Cold Chain Equipment Management Inventory Tool (CCEM)

Version 1.0

User Manual

March 2008

Acknowledgments

The Cold Chain Equipment Management Tool (CCEM version 1.0) was originally designed and developed by John Lloyd (PATH), Sophie Newland (PATH), Paulo Froes (UNICEF The Regional Office for Latin America and the Caribbean), and Dexter Bersonda (WHO Western Pacific Regional Office).

The CCEM is a collaborative effort among UNICEF, WHO, and PATH. The development of the tool and its associated documentation was made possible in part by the generous support of the American people through the United States Agency for International Development (USAID) under the terms of the HealthTech Cooperative Agreement #GPH-A-00-01-00005-00, managed by PATH. Additional support was possible with the generous assistance of Dr. Yang Baoping from WHO Western Pacific Regional Office.

The contents of the CCEM tool and the associated materials reflect the opinions of the authors and do not necessarily reflect the views of USAID.

The developers would like to express their most sincere thanks to all who participated in the testing the original prototypes of this database and provided valuable feedback to the development team, including the Uganda National Expanded Programme on Immunization (UNEPI) team:

Dr. Issa Makumbi UNEPI Country Manager;
Dr. Pamela Zaninka UNEPI
Mr. Tumwine Rweizire UNEPI

Partner collaborators to CCEM development include:

Dr. Fernando Perez, Peru Ministry of Health
Dr. Fiona Braka-Makmot, WHO Uganda
Mrs. Jessica Kafako, USAID Uganda
Dr. Vincent Orinda, UNICEF Uganda
Mr. Nasim Ahmed, STC UNICEF Uganda
Mr. Fred Urlep, WHO/AFRO
Dr. Souleymane Kone, WHO Geneva

Additional technical support was essential for the finalization of CCEM. Valuable contributors include:

Mr. Tom Lewis, PATH Consultant
Ms. Sarah McGray, PATH
Mr. Laurent Bergeron, PATH

About the Cold Chain Equipment Management (CCEM) Tool and User Manual

The Cold Chain Equipment Management (CCEM) tool [version 1.0] is an interactive cold chain equipment database management system for immunization programme managers and public health officers.

The CCEM Tool was designed and developed to facilitate the strategic management of a national cold chain equipment inventory and to ensure the availability of sufficient cold chain equipment for safe vaccine storage and transport, when and where it is needed, in an effective national immunization program.

The CCEM Tool is in the public domain and freely available for use, copying, translation and distribution. It was originally developed by a joint effort of PATH/USAID, UNICEF (The Regional Office for Latin America and the Caribbean) and WHO (The Western Pacific Regional Office).

For more information, please contact:

PATH
1455 NW Leary Way
Seattle, WA 98107
USA
+1 (206) 285-3500
info@path.org
www.path.org

Suggested citation for CCEM Software: Lloyd J, Newland S, Froes P, Bersonda D. CCEM Tool, an Interactive Database System for Cold Chain Equipment Management by Public Health Professionals [computer program]. Version 1.0. Seattle: PATH, UNICEF-TACRO, WHO-WPRO; 2008.

Suggested citation for Software User's Manual: *Cold Chain Equipment Management (CCEM) Software User Manual.* Seattle: PATH, UNICEF-TACRO, WHO-WPRO; 2008.

Acronyms

CCCPT	Cold Chain Capacity Planning Tool
CCEM	Cold Chain Equipment Management
CMYP	Comprehensive multi-year plan
EVSM	Effective Stores Vaccine Management
PIS	Product Information System
PQS	Performance, Quality, and Safety system
UNICEF	United Nations Children's Fund
VMA	Vaccine Management Assessment
VVC	Vaccine Volume Calculator
WHO	World Health Organization
UNICEF	United Nations Children's Fund

Table of Contents

1. Introduction

The Cold Chain Equipment Management (CCEM) software tool is designed to help strategically manage the inventory of national cold chain equipment and ensure the availability of well functioning equipment for safe vaccine storage and transport.

