Application Form for Cold Chain Equipment Optimisation Platform support in 2018

Document Dated: November 2017

CCE Application Form	**Purpose of this document:** This application form must be completed in order to apply for support related to the CCE Optimisation Platform. Applicants are required to read the **Application guidelines** and **How to request new Gavi support** documents. Thereafter, applicants should complete this CCE Application Form and submit by email to proposals@gavi.org.
CCE TG 	**Resources to support completing this application form:** **Technology guide for equipment selection** for counties wishing to request CCE Optimisation Platform support is available here: www.gavi.org/support/hss/cold-chain-equipment-optimisation-platform/ **Extensive technical resources** relating to vaccine cold chain equipment management are available on TechNet-21: www.technet-21.org/en/resources/cold-chain-equipment-management
Weblinks and contact information: All application documents are available on the Gavi Apply for Cold Chain Equipment support webpage: http://www.gavi.org/support/process/apply/cceop/. For any questions regarding the application guidelines please contact countryportal@gavi.org or your Gavi Senior Country Manager (SCM).	

	Countries are informed that based on post IRC recommendations, **final approved amounts may be different** from what countries have requested. **This final approved amount will be dependent on the availability of funding.** **Gavi will respect countries' equipment selection. However, countries could also receive their 2nd or 3rd preference based on their selection in the budget.**

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PART A: APPLICANT INFORMATION

1. Applicant information	
Country	**Ghana**
Date	25 January 2019
Contact name	Dr George Bonsu
Email address	**gybonsu@yahoo.com**
Phone number	**+233 24 4326637**
Total funding requested from CCE Optimisation Platform **(US $)**	*(This should correspond exactly to the budget requested in the embedded template)* **Gavi contribution: USD$ 2,369,171** **Government via Gavi HSS: USD$ 2,369,171 (ref.-** **Total: USD$ 4,738,341**
Does your country have an approved Gavi HSS support on-going?	Yes [X] No [ ] *Indicate the anticipated **final year** of the HSS: **2019***
Proposed CCE Optimisation Platform **support start date** *(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:* **January 2020**
Proposed CCE Optimisation Platform support end date:	*Indicate the month and year of the planned end date of the support, based on the strategic deployment plan:* **December 2022**
Signatures *Include signed (and official) CCE Optimisation Platform application endorsement by:* *a) Minister of Health and Minister of Finance (or delegated authorities)* *b) Members of the*	*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:* **Minister of Health (or delegated authority)** **Minister of Health (or delegated authority)** Name: **Hon. Kwaku Agyemang-Manu** Name: **Hon. Ken Ofori-Atta**

Coordination Forum (HSCC/ICC or equivalent body)	Signature:	Signature:
	te:	Date:

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 **mandatory**, must be **attached** to your application, and they must be **final** and **dated**. Only **complete applications** will be assessed.

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	No	NA	NA	Document signed by MoH. MoF attached
2	Minutes of the Coordination Forum meeting (ICC, HSCC or equivalent) endorsing the proposal[1]	Yes	29/08/17		Submission of CCEOP application has been endorsed (Attach new ICC minutes)
3	National Health Sector Development Plan/ Strategy (or similar)	Yes	Sept 2017	2018-2021	

[1] In the case of HSS and CCE Optimisation Platform requests, minutes must reflect that both were discussed and endorsed.

4	cMYP	Yes	August 2017	2015-2019	New cMYP in 2019
1a	Revised CCEOP Application				
1b	Signature sheet for the Minister of Health and Minister of Finance, or their delegates	No	NA	NA	Document signed by MoH. MoF attached
2	Minutes of the Coordination Forum meeting (ICC, HSCC or equivalent) endorsing the proposal[2]	Yes	29/08/17		Submission of CCEOP application has been endorsed (Attach new ICC minutes)
3	National Health Sector Development Plan/ Strategy (or similar)	Yes	Sept 2017	2018-2021	
4	cMYP	Yes	August 2017	2015-2019	New cMYP in 2019
5	EVM Assessment	Yes	October 2014		Attached
6	EVM Improvement Plan	Yes	October 2018		Attached
7	EVM Annual Workplan **and** Progress Report on EVM Improvement Plan[3]	Yes	October 2018		Attached
8	CCE Inventory Gap Analysis Tool	Yes	January 2019		Now Attached
9	GHA CC Inventory 2018 Report 190128	Yes	January 2019		Updated
10	GHA_CCEOP_Single _Document Chapter 4: Cold Chain Rehabilitation and Expansion Plan Chapter 8: Operational Deployment Plan, including deviation plan Chapter 9: Equipment Selection	Yes	January 2019		CC_Rehabilitation Updated
11	Cold Chain Equipment Preventive Maintenance plan-revised	Yes	January 2019		Revised attached
12	EPI Logistics Forecasting Tool	Yes	January 2019	2019-2024	Now Attached

[2] In the case of HSS and CCE Optimisation Platform requests, minutes must reflect that both were discussed and endorsed.

[3] The EVM IP and annual work plan progress report must have been updated within three (3) months before applying for Platform support.

13	Proof of status for CCE tariff exemptions waiver	Yes		Annual/ Renewable	Currently the exemption of 2018 is available.
14	Terms of Reference for the relevant Coordination Forum (such as ICC) including all sections outlined in Section 5.2 of the General Application Guidelines	Yes	May 2009		Attached
15	Minutes of the Coordination Forum meetings from the past 12 months before the proposal	Yes	29/08/17		Attached
16	Terms of Reference of the Logistics Working Group	Yes	2012		Attached
17	JRF_Ghana_2016 (add JRF_2017)	Yes	2016/2017		Attached
18	Data Quality Assessment Report	Yes	2016		Attached
19	Public Procurement Act	Yes	2003		Attached
20	Other relevant documents (GAVI HSS Plan)	Yes	2018		Attached
21	GDHS	Yes	2014		Attached
22	ICC members signature	Yes	2018		Attached
23	Re-aligned HSS Budget for CCEOP co-payment-2018	Yes	2018		Attached
24a	CCE OP Budget	Yes	2019		Updated
24b	Total Rehabilitation Budget	Yes	2019		Updated
25	Ghana_D4A_HealthFacilities & CCE inventory 5 SEPT 2018-for Gavi.xlsx	Yes	2018		Attached
26	Ghana Response to IRC Action Points	Yes	2019		Attached
27a	TAX EXEMPTION	Yes	2018		Attached
27b	EXEMPTION FROM PAYMENT OF DUTIES,TAXES,LEVIES AND FEES	Yes	2018		Attached
27c	EXEMPTION FROM PAYMENT OF DUTIES,TAXES,LEVIES AND FEES	Yes	2018		Attached

** NOTE: Current documents attached are in this colour

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.

Health Sector Plan 2018-2021-draft (Reference #3)

The programmes and activities of institutions within the Ministry of health are guided by Health Sector Medium Term Development Plan (HSMTDP). The current plan is a draft that was developed in 2017 and will be ending at the end of 2021. The Plan provides a framework for planning by Agencies and Stakeholders in the health sector. It is based on the National Medium Term Development Policy Framework (NMTDPF), which defines the medium term vision and development of the country.

