population of 6.4 million (2015 - as per population and housing census) covering an area of 236,880 sq. km across 18 provinces and 148 districts.

Lao PDR has recently improved its ranking in the Human Development Index (HDI), standing at 139th out of 187 countries according to the 2014 Human Development Report.

Lao PDR is currently implementing the 8th Health Sector Development plan for 2016-2020. This plan focuses on the provision of healthcare through the public system, across all levels. Critical to the provision of primary health care into the communities are the outreach services which extend from these health facilities. Country has a total of 10 central hospitals, 17 provincial hospitals and 136 district hospitals and 1,398 health center.

<sup>2</sup> The EVM IP and annual work plan progress report must have been updated within three (3) months before applying for Platform support.

<sup>3</sup> The CCE Inventory must have been updated within no more than one (1) year of applying for Platform support.

<sup>4</sup> Tool should allow reviewers to understand targeting of equipment to locations relative to contribution towards improving coverage and equity of immunisation.

The Lao PDR health system includes 3.22 health workers per 1000 population with an average of 4.3 health care workers per health center. This is an increase of about 50% since 2012.

Lao PDR is an ethnically and geographically diverse country with a rich history and culture. It is a lower-middle income country with a GNI per capita of US\$2,150 in 2016. In recent years, the country has seen economic growth accompanied by a significant decline in poverty rates.

The country has also made significant progress towards achieving the Sustainable Development Goals (SDGs) with improvement on several key health outcomes. Life expectancy has increased steadily and under-five, infant and maternal mortality rates have also declined significantly. Even with this progress, Lao PDR did not attain a number of its Millennium Development Goal indicators.

The health-care delivery system of the Lao PDR is primarily a government-owned, public system that operates with the health centers as well as district and provincial hospitals. The Lao PDR's public health system has a strong vertical structure and is divided into three main arms:

- health care;
- prevention, promotion, and disease control; and
- health management and administration (cMYP, page 8).

Despite existing network of health care facilities, adequate access of population to the health care services still remains a major challenge in Lao PDR, due to the following reasons:

- Majority of the Lao population lives in rural, remote, and mountainous areas and lack adequate access to the basic health care;
- Health staff is distributed unevenly between rural and urban areas, where most of the health professional staff lives and works in urban areas.

### **EPI program in Lao PDR**

The National Immunization Program (NIP) is considered as one of the priority public health programs of the Government of Lao PDR and has achieved substantial progress over the past 10 years, with a significantly increased coverage of DTP3 and MCV1 up until 2015. Coverage has dropped, however, in the 2016, most likely due to the need for repeated polio campaigns in the wake of a recent cVDPV outbreak (*National EPI review 2018*).+ Additional outbreaks have also been witnessed in recent years: diphtheria, pertussis, and measles, affecting mainly ethnic population groups with inadequate access to immunization services.

Disparities in immunization performance at subnational level indicate the need for improved program management in immunization service delivery at provincial, district and health facility and village levels. In terms of supply, services delivery problems are often due to a delay in budget disbursements, poor road conditions, limited human resources and important language barriers. On the demand side, access to health services is limited mainly in the non-Lao ethnic groups, in particular the Hmong population. Taken together, these

factors are a major challenge to achieving equity in the provision of immunization services.

There is a lack of human resources and their capacities to carry out the immunization activities and developing realistic micro-plans with due consideration of fixed site, outreach and mobile immunization services. Supportive supervision across MNCH services is weak, with technical supervision mainly provided by the central NIP teams with limited reach. Stronger accountability structures are needed at the provincial level to improve monitoring and supervision of all elements of the NIP as part of the broader MNCH service delivery.

The country has recently passed and approved the immunization law (attached copy of the law as additional document). NIP places emphasis on such legislation to sustain gains made so far and to ensure resource allocation by the Government of Lao PDR.

The EPI review concluded in May 2018 found that NIP performances have increased consistently over time, achieving immunization goals and SDGs. However, gaps in program management and service delivery remain, leading to inadequate coverage and inability to prevent outbreaks and reach elimination targets. Capacity to sustain current NIP performances and its increasing needs (i.e. introduction of new vaccines, enhance supply management, HR capacity building) is challenged by financing transition. Increase of domestic funding and strengthening program efficiency within the broader health sector reform is essential.

### **Coverage and equity analysis**

DTP3 coverage in 2015 was quite strong at 89%. The coverage dropped in 2016 to 82% as Lao PDR was responding to the recent circulating vaccine derived poliovirus (cVDPV) outbreak. 2017 coverage was an improvement from 2016 at 85% DTP3 coverage. Even so, vaccination coverage for all the vaccines is still below the target of 90 per cent. BCG coverage stands at 81% and MR1 at 82%. PCV3 coverage in 2017 was 83% and OPV3 was 85%. However and despite low gains in immunization coverages in recent years, hard-to-reach communities are less likely to receive the life-saving care.

Lao PDR is striving to maximize the equity of immunization coverage addressing geographical, wealth, ethno-linguistic, and gender-related barriers. Lao PDR has a relatively small population spread over a large geographical area. Much of the population lives in rural and difficult-to-access areas. About a quarter of the population belongs to non-Lao ethnic groups. In some cases, communities are mobile (or partly mobile) and often with their own language.

The concentration of recent outbreaks amongst ethnic populations point to economic, geographic and ethnic disparities impacting access and coverage.

The Government of Lao PDR is committed to addressing these inequities through both strengthening service delivery and demand for immunisation. For example, Lao PDR is currently reinforcing the development of micro-plans to strengthen service delivery especially in hard-to-reach communities; expanding monitoring and supportive supervision to low-performing/priority districts; and building health care worker capacity thru a comprehensive EPI manager training.

To improve demand for immunization, Lao PDR is developing tailored communications materials in local languages to address disparities among ethnic groups. The country is also conducting interpersonal communication trainings for healthcare workers and

community volunteers in targeted districts to address language barriers.

The government is exploring more efficient ways to deliver a package of services to remote and vulnerable populations including regular integrated outreach. This is part of the essential maternal and child health package, which includes immunization, family planning, antenatal and postnatal care, growth monitoring as well as health promotion messages

### **CCEOP objectives and target needs**

The CCEOP application has been backed by the EVM recommendations of transforming all cold chain equipment to PQS (*EVM improvement plan – Page 6 : proposed interventions*). The National Health Strategic Plan also lists EPI program as its flagship program. There has been serious efforts to put EVM recommendations to place and CCEOP comes into light in right time and right perspective.

The CCEOP application targets all 148 districts, 18 provinces with the core objectives in three folds as described below:

- 1) *Ensure sufficient cold chain capacity to enable introduction of new vaccines and continue routine immunization through 2022.*
  - The CCEOP caters to this additional capacity need by procuring higher capacity equipment to replace existing low capacity sub-optimal equipment. The fully immunized child (FIC) indicator requires the volume of 382cm<sup>3</sup> and this includes the introduction of Rotavirus vaccine and HPV vaccine. This has increased demand for vaccine storage and CCEOP platform is addressing these needs
- 2) *Address coverage inequity by extending the cold chain network (equipping unequipped sites) especially in hard to reach areas and the 62 health centers with immunization coverage <80%*
  - Lao PDR has increased focus on providing fixed immunization session progressively though currently 75% of the children are reached through outreach services. With CCEOP grant implementation country will extend the cold chain points to 62 health centers that do not have cold chain equipment at present and will also extend the cold chain to 7 newly created districts.
- 3) *Improve sustainability and effectiveness of the immunization program by reducing the logistical disruptions and additional operating expenditures that result from sub-optimal cold chain equipment.*
  - By replacing old and beyond repair and other sub optimal equipment, disruption to immunization services (example through CCE breakdown, shortage of LP Gas) will be reduced. This is expected to improve immunization coverage and raise the coverage levels beyond the target of above 90%

The 2018 cold chain inventory analysis shows roughly 73% of CCE are more than 10 years old and 11% of the total equipment is not functional. Replacement of these sub-optimal units would therefore enable the provision of effective service delivery by preventing disruptions to services (e.g. due to CCE breakdown) and protect vaccine stock (worth roughly USD 4.78 million (out of this government finance is 23% as of 2017) due to freezing.



## CCEOP equipment selection

Lao PDR has selected four different models as part of rehabilitation and expansion (Document 10 – single document – page 29). These four models are from single manufacturer (Vestfrost) which has good in-country performance history. Country selected largest Grade A model (VLS 400 A Greenline) for its provincial stores (145 litres size), VLS 300 A Greenline (98 Litres) for district stores. All national, subnational and district stores have full time electricity with minimum power cuts hence no solar model needed for supply chain levels. At service delivery level country selected VLS 200A Greenline (60) litres for electric sites and VLS 26 RF SDD (20 Litres) for sites with poor electricity.

## Prioritized deployment of equipment

The Lao PDR has prioritized the deployment into urgent needs and scale up needs over period of two years (*Document 10 – Single document page 27*). The first priority is replacement of non-functioning units (186 refrigerators of mixed models) (See single document chapter 3). The second priority is Expansion of additional cold chain capacity for improved quality and prevention of stock outs. This amounts to total of 157 refrigerators of mixed models. Priority 3 is extension of equipment to new sites as part of equity reach and improve coverage. This includes 62 health centers and newly created districts. Total 75

units of refrigerators are planned as part of third priority. All the three priorities are part of initial needs. The scale up needs include replacement of aged and non PQS equipment in the country which amounts to 804 refrigerators. The urgent needs are planned for 2019 (total of 418 units from 3 priorities ) and scale up needs are scheduled for 2020.