Cold chain equipment requirements and funding to support the recurrent and capital costs of the equipment must be assessed and presented in multi-year national plans. Effective implementation and analysis of the national inventory of cold chain equipment is needed to support solid multi-year plans with quality data. This analysis is also critical for planning the introduction of new vaccines, which may impact cold chain equipment requirements.

CCEM software provides a comprehensive database tool to help develop multi-year plans and facilitate routine management of cold chain equipment. This tool also provides:

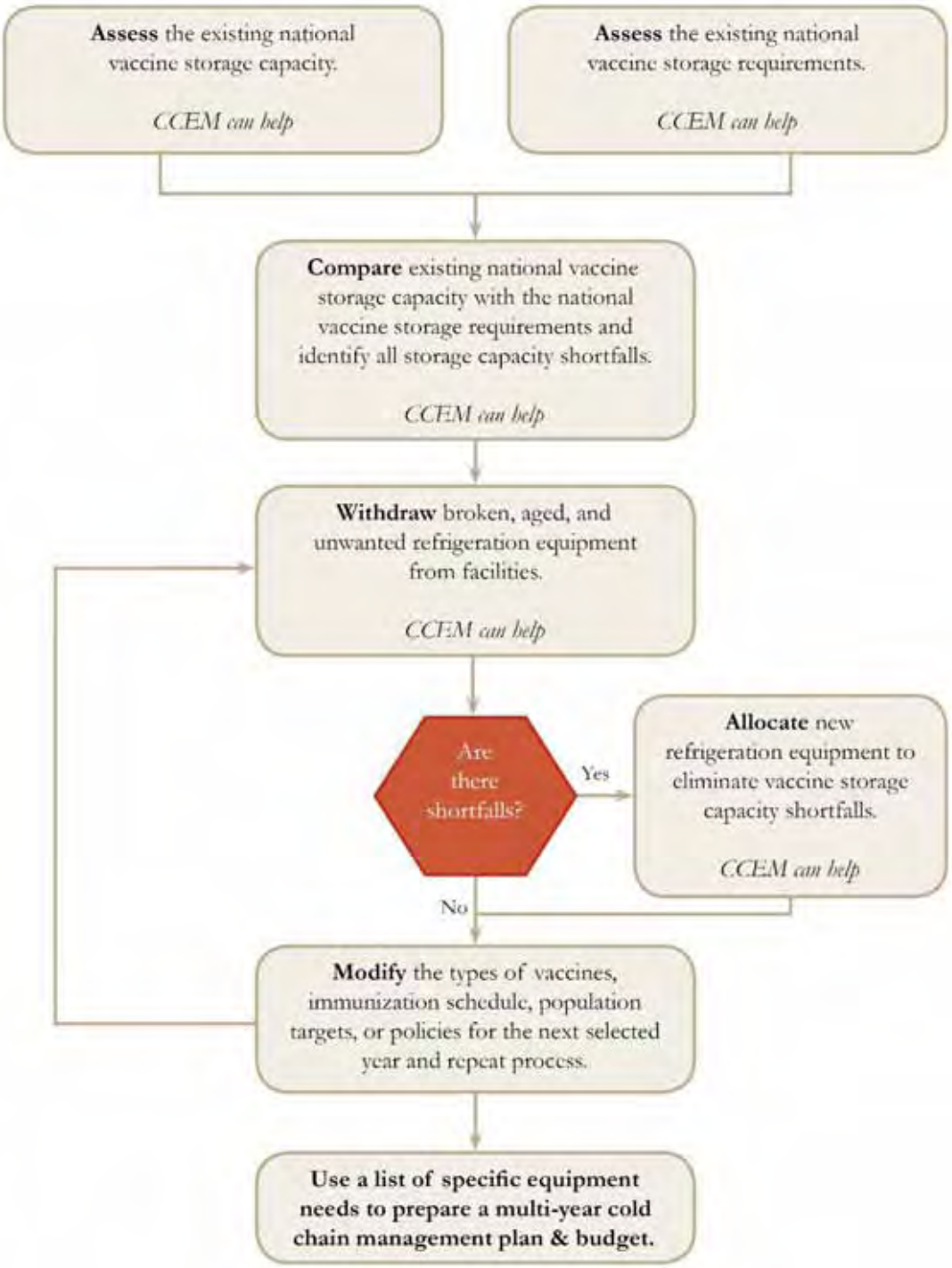
Data management of information related to existing refrigeration equipment and health facilities.

