OPTIMIZE

Vaccine supply chain costing methodology

September 2013

OPTIMIZE Immunization systems and technologies for tomorrow

PATH World Health Organization

This costing methodology was commissioned by Optimize: Immunization Systems and Technologies for Tomorrow, a collaboration between the World Health Organization (WHO) and PATH. The costing methodology was authored by Carol Levin (previously at PATH, now at University of Washington) and Mercy Mvundura (PATH).

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PROJECT OPTIMIZE

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ACRONYMS

The following acronyms are used in this document.

EPI	Expanded Programme on Immunization
PATH	Program for Appropriate Technology in Health

1. OVERVIEW

Between 2009 and 2012, technical staff from project Optimize, a collaboration between PATH and the World Health Organization, worked to develop costing methodology and create an accompanying Microsoft Excel-based costing tool to help estimate the cost of the vaccine supply chain in Senegal and Vietnam. The costing methodology and tool were used to estimate baseline costs and to estimate the changes to costs and other supply chain metrics associated with new supply chain technologies and approaches.

The methodology and costing tool attempt to answer the following questions:

- What are the supply chain costs for the existing supply chain?
- What are the supply chain costs for each tier/level of the supply chain?
- What are the main cost drivers (which of the input categories or supply chain functions account for the largest share of the costs)?
- What are the incremental costs and benefits to supply chain performance indicators from the interventions undertaken by project Optimize work?

We designed each section of the tool so that:

- Baseline information can be entered.
- Each component of the supply chain system is included, such as transportation and cold storage.
- Each level of the supply chain is included within each component.

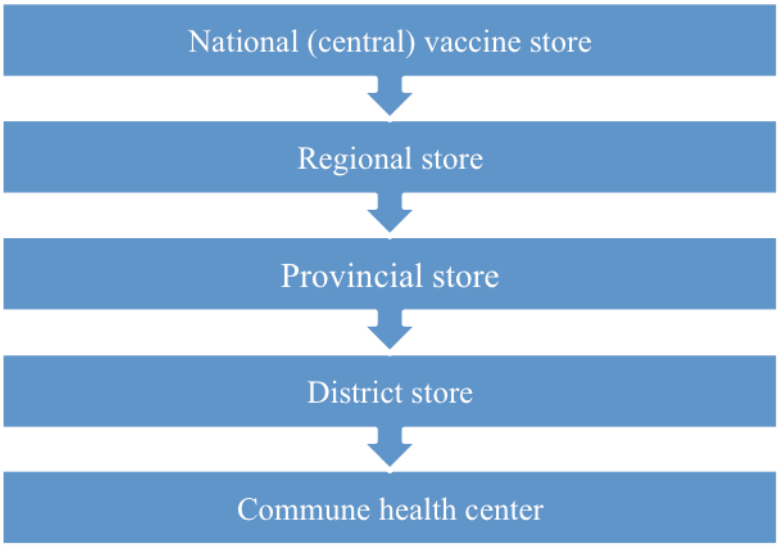
We designed the costing tool to estimate the supply chain costs for the Expanded Programme on Immunization (EPI). Costs are estimated for a fully immunized child receiving 12 doses for the traditional EPI schedule, or receiving ten doses for the pentavalent schedule, and pregnant women receiving two doses of tetanus toxoid.

This report documents the methodology used to develop the costing tool. The tool itself and associated questionnaires are available free of charge from project Optimize. Please contact mmvundura@path.org to receive a copy.

2. STRUCTURE OF THE SUPPLY CHAIN

The levels in a supply chain are called tiers, and a supply chain needs at least two tiers. Figure 1 shows Vietnam's EPI supply chain, which is a five-tier supply chain that includes the national store, regional stores, provincial stores, district stores, and commune health centers. The EPI supply chain in Senegal has four tiers because the system does not have the provincial tier. The number of facilities within each tier differs. Typically the higher tiers, such as the regional level, have fewer facilities than the lower tiers, such as the district level.