Supply chain levels	Model	Urgent needs 2019			Scale up needs 2020	Total
		Priority 1: replacement of non-functioning	Priority 2: Expansion of additional cold chain capacity	Priority 3: Extension of cold chain equipment in new sites	Rehabilitation of cold chain equipment	
Province	VLS 400A Greenline	43	106		27	176
District	VLS 300A Greenline	29	51	13	157	250
Service delivery	VLS 200A Greenline	91		62	552	705
Service delivery	VLS 026 FR SDD	23			68	91
	Total	186	157	75	804	1222

NIP would like to deploy the CCEOP units using its national pool of technicians as preferred option. This is in light of fact that Lao PDR does not have sufficient private refrigeration capacity and most services are outsourced to Thailand.

## Cold chain equipment maintenance

The Cold chain maintenance of all the cold chain equipment is currently managed by a team at national level. NIP has approved plans of creating 5 additional hubs and recruit 10 additional cold chain technicians to ease the maintenance load. EPI tried the option of outsourcing but could not locate a suitable organization decided to strengthen its own network. Country will also expand the pilot project of Cold Chain Information System (CCIS) piloted in 2015 as part of eHealth program where health workers were connected to DHIS2 server using an android based application. Health workers could upload the change in functional status of CCE which in turn informs the technician in real time basis hence improving the overall quality of curative maintenance.

Country could also use CCIS for tracking the performance indicators of maintenance.

### **Tariff exemption**

All the supplies procured by NIP for immunization program purposes are exempted of taxes. NIP has provided evidence of same as part of this application.

**4. Describe how supply chain stakeholders (including Coordination Forum (ICC/HSCC or equivalent), government, NLWG, NITAG, key donors, partners, CSOs and key implementers) have been involved in the application development including if the quorum at the endorsing meeting was met**

**the country have a permanent and functioning National Logistics Working Group (NLWG)? If No, does the country plan to establish one and when?**

*Gavi and its Alliance partners encourage the establishment of such group that coordinates Government and non-Government partners 'activities and investments related to the health supply chain including immunization.*

**Were any of Gavi's requirements to ensure basic functionality of Coordination Forums not met? Then please describe the reasons and the approach to address this (refer to section 5.2 of the General Guidelines for the requirements) (Maximum 1 page)**

The Director of the MCH Center, Ministry of Health, and EPI manager of the National Immunization Program formed a committee to prepare the CCEOP application and all the supporting documents. The Committee was chaired by the Director of MCH Center and lead by National Cold chain Officer and other members includes cold chain logistician, cold chain technician, data manager NIP and partners including UNICEF, WHO and CHAI. UNICEF recruited an international consultant to manage and support the application development process.

The country does not have CSO presence however there are three active unions - Lao Women's Union, Lao Youth Union and Lao Front for National Construction. All three are very active in health sector but were not involved in proposal writing as they are primarily focused on community mobilization.

The committee set aside responsibilities of each member in providing and validating the information for the task they have been assigned. The committee was established in July 2018 after updating the national cold chain inventory. Committee met approximately twice a month to discuss and review the application materials.

### **ICC**

The Lao PDR ICC meets on an as-needed basis and has reviewed and discussed the Gavi Transition Plan (on multiple occasions), rotavirus and HPV introductions, and the international EPI review. The Minister of Health has communicated to Gavi leadership that the Government of Lao PDR (GoL) will make an attempt to allocate budget for the increasing costs during the transition period so that by 2022 the GoL is fully self-financing the NIP.

The committee presented the CCEOP proposal to ICC on 14 September 2018 where the proposal to GAVI was approved unanimously by the committee (*Document 2: Minutes of ICC meetings approving CCEOP page 3*)

### 3. PART C: SITUATION ANALYSIS AND REQUESTED SUPPORT

This section gives an overview of the types of information the IRC will anticipate from countries in their application for CCE Optimisation Platform support. This section must be filled with appropriate reference to the country documents listed in Part B. Countries are required to provide a narrative in response to the following questions.

**5. Situation analysis of country's supply chain and CCE** (number, distribution, functionalities etc.) (*Maximum 3 pages*) Please respond to all questions

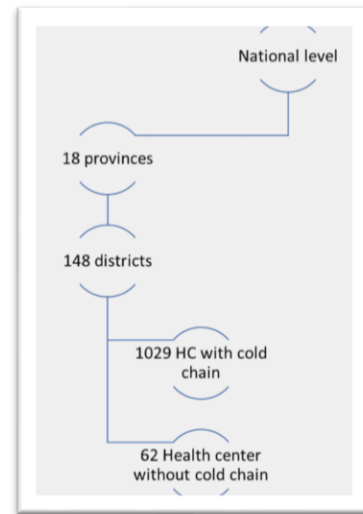
**Countries are encouraged to cross reference (document title, page number) attached mandatory documents.**

*Information is required to cover the following areas:*

- a) *How is the country's immunisation supply chain administered?*
- b) *What weaknesses have been identified in the country's supply chain?*
- c) *Through what interventions are these weaknesses currently being addressed?*
- d) *Describe challenges that are hindering the implementation of these interventions.*
- e) *Describe lessons learnt from recent supply chain related support that inform the current request for CCE Optimisation Platform support.*
- f) *What percentage of facilities have reliable access to grid electricity for up to or more than 8 hours per day?*
- g) *Please give the quantity and percent of current CCE that is: a) functional; b) PQS-approved; c) non-PQS-approved; and/or d) obsolete?*
- h) *What percent of the birth cohort is served by effectively functioning, PQS-approved CCE currently?*
- i) *What are the bottlenecks that CCE can address in the current supply chain set-up (for example, capacity and technology constraints)?*
- j) *Describe any other supply chain challenges that CCE Optimisation Platform support will assist in mitigating?*
- k) *What are the overall CCE needs?*

**a) Immunization supply chain network**

Lao PDR follows four tier immunization supply chain network. The national store is in its capital city Vientiane and two regional stores (extension of national store) is located in two of its provinces (Champasak and Oudomxay) which has proximity to neighbouring provinces and reduce transportation times and burdens. The second layer of immunization supply chain is 18 provincial stores. Third layer is districts stores (148 total) and followed by service delivery (1091) network including health centers and hospitals. The NIP strategically aims to promote the fixed delivery however presently over 75% of sessions were conducted as outreach. As on July 2018, the cold chain refrigerator is present at 1029 service delivery points and in addition there are 62 other health facilities that provide immunization services but do not have a refrigerator yet.



The NIP conducts the following activities to operationalize the immunization supply chain

- **Procurement:** Government of Lao PDR uses the procurement services of UNICEF for procurement of EPI vaccines, vaccination devices and cold chain equipment. Presently 23% of vaccine cost is paid by the government as rest is sourced from different partners (GAVI, JCV (Japan Committee Vaccines for World Children) and PIVI (Partnership for influenza vaccine Introduction))
- **Forecasting:** The National Immunization Program along with UNICEF does the procurement forecast for vaccine needs. Forecasting is done using the standard UNICEF forecasting tool. The procured vaccine is sent to provinces based on the quarterly requests. The same mechanisms will be used for all future new and underutilized vaccines that will be introduced into the national schedule.
- **Clearance and supplies management:** Upon arrival of Vaccines and related supplies NIP clears, stores and distributes to provinces. All vaccine arrives by air at Vientiane airport. The vaccine clearance is handled by NIP.
- **Distribution:** NIP national store delivers the vaccine and related supplies to the Regional Vaccine Hubs, and some provinces directly (Vientiane province, Vientiane Capital, Xayabouly, Bolikhamxay, Xaysomboun and Khammouane). Provinces are required to deliver vaccine and related supplies to the districts and districts deliver to health facilities. The vaccine push from district to health center is based on monthly requirement submitted by health center during their monthly meetings at district hospitals.

#### ***b) Weakness in the supply chain***

The EVM improvement plan developed in year 2015 following the EVM assessment in 2014 identified and listed these weaknesses:

**Distribution:** Lack of distribution plan. The vaccine is sent from national to provinces on adhoc on demand basis. Also there is no standard means of distribution of vaccine at all levels.

**Clarity on policies:** There is a general lack of understanding of policies and no clear policy on cold chain maintenance and repair and response times. There is lack of Standard Operating Procedures that clearly lays the steps in following a task and reporting norms.

**Capacity building:** There is need of designing the quality capacity building package for health workers, cold chain technicians and EPI managers that enables them to clearly understand the task and brings ability to perform as per norms. Also there is no induction program for new health workers.

**Supportive supervision:** There is weak, little and negligible supportive supervision in the country. There is no supportive supervision checklist and also negligible training of health workers by their supervisors.

**Lack of LMIS:** There was no LMIS for managing and facilitating the information flow between supply chain levels and planning ends. Among other issues, stock management has been badly affected due to poor information flow.

**Maintenance of cold chain equipment:** there has been lack of clarity of roles and functions between NIP and MPSC (Medical Product Supply Center) which has the responsibility of maintaining and installing cold chain equipment. The process of reporting and attending the non-functional equipment is sub optimal. The maintenance frequency is low given that entire country relies on two technicians at national level.

**c) Interventions to address the weakness**

The implementation of EVM improvement plan has been seriously put into action. So far country has implemented 27% of the total recommendations (for 2015-2020 EVM IP), while 21% are ongoing activities, 39% are planned for 2019 and 2020 and only 4% activities are delayed.

**Distribution plans** are now have been introduced following the EVM and is followed at national and province level.

The **cold chain maintenance plan 2019** aims to introduce the national policies on cold chain maintenance (*downtime policy, report and repair policy*). The NIP is also increasing the maintenance network by introducing 5 regional hubs and adding two technicians each hub.

Sub national technical assistance related to vaccine management is being provided via eleven STOP consultants deployed by WHO to provinces with the greatest need for capacity building.