The HSMTDP outlines the sector's contribution to government's development priorities and projections in the area of human development, productivity and employment. The immunization programme contributes to the government's poverty reduction and development agenda by decreasing the magnitude of vaccine-preventable diseases through immunization, which is an essential component of Primary Health Care.

Antigens	2013(%)	2014 (%)	2015 (%)	2016 (%)	2017(%)
Penta1	94	99	97	94	99
Penta3	90	98	88	93	99
OPV3	91	94	88	95	94
MCV-1	89	92	89	89	95

From the table above, the Expanded Programme on Immunization (EPI) has been making good strides in increasing immunization coverage. The Penta 3 coverage has increased from 94% in 2013 to 99% in 2017. Measles-Rubella 1 vaccination that is administered at 9 months has also increased from 89% in 2013 to 95% in 2017 (Ref. #Wuenic data- 2017).

The country is currently developing the next multi-year health sector development plan for the period 2018-2022. The important component under consideration includes;

- Health financing
- Sustainability plans
- Human resource development
- Expansion of Community-based health planning and services (CHPS). CHPS provides basic primary health care including immunization.

The current HSMTDP aims at bringing health care, especially primary health care, to the door step of the population through the CHPS concept. Till date, a number of CHPS compounds have been constructed without the requisite facilities to enable them to work optimally. Key constraint has been the lack of cold chain equipment (CCE).

cMYP 2015-2019 (Ref. #4)

This plan draws inspiration from the HSMTDP. The plan provides strategic direction for immunizations in the country. The goal of the current cMYP is to reduce morbidity, mortality and disability associated with vaccine preventable diseases through the provision of high quality immunization services. The objectives of the cMYP are;

1. Reach everyone targeted for immunization to achieve and sustain at least 95% coverage in all childhood immunizations and 85% for Tetanus-diphtheria (Td) for pregnant women by 2019
2. Improve communication, advocacy and information dissemination
3. Strengthen surveillance of vaccine preventable diseases
4. Improve programme management and integration with health systems
5. Ensure that the immunization Programme has sustainable access to predictable funding, quality supply and innovative technologies

(Path, Unicef and WHO have supported the program in various ways which could not be easily quantified.)

One of the strategies for the current cMYP is the provision of adequate cold chain and its maintenance. This is important in ensuring the potency of vaccines throughout the supply chain. The CCEOP provides an opportunity for the country to effectively implement activities under this strategic area.

(This CCEOP activity will be included in the 2015-2019 cMYP when it is revised for 2019 activities and also in the new cMYP for 2020-2024.)

EVMA Report

The country conducted an effective Vaccine Management Assessment (EVMA) in 2014 as a follow up from the 2010 assessment. The EVMA result showed a decrease in the overall score for Capacity of 93% in 2010 to 81% in 2014. At the same time, the maintenance score increased from 62% to 100%. **(Reference#5)**

EVMA IP 2018 (Reference #6)

Based on the 2014 EVMA assessment report, an improvement plan was drawn for implementation. In all, 57 independent activities were defined in the improvement plan, translating into 108 different activities across the various levels of the supply chain. The country has carried 102 activities out of the 108 (94.4%). The summery report is as shown in the table below. The details of this is in the EVMA status of implementation report (reference #7)

Level	Status	E1	E2	E3	E4	E5	E6	E7	E8	E9	Total

PR	Task	2	4	5	3	3	5	4	4	3	33
	#comp'd	2	1	4	3	3	5	4	4	3	29
	% comp'd	100.0	25.0	80.0	100.0	100.0	100.0	100.0	100.0	100.0	87.9
SN	Task		5	3	3	1	6	4	1	3	26
	#comp'd		3	3	3	1	6	4	1	3	24
	% comp'd		60.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	92.3
LD	Task		2	3	3	2	9	4	4	1	28
	#comp'd		2	3	3	2	9	4	4	1	28
	% comp'd		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
SP	Task		3	3	3	1	7	1	3		21
	#comp'd		3	3	3	1	7	1	3		21
	% comp'd		100.0	100.0	100.0	100.0	100.0	100.0	100.0		100.0
Ghana	Task	2	14	14	12	7	27	13	12	7	108
	#comp'd	2	9	13	12	7	27	13	12	7	102
	% comp'd	100.0	64.3	92.9	100.0	100.0	100.0	100.0	100.0	100.0	94.4

CCE Inventory (Reference #9 Ghana cold chain inventory_January 2019**)**

The country conducted cold chain inventory in August 2018. It was conducted to enable the EPI Programme get an inventory of all cold chain equipment in the country and to also get up-to-date information for the preparation of Ghana CCEOP Application. A total of 4,875 facilities were surveyed. Out of these 4,598 health facilities (service points) provide immunization services, of which 2,228 facilities are equipped with a refrigerator (48%) and 2,370 do not have refrigerator (52%). 3,798 health facilities have access to electricity for more than 8 hours per day and 246 health facilities have between 4-8 hours of electricity daily. Out of the 2,228 health facilities with refrigerators, only 502 (23%) have PQS equipment. 1,726 (77%) health facilities do not have any PQS refrigerators. Of these health facilities, 957 (44%) have adequate cold chain capacity. The remaining 1,253 health facilities have insufficient cold chain capacity due to non-functionality or obsolescence (this includes domestic equipment). A total of 2,773 units of cold chain equipment have been inventoried at service delivery level, of which 2,461 were functional (89%). A total of 1,138 cold chain equipment are more than 10 years of age, of which 999 (88%) are functional due to a good maintenance system. A total of 1,491 CC equipment complies with PIS/PQS norms (60%) of which 1,388 were reported as functional (93%). The inventory has reported 994 equipment which do not comply with PIS/PQS norms (40%)

but being utilized at service delivery level and should be replaced. (Ref. #9Ghana cold chain inventory_January 2019_pg 9 &10).

Single Document- 2018 (# 10. Pg8)

The single document provides the key background information of Ghana's EPI program, the administrative and logistic system of the immunization supply chain. Based on the findings of the inventory assessment and rehabilitation plan it defines the salient needs of the country to rehabilitate, replace and expand the CCE network. The plan elaborates on the procurement of 2,145 refrigerators (electric and solar). Based on the segmentation these equipment will be deployed over 3 years. The plan will support the replacement of obsolete and domestic refrigerators. The strategic deployment plan has been added to provide key information to assist in the operational deployment of CCEOP equipment. The plan includes the quantity, type, capacity, energy status and model of equipment to be purchased and justification for choice of equipment.

CCE Maintenance Plan (# 12)

This document describes the preventive and curative maintenance plans. The current maintenance policy and system is functioning relatively well. Out of a total of 3,428 units of CCE, 2,260 (72%) are functional, however there are 526 (15%) units that require repair to maintain optimal functionality. At district store level, 268 cold chain equipment are less than 10 years old. At service delivery level, a total of 1,138 cold chain equipment are more than 10 years of age, of which 999 (88%) are functional due to a good maintenance system.