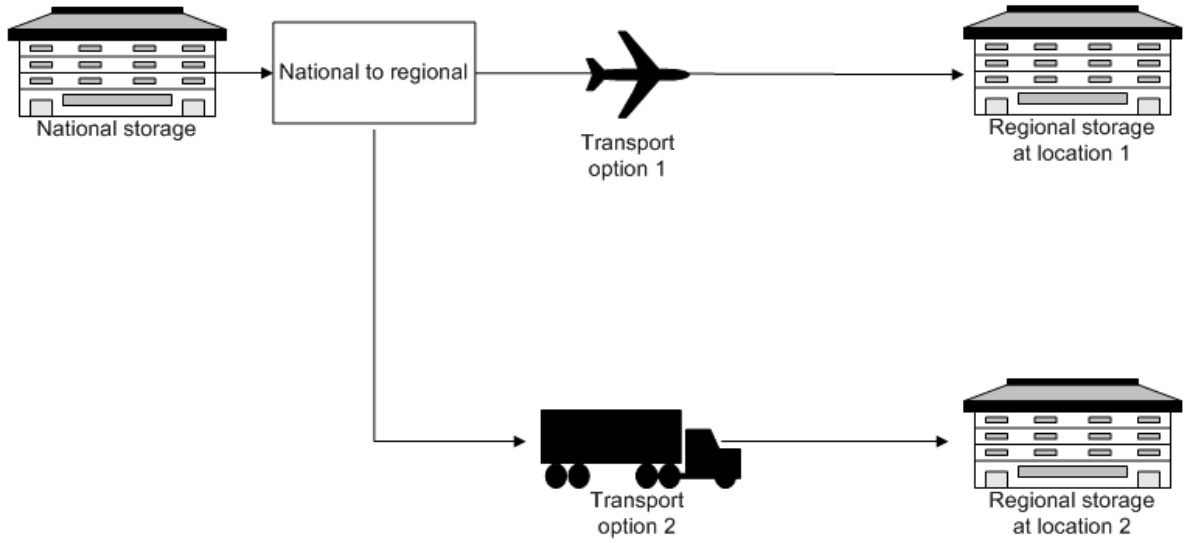
Figure 1. Example of a five-tier supply chain



3. SUPPLY CHAIN COST FUNCTIONS

Each tier of the supply chain can serve different functions. The two main functions that are considered in the costing tool are the storage function and the distribution/transportation function, and an example of these functions for two tiers of the supply chain is shown in Figure 2. Not all levels of the supply chain perform these two functions. For the storage function, typically the national vaccine store is responsible for the procurement of vaccines and dry goods supplies for the entire country, and hence, may also be the first storage point for the vaccines and supplies coming from manufacturers. However, this is not always the case; in some countries, the national store does not provide the storage function for all vaccines or supplies it procures. For example, in Vietnam, the procurement of EPI vaccines is done by the national vaccine store, but some vaccines are delivered directly by the local vaccine manufacturers to the regional stores. Similarly, in Vietnam, procurement of dry goods supplies is done by the national vaccine store, but there is no storage of dry goods at the national vaccine store. In Senegal, the national vaccine store performs the storage function for both vaccines and dry goods. At the lower levels of the supply chain, such as the service delivery points, the storage function may not be performed because some facilities do not have the cold chain equipment required.

Figure 2. Example of supply chain functions between two tiers



The distribution/transportation function can occur through a collection system or a delivery system. In a collection system, the lower-level tiers collect commodities from the higher-level tiers. In a delivery system, the higher-level tiers deliver commodities to the lower-level tiers. Figure 3 and Figure 4 show examples of two distribution systems: the first is solely a collection system; the second is a mixed system, with delivery and a collection system at different tiers.

Figure 3. Example of a collection system

Figure 4. Example of a mixed distribution system

3.1. Storage function

The costs included in the storage function are:

- Annual depreciated value of the cold chain equipment used for storing vaccines at the different levels of the supply chain.
- Energy costs for the cold chain equipment used for storing vaccines.
- Cost of labor used for the storage function. Details on how labor is measured are discussed in section 3.2.

- Infrastructure costs for the space allocated to the vaccine cold chain and dry goods storage.
- Maintenance costs for the cold chain equipment.