Data collection tools and support for an inventory of all health centres throughout the country.

Automatic and customized analytical tools to assess cold chain performance, capacity, and the impact of vaccine introduction and other programmatic changes.

With this tool, cold chain managers can carefully analyze and assess the performance of the national cold chain and introduce interventions that will optimize the management of cold chain equipment. Figure 1 provides an example of the cold chain equipment planning process.

Figure 1: Cold chain equipment planning process



1.1. Equipment Planning and the CCEM Tool

The CCEM tool is an open-source, Microsoft Office database system. The tool uses 15 categories of data to generate national details and an equipment inventory for each facility in the country. With these details, cold chain managers can comprehensively evaluate equipment needs in every facility in the country. See Annex 1 for information on each dataset. The CCEM tool is available for free at http://www.path.org/projects/cold-chain-ccem.php, By downloading the CCEM tool and its supporting documentation from this shareware site, cold chain managers will have available a cold chain equipment planning tool that will facilitate management of the national cold chain.

To achieve strategic cold chain equipment planning, the CCEM tool is designed to meet six sequential objectives:

1. Establish an accurate inventory of existing equipment.
2. Analyze current storage capacity against actual requirements.
3. Analyze the current performance of equipment management.
4. Forecast future equipment needs to meet future requirements.
5. Generate a multi-year plan for equipment procurement and system improvements.
6. Develop a system for annually updating equipment inventory details in order to maintain database accuracy.

Establishing an accurate inventory of existing equipment

Before using the CCEM tool, a well-planned and implemented national survey is needed to collect cold chain data from every health facility that stores vaccines or delivers immunizations. The following tools have been developed, field-tested, and recommended for use with the CCEM tool. These documents are also available for download from http://www.path.org/projects/cold-chain-ccem.php.

CCEM Questionnaire Guide. To help surveyors collect standardized and accurate health facility and cold chain equipment data, a detailed CCEM Questionnaire Guide is included in Annex 2. This guide describes the rationale for each survey question and provides guidance on determining the best response.

Inventory Questionnaires. Trained surveyors collect inventory data from each health facility using a standard set of inventory questionnaires. See Annex 3 for a set of questionnaires developed and piloted for use with the CCEM tool.

Equipment Identification Guide. To help surveyors correctly identify cold chain equipment, an Equipment Identification Guide is provided in Annex 4. This guide provides identification information for cold chain equipment in the World Health Organization (WHO) Performance Quality and Safety (PQS) system. As a first step, cold chain managers should add standard equipment commonly found in each country to the Equipment Identification Guide and the Standard Equipment Library. See Section 3.4 for instruction on adding new equipment to the CCEM Libraries.

Note:

Each country may have unique administrative terms or cold chain equipment not found in the existing Equipment Identification Guide. Before implementing the cold chain equipment survey, review and update the following documents:

1. CCEM Questionnaire Guide (See Annex 2).
2. CCEM Questionnaires (series of seven) (See Annex 3).
3. Equipment Identification Guide (See Annex 4).

When you make changes to the CCEM questionnaires to reflect specific terms and administrative levels used in your country, these changes will not be reflected in the screens found in the CCEM tool. All changes in to the questionnaires should be made only to help surveyors understand how to collect the most accurate data and should not change the essential data collected.