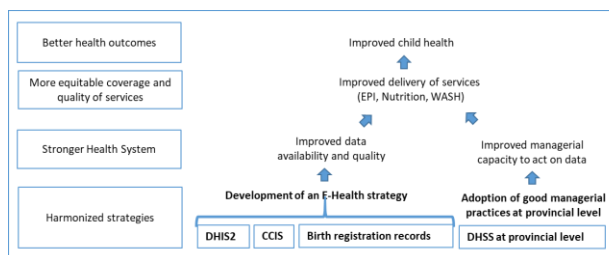
The development partners and national immunization program are working towards the quality and frequency of supportive supervision. This includes the development of supervisory checklist and job aids to reinforce best practices.

**Clarity of policies:** New immunization law has now been passed stating all required policies clearly.

Stock management: NIP is adopting Vaccine visibility tool of UNICEF (VIVA) for dashboard reporting on vaccine management and forecast, distribution at national and sub national level.

**LMIS:** mSupply supports warehouse and hospital stores to track stock in and out of facilities It also connects across store and provides real-time data for reporting. The mSupply tracks stock in and out by batch (batch number, production name, expiration, cost and selling price) to reduce stock-outs. mSupply has been implementing in 91 health facilities across 15 provinces, and is integrated with programs such malaria, HIV, TB, family planning, nutrition already. mSupply has been integrated with DHIS2 to generate key indicators related to logistics. The tracking of EPI commodities may also get integrated with mSupply as an option.

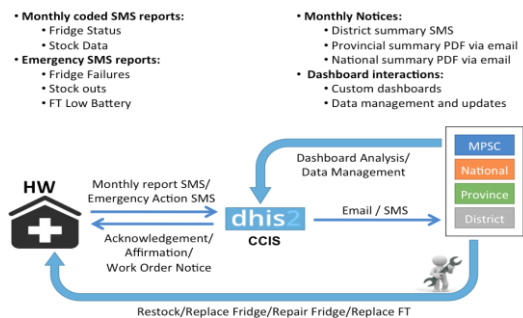
Ministry of Health is investing in DHIS-2 based LMIS (eHealth) connecting EPI coverage and cold chain inventory. Cold Chain Information System is conceptualized as sub module of bigger LMIS which is being designed and implemented.



NIP with its innovative approach designed a Cold Chain Information System that provides following solutions:

- a) Train and enable health workers in correctly using the 30 DTR for temperature monitoring
- b) Reduce the burden of reporting on health workers increasing the ability, willingness, efficiency of using SMS for reporting the data of temperature alarms
- c) Create a “Live” inventory of cold chain refrigerators in the supply chain and keep it “refreshed” with data reported by health workers.
- d) Create indicators of cold chain performance, create pointers of intervention for different cadre of staff.

#### CCIS DATA FLOWS



The DHIS2 based Cold Chain (CC) equipment inventory system strengthen the information system by providing access to accurate and up-to-date equipment data for the whole country. It enables CC managers to know which types of refrigerators are located where, their age and functional status, in order to better assess the actual capacity of the Cold Chain. This precise knowledge equips them to plan and manage the CC equipment and make decisions for the purchase, maintenance and discarding of equipment based on real evidence on their performance.

This DHIS-2 Database links location data with equipment data and provides a web-based platform accessible from anywhere. It gives all EPI staff at multiple levels access to the data through the customizable and user-friendly data visualization component providing reporting on selected key indicators for analysis.

The CCIS is seen as a major intervention in managing the live inventory of cold chain and also used for managing timely informed repair and service of cold chain equipment. The CCIS was pilot tested in 2015 with successful results and now NIP plans to scale it up nationwide in 2020.

Maintenance of cold chain equipment: NIP will create 5 regional maintenance hubs and recruit two cold chain technicians per hub for increased maintenance frequency. The CCIS will fill the information flow gaps to large extend.

#### **d) challenges that are hindering the implementation of these interventions**

- inactive logistics working group to convene and coordinate the implementation of the EVM improvement plan has been a major constraint in timely implementation of interventions. Also competing priorities for limited number of NIP staff. Country has been fighting emergencies (Polio and other VPD outbreaks)
- Limited number of Staff in key logistics positions with limited skill sets.
- Limited funds for operations and supervision at all levels. The logistics and transportation of vaccines and immunization supplies are subject to use of public or private transport between districts and service delivery.

#### **e) Lessons learnt from recent supply chain interventions**

One of the strong lessons learnt from recent cold chain procurement and installation is the difficulty in outsourcing the installation and maintenance services to third party. Most services are outsourced to Thailand based companies that shoots up the costs.

NIP also tried to establish the third party arrangement for outsourced maintenance of cold chain equipment in the country but could not locate a suitable company.

Both the installations of cold chain equipment and maintenance including solar is best handled by in-house government led technicians. NIP is expanding the maintenance network by creating 5 additional hubs in the country which will support the inhouse installation capacity.



With this lesson learnt NIP is strongly advocating with GAVI to establish the in-house service bundle arrangement of CCEOP deployment. In the absence of a qualified third party organization, the NIP will use its own technician to install the CCEOP cold chain equipment. NIP strongly recommends the manufacturer of cold chain equipment to train the core team in installation of CCE prior to deployment and NIP will manage the entire lot of installations over period of 2 years.

### f) Electricity availability

One of the strengths of Lao PDR is electric generating (and exports electricity) and stable electricity across all its provinces and districts. As per cold chain inventory, except for 13% of service delivery level, all cold chain points have reliable cold chain inventory (see cold chain inventory report, section 6, table 2).

Supply chain levels	More than 8 hours of electricity available ?		Grand Total
	No	Yes	
Province vaccine stores		18 (100%)	18
District vaccine stores		148 (100%)	148
Service delivery point	134 (13%)	895 (87%)	1029
<b>Grand Total</b>	<b>134</b>	<b>1061</b>	<b>1195</b>

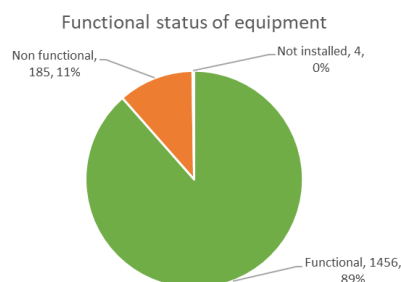
### g) Functional status of cold chain equipment

Lao PDR inventory shows a total of 1,645 cold chain equipment in the country. Of these units 1456, 89% units are functional and 11% (185) units are not functional. There are 4 units that were installed but plugged off as not needed at the site.

Type of equipment	Province	District	Service deliver level	Grand Total
Combined refrigerator and freezer	23	38	546	607
Freezer	5	30	1	36
Ice lined refrigerator	112	259	540	911
Ice pack freezer	13	41		54
Solar refrigerator			37	37
<b>Grand Total</b>	<b>153</b>	<b>368</b>	<b>1124</b>	<b>1645</b>

Of the functional units, 43% units are from Vestfrost, 4% from B Medical, 5% from Dulas, 37% from Electrolux (now B Medical) and 11% from Haier.

Among the non-functional units, 32% are from Vestfrost, 4% from B Medical, 14% from Dulas, 44% from Electrolux (now B Medical) and 6% from Haier.

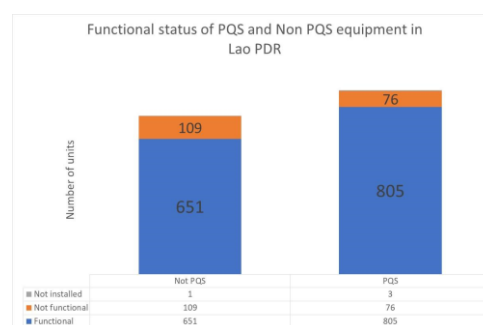


### PQS status of equipment

The country has 54% (884) as PQS equipment and 46% (761) as non PQS equipment as per July 2018 WHO PQS Catalogue listing.

Two important things to note with regards to PQS status of equipment in the country:

- Country always procured PQS-listed equipment through UNICEF supply division. However over period of time some equipment like RCW 50 EG lost it Pre Qualified status and does not list any more in PQS catalogue.



- Lao PDR never stored any vaccine in domestic refrigerator. It has a 100% track record of using PQS-listed equipment.

#### ***h) Birth Cohort served by PQS***

As per the inventory 54% of cold chain equipment is PQS qualified that is serving the 60% of birth cohort in the country. This was derived by dividing the population served by site by total number of equipment multiplied by number of PQS equipment at the site.

#### ***i) Bottlenecks CCE can address***

One of the advantages of going with grade A equipment of CCEOP platform is guaranteed freeze prevention of vaccine, as the supportive supervisory visits have witnessed the sub-zero level temperatures at health facilities a few times. The CCE upgrade through this proposal will also increase cold chain capacity especially at province level which is currently constrained of capacity. As per cold chain rehabilitation plan (Table 5: Cold chain rehabilitation and expansion needs at province stores) all provinces except for Sekong province require additional cold chain capacity. All provinces collectively are short of 14,312 litres of cold chain capacity.

The CCE upgrade will positively support the introduction of new vaccines (HPV, Rota 2019).

#### ***j) Other supply chain challenges***

The recent EPI review highlighted that staff at lower levels are unaware and unable to articulate the minimum and maximum supply chain levels. Also The EEFO is also not implemented. The vaccine requisitions are not made on time and correctly resulting in stock management problems.

The 30 DTRs are in short supply and outlived the battery life. The temperature monitoring is however consistently done using thermometers.

The written contingency plan for CCE is missing at most sites however they have cold boxes as backup device at cold chain points.

#### ***K) Overall needs***

The cold chain rehabilitation plan was prepared in July 2018 based on updated cold chain inventory (updated in July 2018). Country used the Fully Immunized Child volumes needed against the available vaccine volumes methodology to compute the requirements. The overall cold chain needs in the plan was categorized as following:

As per the (Fully Immunized Child) FIC table country needs 367.4cm<sup>3</sup> per FIC volume at supply chain level. This requirement includes current vaccine in immunization schedule and all planned vaccines till 2022. The requirement increases up to 382.6cm<sup>3</sup> per FIC at service delivery level.