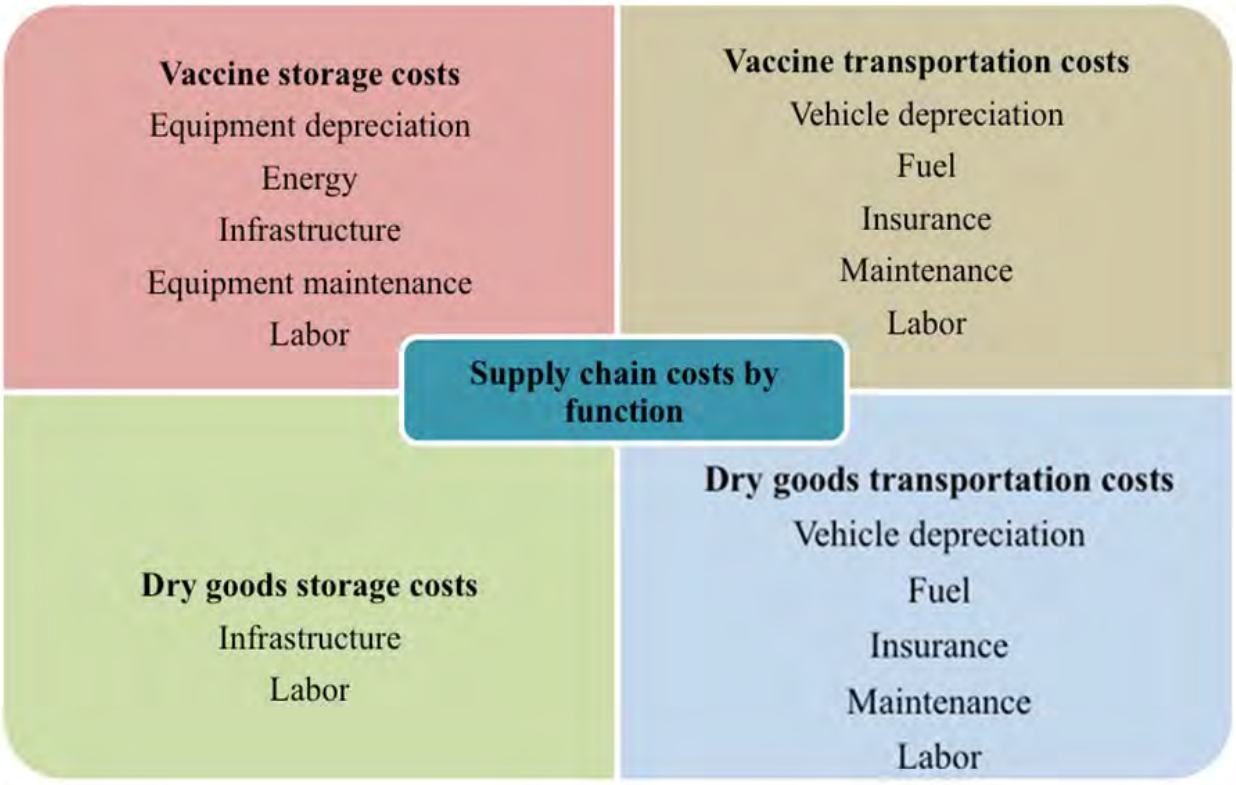
3.2. Distribution function

The costs included in the distribution function are:

- Direct costs for labor spent on delivering or collecting vaccines and dry goods between any two tiers of the supply chain. This includes the costs of the drivers and any health workers who travel to deliver or collect vaccines or dry goods.
- Depreciation of vehicles owned by the ministry of health that are used in the distribution of vaccines or dry goods.
- Fuel costs, maintenance costs, and insurance costs for the vehicles that are used for distribution.
- Contract costs for using third-party logistics companies for the delivery of vaccines or dry goods.

Figure 5 shows the storage and distribution function costs included in the costing model for vaccines and dry goods supplies.

Figure 5. Supply chain costs by function



4. MAJOR SUPPLY CHAIN INPUT CATEGORIES

The major supply chain cost categories included in the costing model for the storage and distribution functions are:

- Labor.
- Cold chain equipment (annualized depreciation).
- Cold chain recurrent costs (energy and maintenance).
- Vehicles (annualized depreciation).
- Storage space.

4.1. Labor

Staff members with duties in EPI logistics are asked to estimate the amount of time they spend on the list of activities summarized in Table 1. The staff are asked how often each activity occurred (daily, weekly, or monthly) and how much time they spent on each activity within the specified time period. The cost of the labor for logistics is then calculated as the percentage of time spent on logistics multiplied by the annual salary.

4.2. Cold chain equipment (annualized depreciation)

The economic capital costs of the cold chain equipment used for storing vaccines is calculated. Using a standard formula (the current replacement cost of the cold chain equipment divided by the annualization factor), a discount rate of 3% is applied, assuming that cold rooms and freezer rooms have an economic life of 15 years, refrigerators and freezers have an economic life of ten years, and cold boxes and vaccine carriers have an economic life of ten years.