There is a well-established maintenance network in the country consisting of national and regional teams with expertise in solar and refrigerator engineering.

A total budget $3,241,738 have been earmarked in the budget for next 5years to be provided by partners and government. An annual budget of $ 327,798 is required for 2019 for this operation. The country plans to use part of the $860,000 it will receive as PBF from Gavi for this purpose, in order to ensure optimal performance of CCE and its sustainability. The program has been sourcing funds from other partners for maintenance every year and will continue to do that for the next five years. Internally Generated Funds (IGF) at health facilities, which are currently being used to purchase gas for absorption-type refrigerators, will be rechanneled for maintenance purposes. Any additional fund from future PBF and any other funds will also be made available for this purpose. In addition to this, the program will also be pressing government for maintenance fund. (#12 cold chain Maintenance & preventive plan, pg 12)

Proof of status for CCE tariff exemptions waiver (#13)

The Ministry of Health benefits annually from the tariff exemption waiver, which ensures that all medical products and equipment, including cold chain equipment, are exempted from tax. Due to administrative delays, this waiver is obtained in the month of April every year and is valid till the end of December the same year. Attached are copies 2016 and 2017 waivers (Ref. #13 & #23). This year (2018) waivers have been secured for many medical items procured by Ministry of Health and the Ghana Health service. Attached is two exemptions secured by the ministry of health for imported items.(ref.- #23a and #23b)

UNICEF/WHO Joint Reporting Form (JRF) #21

The country has made significant progress in reaching out to a larger proportion of the population. However, the coverage is not optimal. There are equity gaps in routine immunization coverage. In 2016, 153 (70.8%) districts achieved Penta-3 coverage of 90% and above, 34 (15.7%) districts had coverage rates between 80-89% and 29 (13.4%) districts had coverage rates between 50-79% (#21a-JRF 2016).

Although there was slight improvement in 2017 equity gaps still exist. Of 216 districts 160 (74%) achieved Penta-3 coverage of 90% and above, 26 (12%) had coverage rates between 80-89% and 30 (14%) districts had coverage rates between 50-79% (#21b-JRF2017). The equity gaps are attributed to several reasons including lack of cold chain in selected facilities, as per the cold chain inventory report (Ref. #10Ghana cold chain inventory_January 2019).

The CCEOP offers the opportunity for such facilities, especially, those attending to a substantial number of children to be provided with a refrigerator. This will go a long way in bridging the equity gaps.

Routine Immunization data is normally not aggregate by gender. The 2014 Ghana DHS report indicate Ghana does not have significant gender disparities (Ref. #GDHS, pg 130).

Deployment plan

The strategic deployment plan provides key information to assist in the operational deployment of CCEOP equipment. The plan includes the quantity, type, capacity, and model of equipment to be purchased and justification for choice of equipment. It also describes the planned procurement through UNICEF and the facilitation of the process by the country as well as description of factors underlying site prioritization and how prioritization contributes to coverage and equity goals. The Deployment Plan also provides lists and address of location.

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 (NWLG)? 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 Ghana Health Service has a functional ICC. The ICC meets quarterly and on emergency basis. The committee has a broad membership including the Ministry of Health, Ghana Health Service, Ghana Education Service, Ministry of Education, Ministry of Finance, Ministry of Gender and Social Protection, WHO, UNICEF, USAID, JICA, PATH, Ghana Coalition of NGOs in Health, Ghana Red Cross Society, Christian Health Association of Ghana, Paediatric Society of Ghana and Ghana Nurses and Midwives council.

The first application CCEOP was presented to the ICC on 12th January 2017, which was supported by the committee. Following this meeting, the EPI Programme, with the support of partners, prepared Ghana's CCEOP Application and presented it to the ICC on 29th August 2017 for approval (Ref #2b, #2c).

Independent Review Committee (IRC) recommendation on resubmission of the country's CCEOP application of 2017. As part of the resubmission exercise and in response to the IRC action point 1, the country conducted a complete cold chain inventory in July 2018. A combined application of HSS and CCEOP through Comprehensive Programme Support Rationale (PSR) was prepared and presented in ICC on 6th September 2018. This ICC chaired by Director Public Health endorsed the application for submission. (Ref. #2d).

The EPI Programme has a substantive Logistics and Supply Chain working group (committee) that manages and advises on matters relating to logistics management as well as the entire supply chain. The membership of this committee comprises of the Deputy Programme Manager, the National Logistician, the National Cold Chain Manager and the Head of the Cold Chain Maintenance Team. Other key members include the Deputy Director for Store, Supplies and Drug Management Division and the Operations

Manager of the Transport Management Department all of the Ghana Health Service and the logistics focal points for WHO and UNICEF. The aforementioned officers participated in the development and finalization of various aspects of the Cold Chain Equipment Optimization Application. Find attached the terms of reference of the Logistics Working Group (Ref#16).

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:

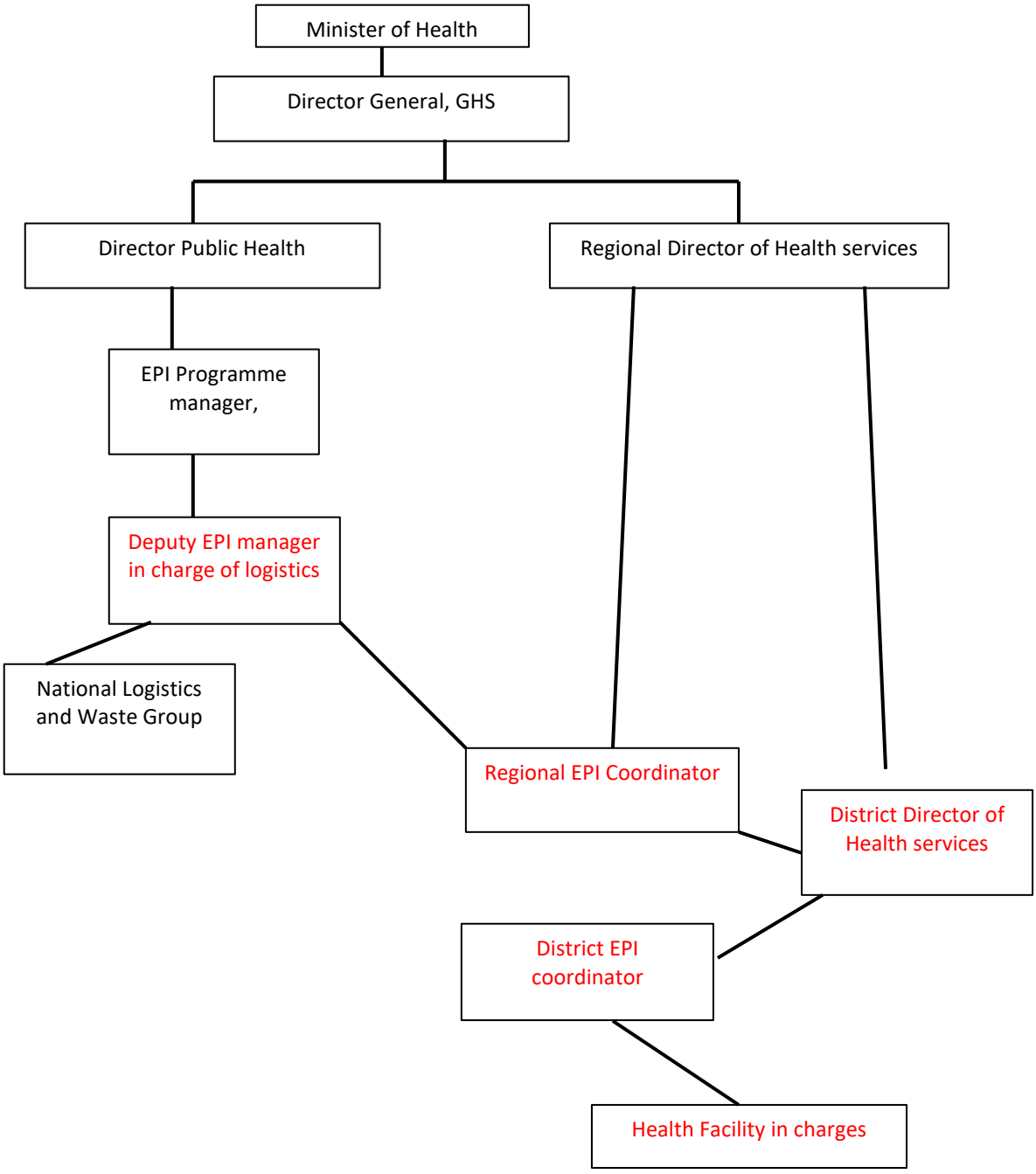
a) How is the country's immunisation supply chain administered?
b) What weaknesses have been identified in the country's supply chain?
c) Through what interventions are these weaknesses currently being addressed?
d) Describe challenges that are hindering the implementation of these interventions.
e) 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) How is the country's immunisation supply chain administered

The Supply Chain system consists of 4-levels: national, regional, district and the health facility level. The overall supply chain system is administered by the Deputy Programme Manager in charge of Logistics. At the regional level is administered by a Regional EPI Coordinator. At the district level, the District Director of Health Services administers the system in collaboration with the district EPI coordinator. See fig1 below.

Both 'pull' and 'push' system is implemented the in supply chain delivery. The national level pushes vaccines to the regional level. From regional to facility levels, vaccines are 'pulled'. All other logistics are pulled from the upper level by the lower level. The table below summarises the levels of supply chain in the country and corresponding number of stores;

FIG1: GHANA EPI SUPPLY CHAIN ORGANOGRAM



No	Level	Name	Number of structures
1	National	National	1
2	Sub-national	Regional	10
3	Lowest delivery level	District	216

4	Service delivery	Facilities	4598

To support the administration, there are cold chain managers and vaccine stores officers at all levels. The Logistics information management system (LMIS) includes the District Health Information Management System (DHIMS), which is the main data repository for the Ghana Health Service. In addition, at the national and regional levels, the WHO Stock Management Tool (SMT) is used to manage vaccine and logistics. The vaccine ledger is used at all levels for recording all transactional information about vaccines. The Stores, Issue and Receipt Voucher (SRA) is used for managing all other immunization related logistics at all levels. The monthly vaccination report is used to report stock usage and status at the facility level whilst the monthly vaccine store report is used to report stock usage and status at the storage points (national, regional and district). The data are also used by the programme for taking informed decisions (e.g. vaccine forecasting, improving on-site supervision etc.)

Table 1: Data recording systems

No	Level	Electronic	Manual
1	National	DHIMS & SMT Monthly Vaccine Store Report	Vaccine Ledger
2	Regional	DHIMS & SMT Monthly Vaccine Store Report	Vaccine Ledger
3	District	Monthly Vaccine Store Report	Vaccine Ledger
4	Facilities	DHIMS	Vaccine Ledger

b) What weaknesses have been identified in the country's supply chain?

Though the country operates a functional supply chain system, there are a number of weaknesses;

1. **Inadequate cold chain equipment capacity**: Out of 4,598 health facilities (service points) providing immunization services 2,370 do not have refrigerator (52%).
2. **Non-compliance of Cold chain equipment to PQS Norms**: Majority of CCE used in the country is non PQS/PIS (994 CCE representing 40% of all inventoried CCE). (Ref. #10 GHA_Cold Chain Inventory Report: January 2019)

3. **Aged Cold Chain Equipment:** The analysis of the cold chain inventory shows that 1,138 of all CCE in lowest health delivery level are 10 years or more. (Ref. #10 GHA_Cold Chain Inventory Report: January 2019).

4. **Inadequate Cold chain equipment management capacity:** Though 20 regional equipment managers (two per region) were trained in 2017 and 2018 to complement the work of the national maintenance team, the number is still inadequate to support (216) districts and 4598 health facilities providing immunization. There is therefore the need to train more technicians to take care of CCE in the districts and health facilities.

5. **Inadequate Logistics management capacity:** Regional and district store managers do not have any professional qualification in Health Logistics. Their current competencies are based on the job training.

6. **Inadequate transport for service delivery**: There is inadequate transport to collect vaccines at the peripheral levels and for service delivery particularly at the outreach points.

7. **Incomplete and late submission of logistics data:** There is usually incomplete and late entry of vaccine stock levels into the DHIMS by service delivery points. This poses challenges for real time tracking and planning.

c) Through what interventions are these weaknesses currently being addressed?

1. **Inadequate cold chain equipment capacity**: At the national level, rescheduling of shipments were coordinated with UNICEF to compensate for inadequate storage capacity. Through ongoing efforts (Gavi HSS, UNICEF and other partners) cold chain capacity at regional level was increased with the installation of walk-in cold rooms. CCE have been procured for district stores and health facilities. Despite these efforts, a huge gap still exists. There is an expectation that CCE OP will provide support in this area.
2. **Non-compliance of Cold chain equipment to PQS Norms**: Since 2012, the Government of Ghana has made it a policy to procure only PQS approved cold chain equipment. Individuals and NGOs who want to support health programmes have been informed to go through the Ghana Health Service/UNICEF to ensure that PQS approved equipment are procured.
3. **Aged Cold Chain Equipment:** Replacement of aged CCE is part of the efforts of cold chain equipment capacity expansion efforts.

4. **Inadequate logistics management capacity:** There is an ongoing effort to build capacity of logistics officers through training, supportive supervision, monthly technical working group meetings. There is also a plan to train lower level staff

on MLM module through the Gavi HSS Support. The programme will also include training on logistics data management, as the country is currently implementing an integrated LMIS.