Analyzing current storage capacity against actual requirements

The CCEM tool calculates the current vaccine storage capacity of each facility and can generate reports to gauge this existing storage capacity against the required capacity to fully support the national immunization efforts.

Calculating capacity. The CCEM tool calculates the current storage capacity[1] at all health facilities and compares this value to the estimated cold chain storage capacity requirements for the specific national vaccine schedule, including the types of vaccines delivered and the number of doses delivered. To ensure that all health facilities have sufficient cold chain equipment, the vaccine and ice pack storage capacity at both +4°C[2] and at -20°C must be calculated and compared to present and future requirements. See Section 3.2 for more detail on how this vaccine schedule is entered into the CCEM tool. The vaccine storage capacity calculations in the CCEM tool use data from the target population, national immunization schedule, and national policies on vaccine wastage, reserve stocks, and resupply intervals. See Annex 5 for information on how the CCEM tool calculates these values.

Capacity reporting. The CCEM tool can provide information and reports for specific facilities or regions regarding vaccine storage capacity. These reports identify facilities with capacity shortfalls, surpluses, and optimal storage capacity. The capacity data presented in these reports may be useful for prioritizing certain geographic areas or types of facilities for follow-up (see Section 5).

[1] Capacity is calculated at +4°C and -20°C separately. This capacity includes equipment both "In Use" and "Not In Use" that is "Working Well" or "Working, Needs Service." See CCEM Questionnaire Guide for exact definitions of these terms. The capacity calculation excludes equipment whose working status is "Not Working" and equipment that is "In stock, available for redistribution" (see Annex 5 to see equations used for capacity calculations).

[2] In CCEM and associated materials, +4°C represents the average of the recommended +2°C–8°C storage condition.

Analyzing the current performance of equipment management

The CCEM tool contains several automatic reporting functions that allow cold chain managers to generate standard and customizable reports that summarize cold chain performance indicators. These indicators can be presented for individual health facilities or for select administrative areas. Examples of performance indicators for the management of cold chain equipment include:

Responsiveness by the cold chain technicians to repair requests.

Quality of the installation of refrigeration equipment.

Storage temperatures and operating status.

Shared storage of vaccines with food and drink.

Performance indicators. Performance indicators are designed to reflect the operation and maintenance of cold chain equipment. These indicators do not include all the indicators found in the WHO Vaccine Management Assessment (VMA) tool; however, reports about performance indicators may prompt managers to include activities such as training in the national multi-year plan to improve the performance of the cold chain system.

Reporting Wizard. Managers can customize additional reports using the CCEM Reporting Wizard. See Section 5.2 for details on the Reporting Wizard function.

Forecasting future equipment needs against future requirements

A critical component of developing a national multi-year plan is understanding the current vaccine storage capacity and the impact of existing capacity shortfalls or surplus on current and future immunization activities. In order to meet the vaccine storage needs for future immunization activities, effective multi-year planning for cold chain equipment must evaluate and address equipment needs. These forecasts must also address changes for populations, vaccine schedules, finances, and other parameters. See Section 6 and Section 7 for information on preparing forecasts for multi-year planning.

The CCEM tool forecasts equipment needs based on the following critical factors:

National policies for outdated or broken equipment.

National recommendations for specific refrigeration equipment for specific facility types.

National recommendations for specific refrigeration equipment for facilities with specific energy supplies.

Future policies for reserve stocks, supply intervals, and vaccine wastage.

Planned introduction of new vaccines.

Using the CCEM tool, the national cold chain manager can evaluate different planning scenarios, produce final equipment lists, and estimate capital and recurrent costs of the cold chain system. Because the CCEM tool can generate capacity and equipment forecasts automatically, managers can compare a variety of planning scenarios and adjust planning criteria to develop the best national multi-year plan.