Table 1. Supply chain activities from labor use survey (respondents reported time spent on each activity)

Procurement for facility	Procurement for lower-level facilities	Transportation	Stock monitoring	Other activities (national store only)
Estimating and forecasting the needs for the facility.	Estimating or preparing orders and completing paperwork for orders for lower tiers.	Transporting to lower tiers or collecting from higher tiers; planning the distribution system, including scheduling the deliveries; managing the vehicle fleet for distribution.	Monitoring the temperature of cold chain equipment used for vaccines.	Advertising and evaluating tenders, awarding contracts, and working on contracts related to logistics.
Preparing and completing the paperwork for orders.	Entering orders from lower tiers into the computer.		Issuing orders to lower tiers, or packing orders for distribution.	Supervising people involved in logistics activities.
Entering orders into the computer.	Checking and approving orders from lower tiers.		Receiving orders from higher tiers, updating stock-ledgers, and organizing and packing orders.	
Checking and approving orders.				

4.3. Cold chain recurrent costs (energy and maintenance)

Recurrent cold chain costs include the energy costs per year and the equipment maintenance costs. Energy costs are calculated as the energy usage per day (kilowatt-hour per 24 hours) multiplied by 365 days multiplied by the price of electricity per kilowatt-hour. The maintenance costs are the reported maintenance expenditures for cold chain equipment or the cost paid in the tender for cold chain maintenance.

4.4. Vehicles (annualized depreciation)

Vehicles are assumed to have an economic life of ten years. In order to estimate the average depreciation per kilometer, we pooled all the data from the facilities that reported using each type of vehicle (refrigerated vehicle, four-wheel drive vehicle, microbus, or sedan) for vaccine transport. Each facility that owned a vehicle reported the annual distance traveled by the vehicle and then averaged the distance by vehicle type. The vehicle's economic life in kilometers was then estimated by multiplying the average distance traveled per year by ten years. We calculated the depreciation costs per kilometer by dividing the current replacement price for a similar new vehicle by the distance traveled during the vehicle's economic life.

4.5. Transport recurrent—fuel, maintenance, and insurance

The recurrent costs for transport include fuel, maintenance, and insurance. Fuel costs are calculated as the annual distance traveled for vaccine (or dry goods) collection or delivery multiplied by the fuel costs per liter and divided by the fuel efficiency of the vehicle. The vehicle maintenance and insurance costs are the reported maintenance costs; these costs are also apportioned for supply chain activities using the percentage of distance traveled for such activities.

4.6. Storage space

Storage space is the cost to lease the space allocated for cold storage or dry goods storage. Only the national store and regions might have dedicated spaces. Other tiers might have shared spaces, so the infrastructure costs might only be calculated for these upper tiers.

5. DATA COLLECTION PROCEDURES

We used several methods to collect data, including:

- Field visits conducted by project staff based in country.
- Records review.
- Interviews using supply chain costing questionnaires. A sample copy of a supply chain costing questionnaire is attached in Appendix 1.

6. THROUGHPUT MEASURES

The throughput of the system is the number of doses of vaccines distributed to each level. For Vietnam, these data were obtained from the stock-ledger data at each facility visited and from the vaccine arrival reports at the national vaccine store. Stock-ledger data were unavailable at the health centers; therefore, population data were used to estimate the demand. We also calculated the corresponding volume of vaccines distributed using the packed volume of each dose of vaccine and the value of the vaccines distributed using the vaccine prices. For some countries, stock-ledger data may not be available, so demand can be estimated for each vaccine using the formula: size of the birth cohort multiplied by the number of doses per fully immunized child multiplied by the immunization coverage rate multiplied by the wastage factor.

7. COST MEASURES AND SUPPLY CHAIN METRICS

Several cost measures and supply chain metrics can be calculated from the model. Some of these costs and metrics can be aggregated across tiers, while others can only be calculated at each facility and cannot be aggregated across tiers. The cost measures are described in Table 2 and the supply chain metrics are described in Table 3.

7.1. Cost measures from the model

Table 2. Cost measures

Cost	Description
Total annual supply cost	Annual total storage and transportation costs for the facility.
Total cost by function	• Total storage cost for the facility. • Total transportation cost for the facility.
Total cost by input	• Labor. • Cold chain equipment depreciation. • Cold chain maintenance. • Cold chain energy. • Vehicle depreciation. • Vehicle fuel, maintenance, and insurance. • Infrastructure.
Cost drivers per tier	The cost inputs or cost functions that account for the largest share of the supply chain costs.
Average supply chain costs	The average supply chain costs for each tier or for a subgroup of facilities in the same tier.