5. **Inadequate transport for service delivery**: Partners are supporting the country through different programmes e.g. Gavi, Global fund, Maternal, Neonatal and Child Health Project (MNCHIP), DFID etc. Through this effort, fibre boats, vehicles and motorcycles have been procured for distribution to facilities. Despite these efforts, gaps still exist. Government is exploring the possibility of deploying the services of drones to deliver essential health commodities (including vaccines) to remote and hard to reach facilities (e.g. riverine and island). The government of Ghana is going to partner with private organisations to fund this project.

d) Describe challenges that are hindering the implementation of these interventions.

The key challenge being faced in addressing the aforementioned interventions is inadequate funding for CCE, maintenance and management. The programme's annual work plan receives insufficient budgetary support from the government.

e) Describe lessons learnt from recent supply chain related support that inform the current request for CCE Optimisation Platform support

Over the years the programme has procured and installed various models of cold chain equipment including domestic. The majority of the models were Vestfrost and B-Medical affiliated. These models and other PQS models were found to be suitable for the programme, due to the technical specifications and the familiarity of the technicians and end-users with the equipment. The storage capacity and the external dimensions of the equipment were key considerations. Technical experience has been developed with the installation of walk-in cold rooms and solar equipment. Additionally there is an existing coordination team (NLWG) which has overseen and monitored previous cold chain equipment deployments, and will form the project management team for CCE OP.

f) What percentage of facilities have reliable access to grid electricity for up to or more than 8 hours per day?

Ghana, all facilities operating under National, Regional and Districts are all on national grid with electricity more than 8 hours.

1. Out of 4,598 facilities rendering immunization services, 3,798 (83%) has access to electricity for more than 8 hours. Also, 246 (5%) facilities were also considered for electric equipment as they have stable electricity between 4-8 hours per day (Ref- #10 GHA_Cold Chain Inventory Report: January 2019).

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?

Parameter	Number	Percent
Total equipment	3,428	100.0%
Functional	2,460	72.0%
Functional, needs servicing	526	15.0%
Unserviceable	429	12.5%
Obsolete	13	0.4%
PQS-approved	817	23.8%
PIS approved	*1,411*	*54.0%*
Non-PQ category	*1,200*	*46.0%*

h) What percent of the birth cohort is served by effectively functioning, PQS-approved CCE currently?

The 502 facilities (23%) that are equipped with PQS CCE cover 24% of the birth cohort. **(Ref. #8 Inventory Gap Analysis)**

i) What are the bottlenecks that CCE can address in the current supply chain set-up (for example, capacity and technology constraints)?

e bottlenecks that will be addressed are:

1. Improved temperature control through the bundling of TMDs with Grade A CCE
2. Transportation challenges will be partially addressed with the provision of adequate storage capacity at health facilities
3. All districts with cold space gaps will be filled (Ref#11 GHA_Rehabilitation Plan: January 2019).
4. All facilities providing immunization services and require cold storage space of more than 5 litres but are currently operating without CCE will be equipped.(Ref.- #9 GHA_Cold Chain Inventory Report: January 2019).
5. All facilities and districts with non-functional CCEs will be replaced

j) Describe any other supply chain challenges that CCE Optimisation Platform support will assist in mitigating?

The capacity of the National Cold Chain Equipment Maintenance team will be strengthened through the partnering with the supplier during the deployment, installation and commissioning of cold chain equipment. Bundling of spare parts with CCE relieves the programme from sourcing spare parts.

End-user training provided by vendor during the installation of CCE will provide an opportunity to further the knowledge of the staff at service delivery level. This will include training on preventive maintenance and temperature monitoring.

It is also hoped that the support will help the programme to introduce Solar Direct Drive (SDD) equipment into our system, especially in facilities that are not connected to the national grid. SDD equipment are more efficient, environmentally friendly and cheaper in terms of total cost of ownership (acquisition, maintenance and final disposal).

k) What are *the* overall CCE needs?

The comprehensive rehabilitation plan provides the overall CCE needs for the next 3 years for all levels. At the national level, 9 WICRs of 40m3 each will be required to meet the needs of the programme. No additional positive storage gap was identified at the regional level, however 4 regions require an additional one 200 litre freezing capacity each. The district level requirement for the expansion and replacement is 258 units of cold chain equipment.

The service delivery level will require a total of 2,683 units of CCE (2,394 on grid refrigerators, 255 SDDs) and 2,020 TMDs, 3,000 freeze free vaccine carriers and 500 voltage regulators for rehabilitation (#11 Gha_CCEOP Single document, pg 8).

Table : Summary of overall CCE requirements

Level	Energy Source	2020	2021	2022	Total
SP	**Solar**	171	30	54	255
	Electric	776	1,140	512	2,428
LD	**Solar**	0	0	0	0
	Electric	199	15	44	258
Total	**Solar**	171	30	54	255
	Electric	975	1,155	556	2,686
Grand Total		**1,146**	**1,185**	**610**	**2,941**

The total estimated budget for the overall CCE needs is presented in the table below.

Level	Total Estimated Budget	CCE OP Budget	Other Sources (GoG & Partners)
National	$1,440,000		$1,440,000
Regional	$3,200		$3,200
District	$500,000	$357,315	$142,685
Service Delivery	$6,000,000	$4,381,026	$1,618,974
Total	**$7,943,200**	**$4,738,341**	**$3,204,859**

This includes service bundle costs. The total CCE OP budget includes both the country joint investment and the contribution requested from the Gavi CCE Optimisation Platform.

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?*

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?

Ghana's immunisation coverage has improved over the years. However, using Penta-3 as a proxy, there has been stagnation of coverage at around 90% over the past 3 years. Successive Ghana Demographic and Health Surveys (GDHS 2003, GDHS 2008, and GDHS 2014) have progressively shown that, there is no apparent gender related barrier to immunization. From the GDHS 2014 report, coverage for Penta-3 was only slightly in favour of females as against males: 90.3 and 86.8% respectively.

Characteristics	2003	2008	2014
Sex			
Male	81.3	88.8	86.8
Female	77.3	88.8	90.3
Residence			
Urban	86.2	87.2	88.1
Rural	75.8	89.8	88.8
Wealth			
Lowest	64.5	88.0	87.4
Highest	87.4	93.3	91.9

However, variations in regional and district coverage exist. For example, the proportion of districts reporting Penta-3 coverage of <80% in 2014 was 23%; 24% in 2015, 19% in 2016 and 14% in 2017. This may be attributable to many factors including inequities in human resource, transport and other logistics such as cold chain equipment.

This notwithstanding, the prioritization and segmentation of CCE was done to address equity issues, such that, areas without CCE would be provided with equipment and areas

needing expansion or replacement will also be adequately catered for.

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?**

The supply chain system will be modified in order to address some geographical and operational challenges to improve coverage and equity. In riverine and island communities, CCE with higher capacity will be deployed. This will be able to hold requirements for at least a quarter and therefore reduce the number of times facilities in such areas have to travel to the district level for vaccine supply. This will reduce interruptions in the supply chain system and subsequently improve coverage of services.