Generic vaccine name	STEP 2 Default figures				STEP 3 Default figures			STEP 5	STEP 7	STEP 6
	Vaccine	Presentation	Maxi packed volume Extracted from data base		National data	WHO/GAVI	Wastage factor	Set Target Group	New schedule	Current schedule
	Choose from list	Choose from list	Vaccine volume (cm <sup>3</sup> /dose)	Diluent volume (cm <sup>3</sup> /dose)	Enter wastage rate (%)	indicative wastage		Enter as % of total population	Enter doses per recipient	Enter doses per recipient
BCG	BCG	20	1.8	1.3		50	2.00	100%	1	1
Penta	DTP-HepB-Hib	1	26.1			5	1.05	100%	3	3
IPV	IPV	5	4.9			5	1.05	100%	1	1
HPV	HPV	2	12.1			5	1.05	100%	2	2
MR	MR	10	2.6	2.6		45	1.82	100%	2	2
Rota	Rota_liq	1	46.3			5	1.05	100%	3	3
Td	Td	10	4.1			25	1.33	100%	5	5
OPV	bOPV1+3	20	1.0			25	1.33	100%	3	3
PCV	PCV-13	4	13.8			5	1.05	100%	3	3
JE	JE_lyo	5	2.4	2.9		10	1.11	100%	1	1
HepB	HepB	1	16.8			5	1.05	100%	1	1
Net volume of OPV at -20°C at CCR, per Target Group									4.0	4.0
Net volume of all vaccines, including OPV, stored at +5°C in lower level stores, per Target Group									367.4	367.4
Net volume of all vaccines, including OPV and diluents, stored at +5°C at service delivery level, per Target Group									382.6	382.6

Above table shows the vaccines in immunization schedule and vaccine volumes used by Lao PDR for procurement and vaccine volume estimates.

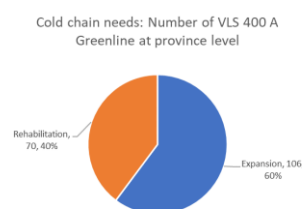
### Cold chain expansion

The cold chain expansion is defined as addition of vaccine storage capacity to existing capacity in order to suffice the current and future needs.

The province level is especially short of cold chain capacity.

Based on these volumes, the rehabilitation plan shows that there are expansion needs to the tune of 106 VLS 400 A Greenline refrigerators at province level (refer to table 6 of rehabilitation plan and figure 4 in rehabilitation plan for details).

As seen from table 5 in rehabilitation plan document, there are especially three large provinces that are a candidate for a cold room (Champasak (2,557 litres requirement), Savanhnakhet (3,204 litres of space needed) and Vientiane capital (2,487 litres) of space needed. NIP is considering a cold room for these sites from 2022 onwards as cold room need space and other requirements which needs to be considered before planning. For meantime, NIP estimated refrigerator needs for these large provinces



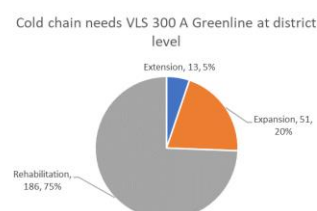
At district level, 51 of 148 districts need expansion of capacity to accommodate current and future needs. Please refer to table 8 in rehabilitation plan for details.

In total the overall expansion needs are 106 (at provincial level) plus 51 (at district level), 157 units. Of these 106 are VLS 400 A Greenline (for province store) and 51 VLS 300 A Greenline for district stores. For selection of equipment refer to rehabilitation plan chapter 4.

### Cold chain extension

The cold chain extension is seen as extending the cold chain refrigerator to a site which does not have a refrigerator yet. This has direct impact on equity reach as this increases the vaccine availability at health center (or supply chain level for improved frequency).

All the provinces in Lao PDR have cold chain equipment.



Lao PDR does not have cold chain equipment in 7 of 148 district stores, these 7 are newly created districts in Champasak, Houaphanh, Khammouane and Luang Namtha provinces. A total of 13 refrigerators of VLS 300 A Greenline is needed at district level to provide the cold chain equipment at this level. This extension is 5% of total needs at district levels.

In addition to 62 of health facilities registered in DHIS-2 as facilities providing health services do not have cold chain equipment. Refer to Table 9 in rehabilitation plan for details.

In total the extension needs are 13 (at district level) VLS 300 A Greenline and 62 at service delivery level.

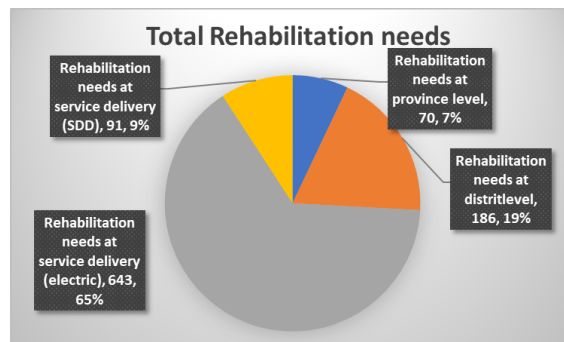
### **Cold chain rehabilitation**

The cold chain rehabilitation is seen as replacement of existing equipment which is sub optimum (non-PQS), non-functional (non-repairable) and being in service for more than 10 years.

As per the cold chain inventory report: 73% (1203) of current equipment is more than 10 years old, 11% of the total equipment is non-functional and 46% of total equipment is non PQS. Some of these equipment overlap in these 3 categories.

To simplify and accurately calculate the needs, the cold chain inventory tool and rehabilitation tool considers these options and takes the vaccine volumes as needed for the sites (for population projection upto 2022) and compares it against the current optimum operational volumes (PQS, functional and less than 10 years old) and projects the rehabilitation needs.

As per the rehabilitation plan, the province level needs 70 VLS 400 A Greenline refrigerator at province level towards rehabilitation (table 6- Chapter 1 Comprehensive Single document), the district level need 186 refrigerators of VLS 300 A Greenline (Table 8 – Chapter 1 Comprehensive single document) and (643 electric refrigerators (VLS 200 A Greenline) for service delivery level with electricity more than 8 hours and 91 VLS 26 FR SDD dual chamber solar direct drive refrigerator for sites with electricity less than 8 hours a day) at service delivery.



### **Spare parts needs**

The spare parts needs are computed based on PQS recommendations and UNICEF Supply Division was contracted for their advice. The estimated cost of spares for electric ILR is \$176 per 10 units and \$421 for a set of every 10 units of SDD per annum. Given this the total cost of spares parts is estimated to be \$337,020 for a 10 years cycle. Please see table 10 (Chapter rehabilitation plan in Single document) for detailed computation of spare parts needs.

### **30 DTR and RTM**

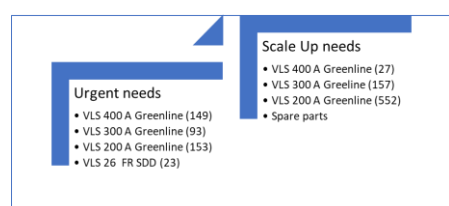
All new CCEOP procured equipment will be bundled with 30 DTR which will be sufficient for 3 years cycle. For remaining existing units and refurbishing after 3 years country will use national budget from 2021 onwards.

### Voltage stabilizers

All new CCEOP procured equipment will be bundled with voltage regulator. For existing needs (400 electric refrigerators that will remain after rehabilitation), if any further needs rises country will use its national budget for procurement of voltage stabilizers.

### Overall needs (covered by CCEOP application)

The overall cold chain equipment requirement sums up to 1222 units of refrigerators. Figure below sums up the requirement.



Supply chain levels	Model	Urgent needs 2019			Scale up needs 2020		Total
		Priority 1: replacement of non-functioning	Priority 2: Expansion of additional cold chain capacity	Priority 3: Extension of cold chain equipment in new sites	Rehabilitation of cold chain equipment		
Province	VLS 400A Greenline	43	106		27	176	
District	VLS 300A Greenline	29	51	13	157	250	
Service delivery	VLS 200A Greenline	91		62	552	705	
Service delivery	VLS 026 FR SDD	23			68	91	
	Total	186	157	75	804	1222	

### Overall rehabilitation plan needs (including source of funding)

As a part of overall rehabilitation NIP will also procure few things like domestic freezers for making ice packs at province and district level (and health centers if needed). It will also procure from national budget the RTM for tracking the cold room temperature (Cold-Trace for now as it integrates with national CCIS database.) The NIP will procure domestic freezers for making ice packs at all levels with grid equipment. Figure below sums up the overall requirements and source of funding.