Generating a rational multi-year plan for equipment procurement and system improvement

With the CCEM tool, managers can build multi-year plans supported by a comprehensive analysis of the national cold chain inventory and the impact of changes to national policies and recommendations. Automatic reports document the need for cold chain equipment and equipment procurement lists facilitate the ordering of appropriate equipment for an optimized national cold chain system. As part of the development of a comprehensive multi-year plan (cMYP) for immunization, countries must streamline immunization planning at the national level into a single comprehensive plan with an associated budget. Using the CCEM tool helps cold chain managers to develop cMYPs for cold chain equipment by providing:

Estimates for future vaccine storage capacity requirements.

Details about systematic replacement of outdated cold chain equipment.

Details about standardizing cold chain equipment to reflect global policy and national experience.

Information about the energy supply needed for equipment, including solar energy.

Direction for efficient national policy on resupply intervals, balancing storage needs against transport cost and availability.

Equipment procurement lists and estimated capital and operation costs.

Developing a system for annual updating to maintain accuracy

Once the inventory data are collected and entered into the CCEM tool, the database must be routinely updated to ensure continued accuracy and effective management of national cold chain equipment.[3] For example, when refrigeration equipment is discarded, moved, or purchased, changes in equipment status must be reported, recorded, and entered into the inventory database. A paper-based system is used to collect this information from health facilities, and the forms are sent to the national cold chain manager for entry into the inventory database. See Section 7 for an explanation of the importance of updating the national cold chain equipment inventory. See Annex 6 for health centre updating forms and regional updating forms.

[3] Future versions of the CCEM tool will include options for decentralizing the process for updating information and networking computers nationally.

1.2. How the CCEM Tool Complements Other Tools

As new global standards for immunization logistics emerge, several computer spreadsheet and database tools are now available to help cold chain program managers meet these standards. Following are several existing tools and details on how the CCEM tool complements or works with these programs:

Effective Stores Vaccine Management (EVSM):[4] Evaluates ten criteria using a spreadsheet tool to assess the standard operating procedures and equipment needs of primary vaccine stores, including how central storage capacity meets requirements. The CCEM tool also assesses primary vaccine storage capacity as well as evaluates storage capacity needs at peripheral vaccine stores.

Vaccine Management Assessment (VMA):[5] Assesses vaccine management using a spreadsheet tool in a sample of the country's vaccine stores. The VMA does not assess equipment issues related to performance, repairs, or the availability of spare parts and tools. The CCEM tool captures information for every health facility in the country in order to provide detailed planning capacity for multi-year plans.

Vaccine Volume Calculator (VVC):[6] Estimates the volume of vaccine stored for a given population and immunization schedule using a spreadsheet tool. The VVC does not incorporate country data related to the cold chain system. The CCEM tool uses the principles of the VVC and country cold chain system data to generate cold chain equipment forecasts.

Cold Chain Capacity Planning Tool (CCCPT): Compares country data for existing storage capacity to the estimates of vaccine storage requirements generated by the VVC using a spreadsheet tool. With the CCCPT, equipment details (allocating and withdrawing items from a centre) are made manually for each facility to generate an equipment list. Consequently, the iterative process of scenario testing can be cumbersome in the CCCPT; however, the CCEM tool facilitates scenario testing with an automatic withdrawal and allocation process for cold chain equipment for all facilities in the cold chain system. The CCEM tool is designed to export a dataset for the CCCPT.

Unlike the spreadsheet-based tools described above, CCEM is a database that is more stable, secure, and appropriate for holding and managing large quantities of country data, such as equipment lists with multiple attributes—which can often exceed 5,000 records.

[4] http://whqlibdoc.who.int/hq/2005/WHO_IVB_04.16-20.pdf.
[5] http://whqlibdoc.who.int/hq/2005/WHO_IVB_05.02_eng.pdf
[6] http://www.who.int/vaccines-documents/excel/Volume_calculator_December_2004.xls

1.3. About the User Manual

This CCEM User Manual will support a successful application of the CCEM tool. A CCEM tutorial is available at http://www.path.org/projects/cold-chain-ccem.php.