The system will also be redesigned to ensure that, vaccines and other logistics will be 'pushed' to facilities in hard to reach areas using drones instead of the pull system. This will go a long way to ensure continuous supply of logistics for service delivery.

Satellite facilities which ordinarily will not be provided with a cold chain equipment because of the size of their catchment population will have a designated depot, which will be within a close radius, where such facilities can easily access and collect logistics including vaccines. The depots will service up to 5 satellite facilities.

Densely populated urban slums will have satellite facilities equipped with cold chain equipment and provided with the requisite staff to provide services.

The Service seeks to increase and maintain the immunization coverage for all childhood antigens at 95% and above as well as bridge the equity gap and improve geographical access to service delivery especially at peripheral levels.

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

The choice of cold chain equipment was informed by the improvements envisaged in the cold chain system. Larger storage equipment was selected to equip facilities that will serve as sub-depots to smaller facilities without CCE within their catchment area.

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

The CCEOP guarantees support for the provision of equipment, training of technicians who will conduct periodic maintenance and repairs, provision of spare parts as well as training of staff of simple maintenance practices. This will extend the life of the equipment as a result of good utilization practices and maintenance.

The preparation of the CCE OP application has initiated the systems to update and monitor the cold chain inventory which the programme will build upon and ensure sustainability.

The Government will also incorporate the sustainability of the supply chain system in the Gavi Transitional Plan.

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 preventative 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?

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 preventative and corrective maintenance that the country commits to (supported by partners)?***
- ***What technical support is anticipated for maintenance?***

Two teams at the national level take care of the PPM and CM of all the cold rooms and freezer rooms at the national and regional levels, besides supporting the regional technicians whenever necessary. There are technicians in every region. They cover the respective districts and HF for the technical PPM and CM of the CCE. The teams at both levels develop an annual plan for PPM to carry out the PPM on biannual (at national and regional level) and quarterly frequency at the district and HF level. At all levels the CM is conducted as on demand. A detail budget for the PPM and CM has been provided (ref. #12 - Sec. 6, P. 10) . To ensure that the planned preventive maintenance is effectively implemented, the programme has procured a new vehicle through HSS funds for the team to support their activities.

The main source of funding is from HSS and partner support. In addition, the country plans to use a portion of the PBF received from Gavi. Ghana is eligible for Gavi's

Performance Based Funding (PBF) of approximately $ 860,000.

b. How will the country monitor the completion of preventive and corrective maintenance?

a. Which source(s) of funding will be used for maintenance, and to what extent are they assured?

Forms for reporting the PPM with checklist as well as for reporting the CM have been developed. Upon completion of any PPM or CM visit, the technicians complete these forms and send to the respective supervisor, and finally to the Dep. Program Manager. The respective supervisors review the report, and also cross check with the concerned facility regarding the good functioning of the serviced/ repaired CCE.

The challenge has been the adequacy of resources to implement the preventive maintenance schedule as planned. To ensure that the planned preventive maintenance is effectively implemented, the programme has procured a new vehicle through HSS funds for the team to support their activities.

Besides the HSS budget, the programme receives funds from other sources such Government of Ghana and partners. These funds are used to support the fuel cost, Daily Subsistence Allowance for drivers and technicians and routine maintenance cost of vehicles incurred during the maintenance activities. Additionally the salaries of all the staff are fully borne by the government. A total budget of $3,241,738 have been earmarked in the budget for next 5 years to be provided by partners and government.(Ref #12 Maintenance Plan)

The other important aspect of ensuring that preventive maintenance is implemented is the availability of spare parts.

c. How will the country dispose of obsolete and irreparable equipment replaced by CCE Optimisation Platform equipment?

Procedures for disposal of obsolete equipment in public institutions exist in the country. The Public Procurement ACT 2003, (ACT 663) mandate head of entity (public institution) to dispose of stocks that become obsolete, redundant and unserviceable or surplus to requirement, in an orderly and systematic manner. This is designed to assist public institutions to dispose of their goods and equipment in an efficient, consistent, equitable and accountable manner. (Public procurement ACT 2003) (#12 Maintenance Plan).

Further information from Environmental Protection agency (EPA) directed the service to send all obsolete refrigerators and freezers to a recycling company by name 'City Waste Management Co Ltd (CWM)+ City Waste Recycling Ltd (CWR)'. This is a formal e-waste recycling company, which is known to be using improved methods of disposal. They will be contacted and the EPI program will instruct all Regional and District health administrations to document all obsolete CCEs and send them to the company and send copies of those list to the national level. (#12 Maintenance Plan)

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:

a) How will the country facilitate the manufacturer's or representative's role in equipment purchase, distribution and installation?

b) What is the source of the joint investment? Is the country's joint investment secured?

c) Has the country secured import tariff exemptions for CCE? If yes, attach proof.

a) How will the country facilitate the manufacturer's or representative's role in equipment purchase, distribution and installation?

As part of the CCEOP bundling process the supplier is responsible for all in-country transport and installation process. To facilitate the process, a team made up of representations from the National Logistics Working Group, led by a designated focal person, will oversee the entire exercise of the planning of deployment of CCE in collaboration with the local agent. as well as defining the monitoring process. The team will meet bi-monthly (twice in a month) to plan and track the deployment process. In addition the local agent will be made to submit copies of all installation and commission reports for inspection and verification. The health facilities heads will also confirm the quality of installation and training conducted (Sec 4.3 Single doc)

The Programme will prepare a detailed list of facilities per district, region and equipment type to be deployed and share same with manufacturer or its representative. The deployment schedule and routing shall all be discussed and approved by all partners. This will provide clear information on equipment to be deployed.

Health staff will be sensitized to be aware of their roles and responsibilities in ensuring successful deployment of equipment. Heads of Health facilities will be informed of the arrival of the installation teams to carry out the installation and training of HW. A team will be set up to see to speedy resolution of issues that may come up during the implementation of the project.

Key personnel that will be involved in this process include engineers, technicians and disease control officers.

b) What is the source of the joint investment? Is the country's joint investment

secured?

There is an on-going Gavi HSS support for the country, which started in 2014. At the ICC meeting held on 29th August 2017 to endorse the application, it was unanimously agreed that the country uses part of the 3rd and 4th tranches of the on-going HSS support to co-finance the CCEOP investment (Ref. #2a).

c) Has the country secured import tariff exemptions for CCE? If yes, attach proof.

The Ministry of Health benefits annually from the tariff exemption waiver, which ensures that all medical products and equipment, including cold chain equipment, are exempted from tax. Due to administrative delays, this waiver is obtained in the month of April every year and is valid till the end of December the same year (Ref. #13). For this reason, no deliveries of equipment should reach the country between January and March of any year. (Ref. #13 waiver 2016/2017).

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 **not inclusive** of operational cost. Operational costs must be financed by Ministry of Health or other partners.