7.2. Supply chain metrics calculated

Table 3. Supply chain metrics

Cost measure	Formula	Notes
Cost per dose at the facility	Total annual supply chain cost at the facility divided by the annual number of doses of vaccines that were distributed to that facility.	Calculated at each facility.
Cost per dose	Sum across facilities (cost per dose at the national store, regional store, provincial store, district store, and health center).	This is the core indicator for the model, aggregated across tiers. Measures the cost of moving a single dose of vaccine from the national store to the commune health center.
Cost per cm^3 of vaccines	Vaccine supply chain costs divided by the volume of vaccines distributed to the facility.	Calculated for each facility and for vaccines only.
Supply chain costs as a percentage of the value of the vaccines	Vaccine supply chain costs multiplied by 100 divided by the value of vaccines distributed to the facility.	Calculated for each facility and for vaccines only.

APPENDIX 1. OPTIMIZE VACCINE SUPPLY CHAIN COSTING TOOL

SAMPLE FORM R1: REGIONAL QUESTIONNAIRE	
Name of interviewee:	**Region:**
Interviewee title:	
Interviewee role:	**Date:**
Function of the cold chain: Which of the following is provided by the region? *Please check ALL that apply* ☐ Storage ☐ No	**Which of these options best decribes how vaccines for routine immunization arrive at the region?** *Please check ONLY ONE box* ☐ Delivered to the region ☐ Collected from the national store ☐ Both

DATA ON POPULATION			
	2012	**2011**	**2010**
Total population			
Number of children less than 12 months of age			
Number of pregnant women			
Number of women of child-bearing age			

WASTAGE RATES FOR CONSUMABLES	
Wastage rate of syringes: _____%	**Wastage rate of safety boxes: _____%**

VACCINE DATA FOR 2012

Vaccine name:						**Coverage rate:**				**Wastage rate:**		
Month	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
# of doses in stock												
# of doses received												
# of doses distributed												

Vaccine name:						**Coverage rate:**				**Wastage rate:**		
Month	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
# of doses in stock												
# of doses received												
# of doses distributed												

Vaccine name:						**Coverage rate:**				**Wastage rate:**		
Month	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
# of doses in stock												
# of doses received												
# of doses distributed												

Vaccine name:						**Coverage rate:**				**Wastage rate:**		
Month	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
# of doses in stock												
# of doses received												
# of doses distributed												

VACCINE DATA FOR 2012												
Vaccine name:						**Coverage rate:**				**Wastage rate:**		
Month	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
# of doses in stock												
# of doses received												
# of doses distributed												
Vaccine name:						**Coverage rate:**				**Wastage rate:**		
Month	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
# of doses in stock												
# of doses received												
# of doses distributed												
Vaccine name:						**Coverage rate:**				**Wastage rate:**		
Month	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
# of doses in stock												
# of doses received												
# of doses distributed												
Vaccine name:						**Coverage rate:**				**Wastage rate:**		
Month	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
# of doses in stock												
# of doses received												
# of doses distributed												

VACCINE DATA FOR 2012

Vaccine name:						Coverage rate:				Wastage rate:		
Month	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
# of doses in stock												
# of doses received												
# of doses distributed												

Vaccine name:						Coverage rate:				Wastage rate:		
Month	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
# of doses in stock												
# of doses received												
# of doses distributed												

Vaccine name:						Coverage rate:				Wastage rate:		
Month	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
# of doses in stock												
# of doses received												
# of doses distributed												

Vaccine name:						Coverage rate:				Wastage rate:		
Month	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
# of doses in stock												
# of doses received												
# of doses distributed												

HUMAN RESOURCES DUTIES RELATED TO LOGISTICS

Complete the following information for each health worker with vaccine or consumables logistics duties.

Check all tasks that apply and fill in the appropriate information to provide information on the amount of time that each health worker spends for each task listed below.