Description	Model	Cost per unit	Service bundle cost per unit	Number of units	Total Cost	Source of fund
<b>1. Procurement of cold chain equipment</b>						
<b>Province level</b>						
Rehabilitation of refrigerators	VLS 400 A Greenline	\$ 1,224.16	\$ 400	70	\$ 113,691	CCEOP
Extension of refrigerators to new sites	VLS 400 A Greenline	\$ 1,224	\$ 400	0	\$ -	CCEOP
Expansion of present cold chain capacity	VLS 400 A Greenline	\$ 1,224	\$ 400	106	\$ 172,161	CCEOP
Additional domestic freezers for Ice pack		\$ 200		36	\$ 7,200	NIP
Total province level					\$ 293,052	
<b>District level</b>						
Rehabilitation of refrigerators	VLS 300 A Greenline	\$ 1,019	\$ 400	186	\$ 263,971	CCEOP
Extension of refrigerators to new sites	VLS 300 A Greenline	\$ 1,019	\$ 400	13	\$ 18,450	CCEOP
Expansion of present cold chain capacity	VLS 300 A Greenline	\$ 1,019	\$ 400	51	\$ 72,379	CCEOP
Additional domestic freezers for Ice pack		\$ 200		148	\$ 29,600	NIP
Total district level					\$ 384,400	
<b>Service delivery level</b>						
Rehabilitation of Electric refrigerators	VLS 200 A Greenline	\$ 848	\$ 400	643	\$ 802,361	CCEOP
Rehabilitation of sites with no electricity (solar)	VLS 26 FR SDD	\$ 5,096	\$ 650	91	\$ 522,886	CCEOP
Additional domestic freezers for Ice pack		\$ 200		705	\$ 141,000	NIP
Extension of Electric refrigerators to new sites	VLS 200 A Greenline	\$ 848	\$ 400	62	\$ 77,366	CCEOP
Expansion of present cold chain capacity	VLS 200 A Greenline	\$ 848	\$ 400	0	\$ -	CCEOP
Total service delivery level					\$ 1,543,613	
<b>2. Procurement of other supplies</b>						
30 DTR for existing refrigerators		\$ 80		500	\$ 40,000	UNICEF
Spare parts for existing and new cold chain equipment					\$ 337,020	CCEOP
Voltage regulators for existing refrigerators		\$ 100		200	\$ 20,000	NIP
RTM for existing and new refrigerators		\$ 350		5	\$ 1,750	NIP
Total for other supplies					\$ 398,770	
<b>Grand total procurement for rehabilitation, extension and expansion of cold chain</b>					<b>\$ 2,619,835</b>	

**6. Expected immunisation coverage, equity and sustainability results (Maximum 2 pages) Please respond to all questions**

**Countries are encouraged to cross reference (document title, page number) attached mandatory documents.**

*Information is required to cover the following areas:*

- a) *How will the requested Platform support concretely contribute to addressing identified geographic and socio-economic inequities and gender barriers to sustainable improvements in coverage and equity of immunisation? Examples may include (not exhaustive):*
  - *Geographically remote districts or those with low coverage*
  - *Poorer communities (e.g. in the poorest 10% of the population)*
  - *Communities where gender barriers are significant and/or where low levels of female education is common (as this is often associated with lower coverage)*
- b) *What analyses have been made, or what plans are underway, to optimise the design of the supply chain distribution system in order to improve the efficiency of the supply chain and contribute to achieving coverage and equity goals?*
- c) *How have these system design considerations impacted the choice of CCE to be supported by the Platform?*
- d) *Concretely, how will Platform support help improve the sustainability of the supply chain system?*

The results of Lao PDR Social Indicator Survey (LSIS-II) 2017-2018 showed that important progress has been made in reducing under five mortality, which currently stands at 46 per 1,000 live births infant mortality 40 deaths per 1000 live births. Full immunization coverage has increased from 34 per cent in 2011 to 40% in 2017. Unfortunately, gains are uneven. Children in hard-to-reach areas, from poor backgrounds and those who belong to ethnic groups are lagging. However, more efforts are required to improve vaccination coverage for all the vaccines, which is still below the target of 90 per cent.

Immunization coverage in 2017 did not vary by children's sex, however, a wide degree of variation was observed across the country by province; the LSIS II results show the lowest DPT3 coverage of 22,4% in Xaysomboun province and the highest coverage 84.1% in Bolikhamxay province.

The National Health Sector Reform has identified a few challenges in equitable health care delivery, but geographic access remains one of the major determinants of health and immunization service delivery. Health facilities are very far from farming communities, poor information on immunization resulted in vaccination hesitancy in these communities.

Equitable geographical distribution of the health staff is one of the major challenges faced by the immunization program to achieve the expected coverage rates. Health workers often have little motivation to remain in remote areas due to difficult socio-economic conditions; resulting in reported shortage of health personnel at the district and health center levels. This is one of the major challenges in service delivery to the population in remote and hard-to-reach areas. (EPI review)

There is also an acknowledged difficulty of immunization service delivery in certain urban areas, with a substantial migration to and from neighbouring countries such as Thailand, Vietnam and China fluctuating denominators compounding data quality challenges in the country.

These immunization inequalities point to supply side bottlenecks and the CCE platform will greatly reduce some of these gaps and optimize immunization service delivery in the country. In addition, the highest political levels have embraced full implementation of integrated MCH, EPI and nutrition outreach services with community participation to remote and hard to access populations who are mainly peasant farmers.

**a) How will the requested platform support contribute to addressing geographic and socio economic inequities and gender barriers to sustain improvements in coverage and equity of immunization?**

- Lao PDR needs to expand the cold chain especially at sub national level to provide immunization services to remote areas and to ethnic minority populations. Based on MOH **Policy** of installing refrigerators (1 refrigerator per health center that caters for population of 3000-5000 persons). The country faces challenges of geographical access of health facilities of sparsely populated communities in mountainous regions. This policy is in line with UN Sustainable Development Goals of increasing universal coverage through improving the health services delivery at health centers and reducing the number of outreach services which has high operational costs.
- In all poor performing districts with immunization coverage < 80%; old poorly maintained and non-functional refrigerators will be replaced for equitable availability of vaccines. The CCEOP will support Lao PDR address these district inequities.

**b) What analyses have been made to or what plans are underway to optimize the design of the supply chain distribution system to improve the efficiency of the supply chain and contribute to achieving coverage and equity goals?**

- In Lao PDR presently there is only one team of technicians at national level responsible for repairs of refrigerators that are broken down at health facility of district levels. Repairs may not be affected as needed resulting in cold chain capacity problems. Alternatively, this increases vaccination outreach areas and cost of vaccinating all children in such areas. Lao PDR designs a supply chain distribution system that will optimize vaccine supply at sub national level by:
  1. Reduce number of outreach services and increase fixed vaccination sites by provision of new refrigerators and replacement obsolete and non-repairable cold chain equipment
  2. Use appropriate vehicles to transport vaccines from district warehouses to health center especially mountainous rural areas in the northern part of the country.
  3. Use freeze indicators in transporting vaccines from one warehouse to another warehouse.

**c) How have these system design considerations impacted the choice of CCE to be supported by the Platform?**

The selection of grid-based equipment is supported by availability of reliable power source the national grid in most areas of more than 8 hours power supply per day in the country.

The selection of Solar Direct drive to most Rural and remote communities will benefit from alternative power sources like solar power.

The equipment selected that has enough capacity for storage of current volume of vaccines and new vaccines to be introduced.

Replacement of old equipment more than 10 years that are either obsolete or non-repairable.

**d) Concretely, how will Platform support help improve the sustainability of the supply chain system?**

- Increase the capacity of vaccine storage at all supply chain levels of the health system: provincial, District and health facility levels
- Increase cold chain capacity to reach every child in hard to reach rural communities' potent vaccines
- Introduction of more efficient and technologically improved cold chain equipment for storage of vaccines at recommended temperatures.
- Reduce the cost of highly frequent outreach services or delivery of vaccines to areas without CCE.
- Decrease cost of repairing old CCE.

**7. Maintenance plan (and its source of funding) and equipment disposal (Maximum 2 pages) Please respond to all questions**

**Countries are encouraged to cross reference (document title, page number) attached mandatory documents.**

*Information is required to cover the following areas:*

- a) *How will the country ensure that aspects of maintaining the cold chain are addressed (e.g. preventive and corrective maintenance, monitoring functionality, technicians, financing for maintenance, etc.)?*
  - *What is the frequency of preventive and corrective maintenance that the country commits to (supported by partners)?*
  - *What technical support is anticipated for maintenance?*
- b) *How will the country monitor the completion of preventive and corrective maintenance?*
  - *Which source(s) of funding will be used for maintenance, and to what extent are they assured?*
- c) *How will the country dispose of obsolete and irreparable equipment replaced by CCE Optimisation Platform equipment?*

The National Immunization Program currently employs two people at national level to oversee the maintenance of CCE across the 18 provinces. These resources are deployed to provinces on an as needed basis and also collaborate with NIP or MPSC counterparts at

the provincial level to support preventive and corrective maintenance. NIP staff at the district level (Biomedical engineers) also engage to provide required maintenance at health facilities.

The preventive maintenance is done by healthcare workers at all the cold chain points including cleaning of panels, defrosting of refrigerators and cleaning the refrigerators periodically (twice monthly).

For curative maintenance, it is currently managed by a national team but there are approved plans of creating five maintenance hubs in the country with two technicians each.

The country will introduce few important policies (see document 11 Maintenance plan page 12) to guide, monitor and enforce the improvements in cold chain functionality and accountability of maintenance teams. Some of the important policies that the country will enforce are:

- Reporting time policy: The reporting time for cold chain equipment failure should be 24 hours from time of failure. Any delay in reporting through the application or by other means should be considered a failure at the health worker's end
- Response time policy: The response time policy should indicate that equipment should be attended within 7 days of reporting. Stringent action should be taken against the maintenance team for any delay in attending to the cold chain equipment diagnosis or repair.
- The downtime policy: The downtime policy indicates that the equipment should be repaired within 15 days of reporting the failure or declared as non-repairable by the maintenance team
- Sickness rate policy: The sickness rate of cold chain equipment policy indicates maximum rate of non-functional equipment at any given point of time should not exceed 10% of total inventory. This is applicable for both national and state levels.

In addition to this, country piloted the Cold Chain Information System in 2015 and plans to scale it up by 2021 such that it connected the health workers via an android based application to DHIS-2 based database as a part of e-Health strategy. The application allows health workers to report on equipment failure on real time basis and SMS based system will inform the technician to take the timely call.