CCE	Further information on CCE rehabilitation and expansion plan, equipment selection and strategic deployment plan requirements is provided in Application guidelines Section 5, available at http://www.gavi.org/support/process/apply/cceop/

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	
The need	The cold chain rehabilitation plan has identified the following urgent needs to be covered through CCE OP support: - Extend cold chain capacity by providing 1,037 CCEs to facilities providing immunization services without active cold chain equipment and requiring more than 5 litres of storage and 3 CCEs to district stores
Justification	There are 36 districts in 5 regions, namely Volta, Greater Accra, Northern, Eastern and Brong Ahafo which are around the Volta lake. These 36 districts have facilities, which are basically in rural areas and serve sparse population. These facilities will be provided with adequate equipment through the CCEOP support.
Expected	Re-established and uninterrupted service provision in hard-to-reach,

outcome	riverine and island communities
Total CCE budget	$2,436,536
Prioritised (Urgent) CCE Need #2	
The need	The cold chain rehabilitation plan has identified the following urgent needs to be covered through CCE OP support: - Extend cold chain capacity to (443) facilities providing immunization services without active cold chain equipment and requiring more than 5 litres of storage and 3 district stores - Expand capacity where storage capacity requirements are insufficient in 762 facilities and 52 district stores. This will mainly cover replacement of domestic and obsolete equipment. - Replace over aged functional PQ equipment in xxx facilities
Justification	Extending CCEs to facilities that are currently dependent on others due to non-availability of equipment and equip inadequate district stores
Expected outcome	Improve the regularity and efficiency of immunization at these HFs, and thus increase coverage and improve equity.
Total CCE budget	$ 2,055,197
Prioritised (Urgent) CCE Need #3	
The need	The cold chain rehabilitation plan has identified the following urgent needs to be covered through CCE OP support: - Expand capacity where storage capacity requirements are insufficient in 45 facilities. This will mainly cover replacement of domestic and obsolete equipment. -
Justification	Extending CCEs to facilities that are currently dependent on others due to non-availability of equipment
Expected outcome	Improve the proper vaccine storage in facilities. Reduce frequency of vaccine collection reducing transport use.
Total CCE budget	$ 246,609
Prioritised (Urgent) CCE Need #4	
The need	
Justification	
Expected outcome	
Total CCE	

budget	
GRAND TOTAL CCE BUDGET: Initial support (Years 1 and 2)	$ 4,738,341

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.

Replacement/Rehabilitation				**Expansion**		**Extension**	
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	
No of Equipment	*No of sites*	*No of Equipment*	*No of sites*	*No of Equipment*	*No of sites*	*No of Equipment*	*No of sites*
LD: 173	161			82	52	3	3
SP SDD: 54	54			103	103	68	68
SP EL: 388	388			1157	1157	375	375
Total 615	***Total 603***	***Total = 0***	***Total =0***	***Total 1342***	***Total 1342***	***Total 446***	***Total 446***

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 on-going 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.*	The performance of supply chain managers is key to the success of every immunization programme. The 2014 EVMA identified key areas that need improvements. Several activities were planned to improve their performance within the EVMA improvement plan. These included the following: ● Training of store managers in stock management practices ● Development and implementation of training plan with focus on vaccine management and logistics ● Conduct Supportive supervision to provide on the job-coaching and document best practices The trainings have been conducted and the supportive supervision is on-going. In 2015 and 2016 Gavi HSS fund was used to train Community Health Officers (CHO's) in vaccine management and cold chain managers on vaccines and cold chain management. The CCEOP implementation will lead to increase in the number of cold chain equipment, hence there will be trainings for supply/cold chain managers to improve their performance.
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,*	The EPI Programme with technical and financial support from the CDC, Atlanta, conducted Ghana Immunization Information System

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.	Assessment (GIISA) in August 2016 (Ref. #17). The assessment focused on reviewing the quality of routinely reported immunization coverage data, identifying the gaps in the existing system, and developing strategies to address such gaps. It was meant to inform future activities to strengthen the immunization information system. Data quality improvement plan (DQIP) based on the assessment findings was drawn and follow up activities started in the 2nd Quarter of 2017. The follow-up activities include training of staff on data management, revision of data collection tools and provision of tools for data recording and reporting. Through the support of CDC, data recording tools; vaccine ledgers, monthly immunization reporting forms, monthly vaccine store report, tally books, have been printed and distributed. These will help improve vaccine stock management. Data management trainings will equip staff to timely and accurately input service data into the District Health Information Management System (DHIMS2) - the main data repository for the country`s health information. This will ensure visibility of real-time quality data on vaccine stock and other logistics.
Optimised, efficient design of distribution system *Describe all planned or ongoing activities related to distribution system design optimisation, their sources of funding, and partner support.*	The supply chain system will be modified in order to address some geographical and operational challenges to improve coverage and equity. In riverine and island communities, CCE with higher capacity will be deployed. This will be able to hold requirements for at least a quarter and therefore reduce the number of times facilities in such areas have to travel to the district level for vaccine supply. This will eliminate stock out issues and interruption of the

	immunization, and subsequently improve coverage of services. The system will also be redesigned to ensure that vaccines and other logistics will be 'pushed' to facilities in hard to reach areas instead of the pull system. This will go a long way to ensure continuous supply of logistics for service delivery. Satellite facilities which ordinarily will not be provided with a cold chain equipment because of the size of their catchment population will have a designated depot, which will be within a reachable radius, where such facilities can easily access and collect all their supplies. Currently existing HF of their vicinity will play the role of these depots and each one will service up to 5 satellite facilities. All the CCE strengthening will be within the gamut of CCEOP support. Wherever require Govt. Ad partner support will be sought.
Continuous improvement process *Describe all planned or ongoing activities related to continuous improvement processes, their sources of funding, and partner support.*	The EVMA conducted in 2014 and the resultant improvement plan outlining a number of interventions to ensure continuous improvement of the immunization system. These interventions included the establishment and implementation of planned preventive maintenance (PPM) system for buildings, equipment and transport at all levels (item No. 17 of the #6-GHA_EVMA_Improvement Plan.Xls). The implementation of the PPM is an on-going process being financed by the government. An additional vehicle has been procured through the Gavi HSS to support activities of the cold chain maintenance team at all levels (item 10 of the same document quoted above) There is a planned activity to train cold chain technicians from all the ten regions to support the national teams in

	September 2017. Funding for this activity is from the Gavi HSS. All the above mentioned activities are geared towards ensuring continuous improvement of the EPI system
Temperature monitoring *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).* *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 programme has switched from the use of stem and dial thermometers to electronic thermometers. Installation of continuous temperature monitoring device (multi loggers) are currently on-going at the national and regional cold rooms. An alarm is sounded whenever temperature of an equipment goes beyond the pre-set temperature range. Cold chain managers and key staff are trained on how to respond to temperature alarms. The procurement and installation of the multi-loggers are being financed by Unicef country office. The service delivery points are now using fridge tags which keeps 30-day temperature records. This record can be retrieved from the device for monitoring purposes and can also be printed.

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.

☆	Budgets are **not inclusive** of operational cost. Operational costs must be financed by Ministry of Health or other partners.