Health worker 1

	Health worker has duties related to vaccines	Vaccines		Health worker has duties related to dry goods	Consumables	
		How often does this activity occur?	Average time spent on activity per time period		How often does this activity occur?	Average time spent on activity per time period
ORDERING FOR THE REGION						
Estimating the needs for the region	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
Preparing and completing the paperwork for orders	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
Entering orders into the computer	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
Checking and approving orders	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
ORDERING FOR DISTRICTS						
Estimating or preparing orders and completing paperwork for orders from the districts	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
Entering orders from the districts into the computer	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
Checking and approving orders from the districts	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
COLLECTION/TRANSPORT						
Collecting/transporting vaccines or consumables from the national store	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
Delivering/transporting vaccines or consumables to the districts	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
STOCK MONITORING						
Temperature monitoring of cold chain equipment with vaccine stock	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours			
Issuing orders to the districts	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
Receiving orders from the national store, updating region ledgers, organizing and monitoring stock at the regional store	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours

Health worker 2

	Health worker has duties related to vaccines	Vaccines		Health worker has duties related to dry goods	Consumables	
		How often does this activity occur?	Average time spent on activity per time period		How often does this activity occur?	Average time spent on activity per time period
ORDERING FOR THE REGION						
Estimating the needs for the region	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
Preparing and completing the paperwork for orders	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
Entering orders into the computer	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
Checking and approving orders	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
ORDERING FOR DISTRICTS						
Estimating or preparing orders and completing paperwork for orders from the districts	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
Entering orders from the districts into the computer	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
Checking and approving orders from the districts	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
COLLECTION/TRANSPORT						
Collecting/transporting vaccines or consumables from the national store	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
Delivering/transporting vaccines or consumables to the districts	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
STOCK MONITORING						
Temperature monitoring of cold chain equipment with vaccine stock	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours			
Issuing orders to the districts	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
Receiving orders from the national store, updating region ledgers, organizing and monitoring stock at the regional store	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours

Health worker 3

	Health worker has duties related to vaccines	Vaccines		Health worker has duties related to dry goods	Consumables	
		How often does this activity occur?	Average time spent on activity per time period		How often does this activity occur?	Average time spent on activity per time period
ORDERING FOR THE REGION						
Estimating the needs for the region	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
Preparing and completing the paperwork for orders	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
Entering orders into the computer	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
Checking and approving orders	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
ORDERING FOR DISTRICTS						
Estimating or preparing orders and completing paperwork for orders from the districts	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
Entering orders from the districts into the computer	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
Checking and approving orders from the districts	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
COLLECTION/TRANSPORT						
Collecting/transporting vaccines or consumables from the national store	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
Delivering/transporting vaccines or consumables to the districts	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
STOCK MONITORING						
Temperature monitoring of cold chain equipment with vaccine stock	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours			
Issuing orders to the districts	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
Receiving orders from the national store, updating region ledgers, organizing and monitoring stock at the regional store	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours

Health worker 4

	Health worker has duties related to vaccines	Vaccines		Health worker has duties related to dry goods	Consumables	
		How often does this activity occur?	Average time spent on activity per time period		How often does this activity occur?	Average time spent on activity per time period
ORDERING FOR THE REGION						
Estimating the needs for the region	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours.	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
Preparing and completing the paperwork for orders	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
Entering orders into the computer	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
Checking and approving orders	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
ORDERING FOR DISTRICTS						
Estimating or preparing orders and completing paperwork for orders from the districts	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
Entering orders from the districts into the computer	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
Checking and approving orders from the districts	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
COLLECTION/TRANSPORT						
Collecting/transporting vaccines or consumables from the national store	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
Delivering/transporting vaccines or consumables to the districts	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
STOCK MONITORING						
Temperature monitoring of cold chain equipment with vaccine stock	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours			
Issuing orders to the districts	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours
Receiving orders from the national store, updating region ledgers, organizing and monitoring stock at the regional store	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours	☐ Yes ☐ No	☐ Daily ☐ Weekly ☐ Monthly	☐ Minutes ☐ Hours

COLD CHAIN INVENTORY

Cold rooms, freezer rooms, refrigerators, and freezers

Complete a separate line for each piece of equipment at the facility.

Type CR = cold room FR = freezer room R = refrigerator F = freezer	**Make**	**Model**	**Year of purchase**	**Storage capacity (L)** (net volume for prequalified equipment)	**Only for equipment using gas or kerosene:** monthly cost of gas or kerosene	**% of capacity used for vaccines (EPI)**	**Tool for temperature monitoring** T = thermometer FT = Fridge-Tag	**Operating status** A = good B = working but with problems C = broken

Maintenance and repair of cold chain equipment

a. Was there any routine maintenance of the cold chain equipment at this facility in 2012? ☐ Yes ☐ No

If yes, how much was paid in total in 2012 for the routine maintenance of the cold chain equipment? _____

b. Did any of the cold chain equipment at this facility break down and need repair in 2012? ☐ Yes ☐ No

If yes, how much was paid in total in 2012 for the repair of the cold chain equipment? _____

Cold boxes: Complete a separate line for each cold box at the facility.