The country plans to introduce two key indicators for monitoring performance of cold chain equipment and effectiveness of maintenance plan. These are:

- % of equipment, non-functional at any given point of time (sickness rate)
- % of equipment failures per year

Country can track the performance of various models with these 2 indicators and finalize the procurement in future and can track the performance of cold chain maintenance team and take future course of action

**Maintenance financing:** Lao PDR has budgeted a total of \$181,740 as maintenance budget in cMYP (refer to table 22 in CMYP). the maintenance costs for 2019 maintenance plan is \$367,648. The gaps shall be addressed by HSS funds.



Cost item number	Costing head	Unit cost	Total units	Annual costs (in USD)	Funding source
	<b>Cold room budget</b>				
1	government expenditure on cold room maintenad	\$ 20,000	1	\$ 20,000	Government
	<b>Cold chain equipment maintenance budget</b>				
2	National budget for cold chain equipment mainte	\$ 62,500	1	\$ 62,500	Government
	<b>Cold chain equipment maintenance budget</b>				
3	Spare parts for cold rooms and cold chain equipm	\$ 25,000	1	\$ 25,000	Government
	<b>Direct expenses</b>				
4	Travel expenses of technicians			\$ 32,648	Government
5	DSA of technician	\$ 31	240	\$ 7,500	Government
	<b>CCIS</b>				
6	DHIS - 2 development cost application module	\$ 150,000	1	\$ 150,000	HSS
7	Mobile application development	\$ 10,000	1	\$ 10,000	HSS
8	Training cost per HW	\$ 25	2000	\$ 50,000	HSS
9	Monthly toll free number for SMS	\$ 500	12	\$ 6,000	HSS
10	Memory chip for sharing application with HW	\$ 2	2000	\$ 4,000	HSS
				<b>\$ 367,648</b>	

**Disposal of cold chain equipment:** The country plans to form a committee at province level with members from MOH, NIP, MPSC, and partner organization and national cold chain technician to take a call and methods on disposal of obsolete and non-functioning units. The committee will approve the auction of these equipment at province level with special care of retrieving the refrigerant from units when these are further taken for condemnation.

**Technical assistance needs:** Country needs technical assistance in designing the maintenance hubs and providing technical support in setting up the maintenance hubs. Also needed for training of additional cold chain technicians to be recruited.

**8. Other implementation details (Maximum 1 page) Please respond to all questions Countries are encouraged to cross reference (document title, page number) attached mandatory documents.**

*Information is required to cover the following areas:*

- How will the country facilitate the manufacturer's or representative's role in equipment purchase, distribution and installation?*
- What is the source of the joint investment? Is the country's joint investment secured?*
- Has the country secured import tariff exemptions for CCE? If yes, attach proof.*

The cold chain equipment as part of CCEOP proposal shall be procured through the UNICEF supply division. The UNICEF supply division will provide the cost estimates and country government will deposit the 50% of Co-financing to unicef supply division and other 50% is expected from GAVI.

With the experience of trying outsourcing the maintenance and efforts to find the private company for installation of cold chain equipment, the NIP could not sufficiently identify such organization or companies in the country. Therefore, government of Lao PDR is recommending to use the cold chain technician network (2 national plus 10 additional sub national hub technicians) at the time of deployment to install the equipment as a part of service bundle. Country would appreciate that manufacturer of CCE is involved in training the cold chain technicians in the country for efficient and successful installations.

The joint investment will be sourced from ongoing HSS project.


All the supplies procured by NIP for immunization program are exempted of import taxes. The proposal includes a document as evidence of same.





## 4. PART D: INITIAL SUPPORT PHASE

This **initial support phase** (through years 1 and 2) is designed to address urgent CCE needs contributing to improvements in coverage and equity, to protect vaccine stocks, complement investments in other supply chain ‘fundamentals’ and contribute to full scale-up of optimised, sustainable supply chains.

	Budgets are <b>not inclusive</b> of operational cost. Operational costs must be financed by Ministry of Health or other partners.
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	Further information on CCE rehabilitation and expansion plan, equipment selection and strategic deployment plan requirements is provided in Application guidelines Section 5, available at <a href="http://www.gavi.org/support/process/apply/cceop/">http://www.gavi.org/support/process/apply/cceop/</a>
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### 9. Prioritised (Urgent) CCE needs (Maximum 3 pages)

Provide information on **2 to 4 prioritised (urgent) CCE needs** as identified in the ‘CCE rehabilitation and expansion plan, equipment selection and strategic deployment plan requirements’.

For each prioritised (urgent) CCE need, please provide the following information:

1. **The need:** Type of activity (e.g. replace obsolete CCE, extend CCE to unequipped facilities, etc.); specific CCE site (facility); type of equipment required; quantity of equipment items.
2. **Justification:** Reasons for urgent need (e.g. low CCE and/or immunisation (Penta3) coverage area, gender barriers, mobile population, etc.); current CCE and immunisation (Penta3) coverage in the population area.
3. **Expected outcome:** Anticipated increase in CCE and immunisation coverage (Penta3); anticipated progress against identified inequity (describe, in alignment with country Performance framework).
4. **Total CCE budget:** includes Gavi and country joint investment share

#### Prioritised (Urgent) CCE Need #1

<b>The need</b>	The first pressing needs are replacement of non-functioning units in the country. These are at province level (43), district level (29), service delivery level (91) electric and solar (23) for sites with poor electricity
<b>Justification</b>	These units are beyond repair and their proper functioning is critical to ensuring the maximum coverage and equity in their catchment areas.
<b>Expected outcome</b>	Vaccines kept under proper storage conditions assures the potency of the vaccines; improved coverage due to availability of potent vaccine.
<b>Total budget</b>	<b>CCE</b> \$356,709 (including service delivery)

#### Prioritised (Urgent) CCE Need #2

<b>The need</b>	Expansion of additional cold chain capacity in response to new vaccine introduction and increased capacity needs for population projections.
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<b>Justification</b>	Rota and HPV are planned to be introduced in 2019. Cold chain gap analysis has shown the needs at provincial level are (106 refrigerators) and district level (51) refrigerators totalling of 157 refrigerators.	
<b>Expected outcome</b>	Increased cold chain capacities to accommodate the new vaccine and accounts for population growth	
<b>Total budget</b>	<b>CCE</b>	\$244,513 (including service bundle)
<b><i>Prioritised (Urgent) CCE Need #3</i></b>		
<b>The need</b>	Extension of cold chain equipment to 62 new sites or the sites without cold chain equipment at present	
<b>Justification</b>	As large proportion of Lao population is based in rural and hard to reach settings cold chain expansion to currently CCE unequipped health facilities is imperative to improve the equity in immunization services. Many of these facilities are near international borders and will allow immunization services to be delivered to mobile populations.	
<b>Expected outcome</b>	Improved equity among traditionally marginalized populations including ethnic groups	
<b>Total budget</b>	<b>CCE</b>	\$95,823 (including service delivery)
<b><i>Prioritised (Urgent) CCE Need #4</i></b>		
<b>The need</b>		
<b>Justification</b>		
<b>Expected outcome</b>		
<b>Total budget</b>	<b>CCE</b>	
<b>GRAND TOTAL CCE BUDGET: support (Years 1 and 2 )</b>	<b>Initial</b>	\$697,063

### 10. Summary of INITIAL SUPPORT PHASE replacement/rehabilitation, expansion and extension plan

*All countries must fill this section to highlight the number of equipment and corresponding number of sites these equipment will serve to meet their replacement/rehabilitation, expansion and extension targets. The values entered below must align with those in Section 9 above and in other parts of the application form.*

<b>Replacement/Rehabilitation</b>		<b>Expansion</b>	<b>Extension</b>
Existing sites with (non)functional and/or obsolete non-PQS equipment to be replaced with	Existing sites with (non)functional and/or obsolete PQS equipment to be replaced with platform-	Equipping existing sites with ADDITIONAL pieces of equipment for new vaccine introduction	Equipping previously unequipped sites (providing immunisation services or not, including existing sites without

platform-eligible ILR, SDD or long-term passive devices (including equipping sites with a larger equipment)		eligible ILR, SDD or long-term passive devices (including equipping sites with a larger equipment)		and/or to serve an increasing population		active devices) and add new service sites	
<i>No of Equipment</i>	<i>No of sites</i>	<i>No of Equipment</i>	<i>No of sites</i>	<i>No of Equipment</i>	<i>No of sites</i>	<i>No of Equipment</i>	<i>No of sites</i>
186	142			157	63	75	69 <sup>5</sup>
<b>Total</b>	<b>Total</b>	<b>Total</b>	<b>Total</b>	<b>Total</b>	<b>Total</b>	<b>Total</b>	<b>Total</b>

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<sup>5</sup> 62 Health centers and 7 newly created districts in 4 provinces

**11. Ongoing or planned activities around other supply chain fundamentals in the initial support phase**

*In this section, linkages must be drawn between requested CCE Optimisation Platform support, on-going Gavi investments (especially through the Health Systems Strengthening support) and other partner supply chain support.*

*Describe planned or ongoing activities related to other supply chain fundamentals during the initial support phase, including their sources of funding. Responses to this section should be linked to the EVM Improvement Plan.*

**Supply chain managers**

*Describe all planned or ongoing activities related to improving the availability and performance of supply chain managers, their sources of funding, and partner support.*

1. Recruitment of qualified staff to remote areas (at health center level) with provided incentives and regular training addressing the major challenge of human resources. (source of fund government)
2. Provide job aids for vaccine management and cold chain maintenance (NIP with financial and technical support from UNICEF)
3. Supportive supervision to be strengthen by partner support and improved monitoring
4. Implementation of cold chain Regional maintenance hubs (source of fund GAVI HSS)
5. Conduct nationwide EVM assessment and prepare comprehensive improvement plan (GAVI funded)