CCEM Questionnaires[7], the CCEM Questionnaire Guide, and the Equipment Identification Guide are available in the Annex 2, 3, and 4, respectively and at http://www.path.org/projects/cold-chain-ccem.php.

1.4. Downloading CCEM from the Internet

CCEM files are available at http://www.path.org/projects/cold-chain-ccem.php:

It is important that all data is entered into the same CCEM 1.0.mdb file. Therefore, all CCEM files must be installed into one, central computer that is accessible to all necessary personnel.

The following MS Access files are all required and must be saved in the same, central folder. These files contain data required for all interfaces and functions of CCEM to work. A separate folder should be created for practice using the CCEM tool, using the CCEM 1.0 Practice.mdb file and associated files.

CCEM 1.0 Files (CCEM 1.0 zip)

- CCEM 1.0.mdb (the CCEM tool).
- CCEM WHO.mdb (a file that allows for ease in exporting CCEM data to the WHO CCCPT).
- Criterias.mdb (a mandatory file that must be included in the folder containing the CCEM tool. See Section 1.5 for additional details on all mandatory CCEM files).
- Pictures.mdb (A mandatory file that must be included in any folder containing CCEM. See Section 1.5 for additional details).
- Blank.mdb (A mandatory file that must be included in any folder containing CCEM. See Section 1.5 for additional details)
- CCEM Tool.chm (a mandatory file that contains content for the CCEM Help function)

CCEM 1.0 Practice Files (CCEM 1.0 Practice zip)

- CCEM 1.0 Practice.mdb (the CCEM tool containing practice data).
- CCEM WHO.mdb (a file that allows for ease in exporting CCEM data to the WHO CCCPT).
- Criterias.mdb (a mandatory file that must be included in the folder containing the CCEM tool. See Section 1.5 for additional details on all mandatory CCEM files).
- Pictures.mdb (A mandatory file that must be included in any folder containing CCEM. See Section 1.5 for additional details).

[7] For best results with CCEM, use the set of seven CCEM questionnaires to conduct the national cold chain equipment survey.

- Blank.mdb (A mandatory file that must be included in any folder containing CCEM. See Section 1.5 for additional details)
- CCEM Tool.chm (a mandatory file that contains content for the CCEM Help function)

CCEM Support Documents

- CCEM User Manual. (CCEM Document 1)
- CCEM Questionnaire Guide (CCEM Document 2).
- Health Facility Questionnaire (CCEM Document 3).
- Refrigeration Equipment Questionnaire (CCEM Document 4).
- Cold Boxes, Vaccine Carriers, and Ice Packs Questionnaire (CCEM Document 5).
- Spare Parts and Tools Questionnaire (CCEM Document 6).
- Voltage Regulator/Stabilizer Questionnaire (CCEM Document 7).
- Generator Questionnaire (CCEM Document 8).
- Cold Room Questionnaire (CCEM Document 9).
- Equipment Identification Guide (CCEM Document 10).
- CCEM Technical Documentation.

To download the files:

1. Create a new folder entitled "CCEM Tool" on your computer or shared network drive.
2. Go to http://www.path.org/projects/cold-chain-ccem.php.
3. Click on the English, French, or Spanish link. This will take you to the next page where you will find the following instructions and the files to be downloaded.
4. **Click on each link to download the self-extracting zip files.**
   - When asked "Do you want to run or save this file?" select "Save."
   - Browse to the "CCEM Tool" folder you created above.
   - Click "Save" again to save the self-extracting file to the folder.
5. **Once finished, you should have three zip files and one PDF document in the "CCEM Tool" folder on your computer.**
6. **Un-Zip the three zip files. NOTE: All Microsoft Access files (.mdb) MUST be saved in the same folder on your computer for the CCEM database software to function properly.**
   - Go to the "CCEM Tool" folder on your desktop. You will see the self-extracting zip files in the folder.
   - Double-click on the file.
   - Click the "Browse" button and choose the "CCEM Tools" folder.
   - Click "Unzip."
   - Click "Close" when the unzipping process is complete.