Make and model	**Capacity (L)**	**Number of units at the facility**

STORAGE

Vaccines	Consumables
Type of space used to store vaccines: ☐ Shared space with other health products ☐ Room specially allocated for vaccines ☐ Room specially allocated for vaccines and consumables	**Type of space used to store consumables:** ☐ Shared space with other health products ☐ Room specially allocated for consumables
What is the building area (m^2) used for storing vaccines?	**What is the building area (m^2) used for storing consumables?**

STOCKOUTS

Vaccines

Did you experience any stockouts in 2012?

Please check ALL that apply and if there was a stockout, provide information on the duration of the stockout.

Vaccine	Stockout experienced?	Duration of the stockout
	☐ Yes ☐ No	
	☐ Yes ☐ No	
	☐ Yes ☐ No	
	☐ Yes ☐ No	
	☐ Yes ☐ No	
	☐ Yes ☐ No	
	☐ Yes ☐ No	

Consumables

Did you experience any stockouts in 2012?

Please check ALL that apply and if there was a stockout, provide information on the duration of the stockout.

Consumables	Stockout experienced?	Duration of the stockout
	☐ Yes ☐ No	
	☐ Yes ☐ No	
	☐ Yes ☐ No	
	☐ Yes ☐ No	
	☐ Yes ☐ No	
	☐ Yes ☐ No	

What were the reasons for the stockout of vaccines?

What were the reasons for the stockout of consumables?

COLLECTION OF VACCINES AND CONSUMABLES FROM THE NATIONAL STORE

Distance (km) from the region to the national store: _____

Are both vaccines and consumables collected from the national store or delivered by the national store to the region?

☐ Collected from the national store ☐ Delivered to the region

If both vaccines and immunization supplies are DELIVERED to the region, DO NOT COMPLETE THIS SECTION. If either vaccines or consumables are collected by the region, then complete the section below.

Collection of vaccines from the national store Please provide the following information on the collection of vaccines.	**Collection of consumables from the national store** Please provide the following information on the collection of consumables.
Number of trips each year to collect vaccines: _____	**Are consumables collected at the same time as vaccines?** ☐ **Yes** *If YES, skip this section and go to section on vehicles.* ☐ **No→**
Number of health workers traveling together for each trip to collect vaccines: _____	**Number of trips each year to collect consumables:** _____
Are per diems paid for these trips to collect vaccines? ☐ **Yes→** **Amount of per diem per person per trip:** _____ ☐ **No**	**Number of health workers traveling together to collect consumables:** _____ **Are per diems paid on the trips to collect consumables?** ☐ **Yes→** **Amount of per diem per person per trip:** _____ ☐ **No**

DISTRIBUTION OF VACCINES AND CONSUMABLES TO THE DISTRICTS

Distribution of vaccines to districts

Please check ALL that apply

☐ Vaccines are delivered using a vehicle that is owned by the region or the government
☐ Vaccines are delivered using a private vehicle that is rented/hired
☐ The districts collect vaccines from the region

If the region does not deliver vaccines to the districts, skip this section and go to the section on vehicles.

Distribution of consumables to districts

Please check ALL that apply

☐ Consumables are delivered using a vehicle that is owned by the region or government
☐ Consumables are delivered using a private vehicle that is rented/hired
☐ The districts collect consumables from the region

If the region does not deliver consumables to the districts, skip this section and go to the section on vehicles.

Total number of vaccine deliveries to the districts in 2012:

_____

Total number of consumables deliveries to the districts in 2012:

_____

If vaccines were distributed to districts by a private vehicle, what was the total expenditure for these services in 2012?

_____

If consumables were distributed to districts by a private vehicle, what was the total expenditure for these services in 2012?

_____

Delivery of vaccines

Complete this section if vaccines were delivered to districts using government vehicles.

Number of health workers traveling together for each delivery of vaccines:

_____

Are per diems paid for these delivery trips?

☐ **Yes→** **Amount of per diem per person per trip:**

_____

☐ **No**

Transportation of vaccines

Number of districts to which vaccines are delivered:

_____

Delivery of consumables

Complete this section if consumables were delivered to districts using government vehicles.

Are consumables delivered at the same time as vaccines?

☐ **Yes** If YES, skip to the next section.

☐ **No→**

Number of health workers traveling together for each delivery trip:

_____

Are per diems paid for these delivery trips?