**Data for supply chain management**

*Describe all planned or ongoing activities related to data for management, their sources of funding, and partner support. In particular, provide information explaining how improvements to the functionality of logistics management systems will improve the visibility of up-to-date and accurate vaccine stock records at each level of the vaccine supply chain.*

1. BMGF has provided a grant to CHAI to support the expansion of mSupply to include the immunization commodities. The total budget for the supply chain component of the work is about \$240,000 over three years, including funds for:
  - Consultation workshops and planning meetings (NIP government funds)
  - mSupply Software licenses, and any customization necessary to accommodate

	<ul style="list-style-type: none"> <li>- Laptops for up to 20 distribution points (provincial) World bank funded</li> <li>- Training and follow up for relevant staff (World bank funded)</li> <li>- Targeted support to two focal provinces.</li> <li>- For improvement of stock management at national and sub national level NIP is adopting the vaccine visibility tool (VIVA designed by UNICEF). This is currently being implemented.</li> </ul>
<p><b>Optimised, efficient design of distribution system</b></p> <p><i>Describe all planned or ongoing activities related to distribution system design optimisation, their sources of funding, and partner support.</i></p>	<p>The national NIP designs and implements the distribution plan with source of funds coming from HSS till 2020. Post 2020 this will be sourced from government funds. The plans for distribution will be decentralized from 2019 onwards such that each province will plan and implement their own distributions. This will bring in the optimization of timely supply of vaccine at province and lower levels. Also implementation of VIVA tool will improve the stock management and hence support timely distribution of vaccines and supplies. The vaccine distribution will be on requisition system (pull system) at lower levels of supply chain.</p>
<p><b>Continuous improvement process</b></p> <p><i>Describe all planned or ongoing activities related to continuous improvement processes, their sources of funding, and partner support.</i></p>	<p>WHO has deployed 11 STOP (Stop Transmission of Polio) consultants and Lao program assistants in provinces to strengthen overall immunization practices in vaccine and cold chain management</p>
<p><b>Temperature monitoring</b></p> <p><i>Describe the temperature monitoring devices that are currently available in the country? E.g. central level (CTMS), sub-national, lowest distribution and service delivery levels (30 DTRs and RTM devices), and during transportation (freeze tags). <u>Furthermore, describe which measures are in place to a) obtain temperature data from the various devices;</u></i></p>	<p>The country will improve the temperature monitoring through 30 DTR implementation nationwide and training of health workers in reading and taking action on fridge preventive maintenance as part of CCIS implementation.</p> <p>This will be jointly funded by GAVI HSS, government and UNICEF</p>



*b) act following temperature alarms (curative maintenance);*

*c) in case of RTM devices, please elaborate on SOPs for each responder in the temperature monitoring system; and*

*d) countries wishing to purchase such devices are required to demonstrate how the recurrent costs, such as HR, data transmission, analysis etc., will be covered in this section.*

Country will also scale of RTM for monitoring of cold rooms temperatures remotely and implementation of alarms system. Source of funds (GAVI HSS). The RTM have already been procured by government and awaiting installation.

The NIP will develop the job aid on SOP of how to address the RTM alarms and train the cold room staff on taking timely actions.


The temperature data from supply chain levels shall be centrally collected on DHIS-2 server sent by SMS through a mobile phone application in terms of number of alarms occurred monthly as well as any freezing instances on SOS basis.

The CCIS system will channel the information on equipment performance to its associated cold chain technician who will take the timely action with given information.

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## 5. PART E: SCALE-UP SUPPORT PHASE

This second phase of Gavi CCE Optimisation Platform support (provided from approximately year 3 onwards) is designed to address additional CCE needs as part of optimising design and increasing the sustainability of the supply chain.

	<p>Budgets are <b>not inclusive</b> of operational cost. Operational costs must be financed by Ministry of Health or other partners.</p>
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### 12. Prioritised (Additional) CCE needs (Maximum 3 pages)

Provide information on **2 to 4 prioritised (additional) CCE needs** as identified in the 'CCE rehabilitation and expansion plan, equipment selection and strategic deployment plan requirements'.

For each prioritised (additional) CCE need, please provide the following information:

1. **The need:** Type of activity (e.g. replace obsolete CCE, extend CCE to unequipped facilities, etc.); specific CCE site (facility); type of equipment required; quantity of equipment items.
2. **Justification:** Reasons for urgent need (e.g. low CCE and/or immunisation (Penta3) coverage area, gender barriers, mobile population, etc.); current CCE and immunisation (Penta3) coverage in the population area.
3. **Expected outcome:** Anticipated increase in CCE and immunisation coverage (Penta3); anticipated progress against identified inequity (describe, in alignment with country Performance framework).
4. **Total CCE budget:** includes Gavi and country joint investment share

#### Prioritised (Additional) CCE Need #1

<b>The need</b>	The replacement of all aged (equipment that served more than 10 years) in the country
<b>Justification</b>	These units are expensive to maintain and not reliable (not guaranteed against freezing) and frequent breakdown causes disruption in immunization services and damage the quality of vaccine
<b>Expected outcome</b>	Freeze free vaccine guarantee from Grade A equipment and lower maintenance costs. 10 years of uninterrupted services assured.
<b>Total budget</b>	<b>CCE</b> \$1,346,255 + 337,020 (spare parts) (including service bundle)

#### Prioritised (Additional) CCE Need #2

<b>The need</b>	
<b>Justification</b>	
<b>Expected outcome</b>	
<b>Total budget</b>	<b>CCE</b>



<b>Prioritised (Additional) CCE Need #3</b>	
<b>The need</b>	
<b>Justification</b>	
<b>Expected outcome</b>	
<b>Total budget</b>	<b>CCE</b>
<b>Prioritised (Additional) CCE Need #4</b>	
<b>The need</b>	
<b>Justification</b>	
<b>Expected outcome</b>	
<b>Total budget</b>	<b>CCE</b>
<b>GRAND TOTAL CCE BUDGET: "Scale-up support" (Years 3, 4 &amp; 5 )</b>	1,683,222

### 13. Summary of SCALE-UP SUPPORT PHASE replacement/rehabilitation, expansion and extension plan

All countries must fill this section to highlight the number of equipment and corresponding number of sites these equipment will serve to meet their replacement/rehabilitation, expansion and extension targets. The values entered below must align with those in Section 9 above and in other parts of the application form.

<b>Replacement/Rehabilitation</b>		<b>Expansion</b>		<b>Extension</b>			
Existing sites with (non)functional and/or obsolete non-PQS equipment to be replaced with platform-eligible ILR, SDD or long-term passive devices (including equipping sites with a larger equipment)		Existing sites with (non)functional and/or obsolete PQS equipment to be replaced with platform-eligible ILR, SDD or long-term passive devices (including equipping sites with a larger equipment)		Equipping existing sites with ADDITIONAL pieces of equipment for new vaccine introduction and/or to serve an increasing population		Equipping previously unequipped sites (providing immunisation services or not, including existing sites without active devices) and add new service sites	
<i>No of Equipment</i>	<i>No of sites</i>	<i>No of Equipment</i>	<i>No of sites</i>	<i>No of Equipment</i>	<i>No of sites</i>	<i>No of Equipment</i>	<i>No of sites</i>
804	732						
<b>Total</b>	<b>Total</b>	<b>Total</b>	<b>Total</b>	<b>Total</b>	<b>Total</b>	<b>Total</b>	<b>Total</b>

## 14. Ongoing or planned activities around other supply chain fundamentals in the scale-up support phase

*In this section, linkages must be drawn between requested CCE Optimisation Platform support, on-going Gavi investments (especially through the Health Systems Strengthening support) and other partner supply chain support.*

*Describe planned or ongoing activities related to other supply chain fundamentals during the scale-up support phase, including their sources of funding. Responses to this section should be linked to the EVM Improvement Plan.*

<p><b>Supply chain managers</b></p> <p><i>Describe all planned or ongoing activities related to improving the availability and performance of supply chain managers, their sources of funding, and partner support.</i></p>	<p>The NIP plans to establish and scale up of and five maintenance cold chain hubs during this phase of CCEOP implementation. Source of funds (world bank)</p> <p>Continued support to EPI manager training certifying 50 EPI managers per year (world bank funded and GAVI HSS)</p>
<p><b>Data for supply chain management</b></p> <p><i>Describe all planned or ongoing activities related to data for management, their sources of funding, and partner support. In particular, provide information explaining how improvements to the functionality of logistics management systems will improve the visibility of up-to-date and accurate vaccine stock records at each level of the vaccine supply chain.</i></p>	<p>Continuous implementation of mSupply to track EPI commodities and prevent stock outs. Source of funds (WHO)</p> <p>Continuous implementation of VIVA at sub national level for improved stock management and distribution</p>
<p><b>Optimised, efficient design of distribution system</b></p> <p><i>Describe all planned or ongoing activities related to distribution system design optimisation, their sources of funding, and partner support.</i></p>	<p>Strengthening distribution by providing 60 motorcycle a year through UNICEF procurement services using GAVI funds.</p> <p>Procurement of 16 vaccine cars equipped with fridges (4 per year), 10 light trucks (5 in the first year and 5 in the second year) source of funds (GAVI HSS)</p>
<p><b>Continuous improvement process</b></p> <p><i>Describe all planned or ongoing activities related to continuous improvement processes, their sources of funding, and partner support.</i></p>	<p>Using data from mSupply and DHIS-2 to identify weak districts needing support in strengthening the vaccine and cold chain management (source of funds WHO)</p>
<p><b>Temperature monitoring</b></p> <p><i>Describe how the temperature monitoring system will evolve? Which devices will be used?</i></p>	<p>CCIS will be scaled up to gather the alarms (or no alarms) from 30 DTR and information will populate the DHIS-2 data and help NIP to better monitor and control</p>

Furthermore, describe which measures are in place to

*a) obtain temperature data from the various devices;*

*b) act following temperature alarms (curative maintenance);*

*c) in case of RTM devices, please elaborate on SOPs for each responder in the temperature monitoring system; and*

*d) countries wishing to purchase such devices are required to demonstrate how the recurrent costs, such as HR, data transmission, analysis etc., will be covered in this section.*

the performance of cold chain equipment. Source of funds (GAVI HSS and UNICEF)

In case of alarms the alarms will be sent by health workers from their mobile phones using an application and alarms will be addressed by the responsible cold chain technician.