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	
The need	
Justification	
Expected outcome	
Total CCE budget	
Prioritised (Additional) CCE Need #2	
The need	
Justification	
Expected outcome	
Total CCE budget	
Prioritised (Additional) CCE Need #3	
The need	

Justification	
Expected outcome	
Total CCE budget	
Prioritised (Additional) CCE Need #4	
The need	
Justification	
Expected outcome	
Total CCE budget	
GRAND TOTAL CCE BUDGET: "Scale-up support" (Years 3, 4 & 5)	

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.

Replacement/Rehabilitation				**Expansion**		**Extension**	
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	
No of Equipment	*No of sites*	*No of Equipment*	*No of sites*	*No of Equipment*	*No of sites*	*No of Equipment*	*No of sites*
Total	***Total***	***Total***	***Total***	***Total***	***Total***	***Total***	***Total***

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.*	
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.*	Supply chain manager's performance was identified in the 2014 EVMA as key to immunization programme. Several activities were planned to improve their performance within the EVMA improvement plan (#6-GHA_EVM_improvement_plan_081214) These included the following: ● Training of store managers in best stock management ● Development and implementation of training plan with focus on vaccine management and logistics ● Conduct Supportive supervision to encourage staff. Supportive supervision will be an on-going process. Funds will be solicited from partners and Ghana Government. The 2015 and 2016 Gavi HSS supported trainings for Community Health Officers (CHO's) in vaccine management and cold chain managers on vaccines and cold chain will continue in the scale up phase. with funding from GoG The service bundling of CCEOP will also help towards training of supply/cold chain managers in proper use and preventive maintenance of the new CCE.

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.*	There will be refresher training for data managers to improve their skills and competencies in managing immunization data. Service providers will also be trained on District Health Information Management System (DHIMS2) to improve their level of understanding and usage of the tool. Cold chain managers at all levels will be reporting on vaccine stock as well as status of CCE monthly through the DHIMS2 platform to inform planning and decision making.
Optimised, efficient design of distribution system *Describe all planned or ongoing activities related to distribution system design optimisation, their sources of funding, and partner support.*	The current system of distribution of vaccines and logistics will continue at the scale-up phase. Vaccines are pushed from national to regional cold rooms, whiles districts and health facilities pull from the next higher level. Immunization devices are pulled from the national level through the supply chain pipeline. Funding source will continue to be from the Ghana Government.
Continuous improvement process *Describe all planned or ongoing activities related to continuous improvement processes, their sources of funding, and partner support.*	The implementation of the PPM will continue and will be financed by the government. There is a vehicle support for on-going activities of the supply chain process There is a planned activity to train cold chain technicians from all the ten regions to support the national teams. Funding for this activity is from the Gavi HSS. Periodic supervision visits form the national level will continue as planned under the HSS. All the above-mentioned activities are

	geared towards ensuring continuous improvement of the EPI system.
Temperature monitoring *Describe how the temperature monitoring system will evolve? Which devices will be used?* *<u>Furthermore, describe which measures are in place to</u>* *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 programme will continue to use of 30 DTRs (Fridge Tag 2) at all service delivery points. Regular procurement will be done to ensure universal availability and use. Regular monitoring and supervision will be conducted to ensure that every CCE has fridge tag for monitoring temperature.

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..*

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 <u>if countries are procuring User independent fre</u> <u>vaccine carriers;</u> and***
- ***1 to 3 ADDITIONAL intermediate results indicator(s).***

1) ***CCE Replacement/Rehabilitation in existing equipped sites**: Percentage of existing sites with non-PQS and PQS equipment to be replaced with platform-eligible ILR, SDD or long-term passive de with a larger equipment)*
2) ***CCE Expansion in existing sites:** Percentage of existing sites being equipped with ADDITIONA vaccine introduction and/or to serve an increasing population;*

   ***3. CCE Extension in unequipped existing and in new sites:** Percentage of previously unequippe services or not, including existing sites without active devices) and new service sites being e equipment.*

   ***4. CCE maintenance :** Well-defined indicator proposed by country to reflect appropriate maintena percentage of equipped facilities with functioning cold chain,[4] such as demonstrated by remote temp*
3) ***5. Freeze-free to non-freeze-free carrier ratio:** Ratio of freeze-free cold boxes/carriers to non-fre country?*

USE THE TABLE BELOW TO COMPLETE MANDATORY INDICATORS

Indicator *(Provide name of*	***Definition*** *(Provide definition if not already*	***Data Source***	***Reporting frequency***	***Baseline (Year)*** *(Provide*	***Target Year 1*** *(Provide numerator*	***T*** *(P*

[4] **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.

the mandatory indicator as shown above)	*specified)*	*(identify data source)*	*(annual, semi-annual, quarterly etc.)*	*numerator and denominator for calculating percentage)*	*and denominator for calculating percentage)*	*n d c p*
*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)*	*Survey(Cold chain Equipment inventory)*	*Annual*	*Numerator = 1,726* *Denominator= 1,726* *Percentage= 100%*	*Numerator =1,210* *Number of non-functional equipment replaced* *Denominator= 1,726* *Percentage=70%*	*N* *N fu e re* *D 1,* *P*
*2. **CCE expansion in existing equipped sites:***	*Percentage of existing sites being equipped with ADDITIONAL pieces of equipment for new vaccine introduction and/or to serve an increasing population;*	*Survey(Cold chain Equipment inventory)*	*Annual*	*Numerator = 0* *Denominator= 216* *Percentage=0%*	*Numerator = 77* *Denominator=216* *Percentage=36%*	*N* *D* *P*
3.. CCE extension in unequipped existing and/or 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.*	*Survey(Cold chain Equipment inventory)*	*Annual*	*Numerator = 0* *Denominator= 447* *Percentage=0%*	*Numerator = 447* *Denominator=447* *Percentage=100%*	*N* *D* *44* *P %*
*4. **CCE maintenance***		*Survey(Cold chain Equipment inventory)* *Routine*	*Annual* *Bi-annual*	*Numerator =* *Denominator=4,434 (=3,392+1042 new arrivals)* *Percentage=76 %*	*80%*	*8*
*. **Freeze-free to non-freeze-free carrier ratio***	*Ratio of freeze-free cold boxes/carriers to non-freeze-free cold boxes/carriers in-country*	*NA*				

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

***ples** 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% fu*
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*
5. ***Temperature alarms:** Frequency and magnitude of heat and cold alarms per monitoring period (i.e., tempera 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 m*

USE THE TABLE BELOW TO COMPLETE ADDITIONAL INDICATORS

Indicator *(Provide name of the **additional** indicators as shown above)*	***Definition*** *(Provide definition if not already specified)*	***Data Source*** *(identify data source)*	***Reporting frequency*** *(annual, semi-annual, quarterly etc.)*	***Baseline (Year)*** *(Provide numerator and denominator for calculating percentage)*	***Target Year 1*** *(Provide numerator and denominator for calculating percentage)*
1.		*DHIM S*	*Quarterly*	*80%*	*85%*
2.					
3.					
Add more indicators HERE if needed.					