☐ **Yes→** **Amount of per diem per person per trip:**

_____

☐ **No**

Transportation of consumables

Number of districts to which consumables are delivered:

_____

Routing of vaccine distribution

Which of these best describe the routing of vaccine deliveries in 2012? Please check ALL that apply.

☐ One round-trip delivery to all districts in the region

☐ Delivery to one district at a time

☐ Delivery to several districts at a time (but not to all)

Routing of consumables distribution

Which of these best describe the routing of consumables deliveries in 2012? Please check ALL that apply.

☐ One round-trip delivery to all districts in the region

☐ Delivery to one district at a time

☐ Delivery to several districts at a time (but not to all)

Distribution schedule for vaccines

Route	Districts served on this distribution route	Distance (round trip)

Distribution schedule for consumables

Route	Districts served on this distribution route	Distance (round trip)

VEHICLES

Government vehicle #1

Type: ☐ Refrigerated ☐ Truck ☐ Pickup/four-by-four ☐ Car	**Type:** **Volume** *(for refrigerated vehicles only)* _____**m^3**	**Model:**	**Year of purchase:**	**Fuel type:** ☐ Petrol ☐ Diesel	**Operating condition:** ☐ Good ☐ Bad ☐ Broken* *Indicate the length of time and reason for it being broken:
How many days per month is the vehicle used for EPI activities? ___ days per month	**Is the vehicle used for outreach?** ☐ Yes ☐ No		**Total distance traveled by the vehicle since it was purchased (odometer reading):** _____		
What was the total expenditure on fuel cost for this vehicle in 2012?* _____ *Information to collect from accounting	**What was the total cost of insurance for this vehicle in 2012?*** _____ *Information to collect from accounting		**What was the total cost of maintenance for this vehicle in 2012?*** _____ *Information to collect from accounting		

Government vehicle #2

Type: ☐ Refrigerated ☐ Truck ☐ Pickup/four-by-four ☐ Car	**Type:** **Volume** *(for refrigerated vehicles only)* _____**m^3**	**Model:**	**Year of purchase:**	**Fuel type:** ☐ Petrol ☐ Diesel	**Operating condition:** ☐ Good ☐ Bad ☐ Broken* *Indicate the length of time and reason for it being broken:
How many days per month is the vehicle used for EPI activities? ___ days per month	**Is the vehicle used for outreach?** ☐ Yes ☐ No		**Total distance traveled by the vehicle since it was purchased (odometer reading):** _____		
What was the total expenditure on fuel cost for this vehicle in 2012?* _____ *Information to collect from accounting	**What was the total cost of insurance for this vehicle in 2012?*** _____ *Information to collect from accounting		**What was the total cost of maintenance for this vehicle in 2012?*** _____ *Information to collect from accounting		

Government vehicle #3					
Type: ☐ Refrigerated ☐ Truck ☐ Pickup/four-by-four ☐ Car	**Type:** **Volume** *(for refrigerated vehicles only)* _____**m^3**	**Model:**	**Year of purchase:**	**Fuel type:** ☐ Petrol ☐ Diesel	**Operating condition:** ☐ Good ☐ Bad ☐ Broken* *Indicate the length of time and reason for it being broken:
How many days per month is the vehicle used for EPI activities? ___ days per month	**Is the vehicle used for outreach?** ☐ Yes ☐ No		**Total distance traveled by the vehicle since it was purchased (odometer reading):** _____		
What was the total expenditure on fuel cost for this vehicle in 2012?* _____ *Information to collect from accounting	**What was the total cost of insurance for this vehicle in 2012?*** _____ *Information to collect from accounting		**What was the total cost of maintenance for this vehicle in 2012?*** _____ *Information to collect from accounting		

Uses of the vehicles for the collection or delivery of vaccines and consumables in 2012

Vehicles (Please list)	Complete columns A and B if vaccines and consumables are collected at the same time.		Complete these columns if vaccines and consumables are collected/delivered at different intervals.			
	Number of trips for which this vehicle was used to collect *BOTH* vaccines AND consumables in 2012 (A)	**Number of trips for which this vehicle was used to deliver *BOTH* vaccines AND consumables in 2012** (B)	**Number of trips for which this vehicle was used to collect vaccines in 2012**	**Number of trips for which this vehicle was used to deliver vaccines in 2012**	**Number of trips for which this vehicle was used to collect consumables in 2012**	**Number of trips for which this vehicle was used to deliver consumables in 2012**
Vehicle #1:						
Vehicle #2:						
Vehicle #3:						