## 6. PART F: BUDGET TEMPLATES

This section details the number of requested equipment items and equivalent budget. A maximum investment amount (and indicative number of equipment items) corresponding to the phased support request will be considered for recommendation of approval by the IRC and subsequent decision by Gavi.

However, in consultation with the Secretariat and in-country partners, the number of equipment items may be modified when the detailed operational plan is developed subsequent to the Platform proposal and the support may vary within the limit of the approved maximum amount.

Budgets must be completed in the attached budget template, and with reference to the **CCE Optimisation Platform Guidelines, Gavi CCE Optimisation Platform Technology Guide and CCE planning prices and Total Cost of Ownership (TCO) analysis tool**.

### 15. CCE Optimisation Platform - Budget Template

*To be filled by **ALL** countries after selection of equipment that best suit their CCE needs (e.g. specific model and make).*

*Countries will plan with indicative PQS prices and corresponding service bundle estimates (depending on equipment being on/off-grid and estimated costs of service bundle).*

*Planning price ranges are provided in this template.*

*How to fill the attached budget template: Countries should:*

- *Select appropriate 'Equipment Model' against the listed equipment types*
- *Fill out the 'Estimated service bundle cost' and 'Number of equipment' requested*
- *(In the last 'Total CCE OP Request' table), fill out second and third preference for each model selected. The second and third preference should be comparable products in the same capacity segment. **Countries are informed that Gavi, and its Alliance partners principally UNICEF, will try as much as possible to respond to countries' first preference, but manufacturers' lead time could also lead to countries receiving cost estimates for either their second or third preference.***

**Completed budget template should be sent as an attachment along with application form.**

#### **Budgeting for Buffer and Procurement fees**

- ***Buffer fees:** A 7% buffer on **total equipment cost** is built into country yearly budgets. This will cover currency variations, demurrage and associated costs and will be returned to country, if unused.*
- ***Procurement fees:** Countries will also need to **pay UNICEF's procurement costs for the country joint investment portion**, estimated to be up to 8.5%. Please obtain actual amounts from the UNICEF country office.*



## 7. PART G: PERFORMANCE FRAMEWORK

Countries must include **CCE Optimisation Platform indicators** in the application. The indicators need to be included in the Performance Framework for the current and/or proposed Gavi HSS support, after Platform proposal approval.

According to their specific context, countries are required to consider the most appropriate data sources to report on programme implementation and progress against the targets set. This should be discussed with partners (which may provide technical assistance) and the Gavi Secretariat.

Programmatic reporting updates, as well as targets and indicator updates, will be made as part of the Gavi performance framework and annual Joint Appraisal process. Countries are expected to consider relevant smart indicators to be monitored and reported against, in terms of intermediate results or outcomes/impact.

### 16. Indicator monitoring and reporting requirements

As a **minimum**, countries need to monitor and report on:

- **5 MANDATORY intermediate results indicators;**
- **1 MANDATORY intermediate result indicators if countries are procuring User independent freeze protected cold boxes and vaccine carriers; and**
- **1 to 3 ADDITIONAL intermediate results indicator(s).**

- 1) **CCE Replacement/Rehabilitation in existing equipped sites:** Percentage of existing sites with (non)functional and/or obsolete non-PQS and PQS equipment to be replaced with platform-eligible ILR, SDD or long-term passive devices (including equipping sites with a larger equipment)
- 2) **CCE Expansion in existing sites:** Percentage of existing sites being equipped with ADDITIONAL pieces of equipment for new vaccine introduction and/or to serve an increasing population;
3. **CCE Extension in unequipped existing and in new sites:** Percentage of previously unequipped sites (providing immunisation services or not, including existing sites without active devices) and new service sites being equipped with Platform eligible equipment.

**4. CCE maintenance** : Well-defined indicator proposed by country to reflect appropriate maintenance of equipment; for example percentage of equipped facilities with functioning cold chain,<sup>6</sup> such as demonstrated by remote temperature monitoring; **and**

3) **5. Freeze-free to non-freeze-free carrier ratio**: Ratio of freeze-free cold boxes/carriers to non-freeze-free cold boxes/carriers in-country?

**USE THE TABLE BELOW TO COMPLETE MANDATORY INDICATORS**

<b>Indicator</b> <i>(Provide name of the mandatory indicator as shown above)</i>	<b>Definition</b> <i>(Provide definition if not already specified)</i>	<b>Data Source</b> <i>(identify data source)</i>	<b>Reporting frequency</b> <i>(annual, semi-annual, quarterly etc.)</i>	<b>Baseline (Year)</b> <i>(Provide numerator and denominator for calculating percentage)</i>	<b>Target Year 1</b> <i>(Provide numerator and denominator for calculating percentage)</i>	<b>Target Year 2</b> <i>(Provide numerator and denominator for calculating percentage)</i>	<b>Target Year 3 (If applicable)</b> <i>(Provide numerator and denominator for calculating percentage)</i>
<b>1. CCE Replacement/rehabilitation in existing Equipped sites</b>	Percentage of existing sites with (non)functional and/or obsolete non-PQS and PQS equipment to be replaced with platform-eligible ILR, SDD or long-term passive devices (including equipping sites with a larger equipment)	National cold chain inventory	Annual	Numerator = 0 Denominator=990 Percentage=0%	Numerator = 186 Denominator=990 Percentage=19%	Numerator = 990 Denominator=990 Percentage=100%	
<b>2. CCE expansion in existing equipped sites:</b>	Percentage of existing sites being equipped with ADDITIONAL pieces of equipment for new vaccine introduction and/or to	National cold chain inventory	Annual	Numerator = 0 Denominator=157 Percentage=0%	Numerator = 157 Denominator= 157 Percentage= 100%		

<sup>6</sup> **Indicator definition:** % CCE functioning = (# functioning CCE devices) / (total # of CCE devices designated for use). CCE devices considered for this indicator include all refrigerators, fixed passive storage devices, walk-in cold rooms and freezers designated for string vaccines. Both the numerator and denominator should be collected from the same geographical area / period in time and should not include decommissioned equipment. Functionality of CCE is broadly defined to mean that the device is operable at a particular point in time for storing vaccine.

	<i>serve an increasing population;</i>						
<i>3. CCE extension in unequipped existing and/or new sites:</i>	<i>Percentage of previously unequipped sites (providing immunisation services or not, including existing sites without active devices) and new service sites being equipped with Platform eligible equipment.</i>	<i>National cold chain inventory</i>	<i>Annual</i>	<i>Numerator =0 Denominator=75 Percentage=0%</i>	<i>Numerator = 75 Denominator=75 Percentage=100%</i>		
<b>4. CCE maintenance</b>	<i>Percentage of equipment functional at any point of time</i>	<i>Cold chain inventory</i>	<i>Semi annual</i>	<i>Percentage = 89%</i>	<i>90+ %</i>	<i>90+ %</i>	
<b>. Freeze-free to non-freeze-free carrier ratio</b>	<i>Ratio of freeze-free cold boxes/carriers to non-freeze-free cold boxes/carriers in-country</i>						



**ADDITIONAL intermediate results indicator(s):** Countries are required to suggest 1 to 3 intermediate results indicators to track performance of rehabilitation, expansion, maintenance and/or other supply chain fundamentals (include baseline, data source, targets and frequency of reporting).

Options of additional intermediate results indicators options are:

1. **Functional status of cold chain equipment:** Ratio of functional CCE and ratio of districts with at least 90% functional equipment;
2. **Closed vial wastage:** Rate at a national, district and facility level;
3. **Forecasted demand ratio:** Ratio of actual usage compared to forecast (vaccines);
4. **Full stock availability:** Ratio of facilities/districts without any stock out;
  - a. *Stocked according to plan:* Percentage of facilities/stores/districts that have stocks levels between set minimum and maximum stock levels;
5. **Temperature alarms:** Frequency and magnitude of heat and cold alarms per monitoring period (i.e., temperature excursion) and number of CCE devices with more than a certain level of temperature excursion;
6. Rate of health facilities dashboard use, timely analysis and use for decision making;
7. **On-time and in-full (OTIF) delivery:** Ratio of order completely delivered on time; **or**
8. Number of health managers trained and despatched for supply chain oversight function and rate of reported monitoring activities.

### USE THE TABLE BELOW TO COMPLETE ADDITIONAL INDICATORS

<b>Indicator</b> <i>(Provide name of the additional indicators as shown above)</i>	<b>Definition</b> <i>(Provide definition if not already specified)</i>	<b>Data Source</b> <i>(identify data source)</i>	<b>Reporting frequency</b> <i>(annual, semi-annual, quarterly etc.)</i>	<b>Baseline (Year)</b> <i>(Provide numerator and denominator for calculating percentage)</i>	<b>Target Year 1</b> <i>(Provide numerator and denominator for calculating percentage)</i>	<b>Target Year 2</b> <i>(Provide numerator and denominator for calculating percentage)</i>	<b>Target Year 3 (If applicable)</b> <i>(Provide numerator and denominator for calculating percentage)</i>
1. Temperature alarms	Identification and reduction in temperature alarms using 30 DTR	30 DTR	quarterly	0%	10% reduction in alarms	20% reduction in alarms	
2.							
3.							

<i>Add more indicators HERE if needed.</i>							
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