7. **Repeat for each zipped file.**

Open the User Manual (PDF document) first for instructions on using the CCEM Tool.

Note:
All MS Access files (.mdb) MUST be saved in the same folder on your computer for the CCEM database software to function properly.

1.5. Installing the CCEM Tool

System requirements for the CCEM tool to operate on a personal computer include a minimum speed of 1.5 GHz, minimum dynamic RAM of 1 Mb, and at least 10 Mb of free hard disk space. The CCEM tool runs most efficiently with the Windows XP operating system (Service Pack 2 or later), and requires Microsoft Access 2003 with object library version 10 (or one of the respective later versions).

If countries want to alter the CCEM tool for specific needs, they should contact an experienced Microsoft Access programmer. A technical manual for experienced Microsoft Access programmers is available at http://www.path.org/projects/cold-chain-ccem.php.

Installing the CCEM tool:

1. Go to the specific directory on your computer where you saved the CCEM files downloaded from http://www.path.org/projects/cold-chain-ccem.php.
2. Double-click the CCEM Practice.mdb file to practice with CCEM, using a practice dataset. A CCEM Interactive Tutorial is available to demonstrate the application of CCEM. **You must not enter your cold chain equipment inventory data in this file.** Screens in this file will have an orange background.
3. Double-click the CCEM.mbd file when you are ready to start entering country cold chain inventory data into the CCEM tool. Screens in this file will have a blue background.

To ensure all data entry is performed using the same CCEM file, do not install the CCEM software on multiple computers, even if the tool will be accessible from more than one computer through a network. For best results, create a single CCEM folder on a main computer that is assessable to all appropriate staff. This will ensure that all data is entered into a single CCEM database and that a complete national cold chain inventory database is achieved.

The following five MS Access files MUST be saved in the same folder (the CCEM folder on your computer) for CCEM to function. These files provide the interface required for CCEM to access all datasets and perform the analysis functions requested by CCEM users.

Essential files	Description
CCEM 1.0.mdb or CCEM Practice.mdb	CCEM.mdb is the main CCEM database file. CCEM Practice.mdb is a CCEM tool that contains practice data to familiarize users with CCEM operation.
CCEM_WHO.mdb	Database file used to export data to the WHO CCCPT Excel spreadsheet. (see Section 8.5).
pictures.mdb	Database file of photos of the refrigerators and freezers in the CCEM libraries (see Section 3.3).
criteria.mdb	Database file of CCEM criteria for the cold chain equipment analysis and forecasting.
CCEM_Tool.chm	An extension help file compiled to provide help to the CCEM user
blank.mdb	File used to generate backup files and transfer CCEM data.

Note:
Users are advised to backup and save all data files at the end of each day—or more frequently. Weekly, a backup file should be copied to a flash drive for safekeeping. See Section 8.2 for more information on creating a backup utility.

2. Getting Started with the CCEM Tool

After installing the CCEM tool on your computer, you are ready to explore how the datasets and reporting functions can optimize the national vaccine cold chain and help prepare comprehensive multi-year plans.

The CCEM 1.0 Practice.mdb file (available from http://www.path.org/projects/cold-chain-ccem.php) contains practice data to test various applications described in the following pages. To avoid confusion when you are ready to develop the national cold chain equipment database, remove this practice file from the computer or move it to another folder. Use the clean, empty CCEM tool (CCEM 1.0.mdb) to update the national cold chain equipment inventory and management details.

2.1. Main Menu

The **Main Menu** appears when the CCEM tool is opened, and the following main options appear:

1. Enter/Edit Country Information.
2. Enter Inventory Data.
3. Generate Reports.
4. Generate Forecasts.
5. Utilities.

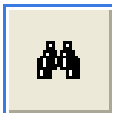
Navigate the CCEM tool using the appropriate option from the **Main Menu** or use the menu buttons located at the top of the screen.

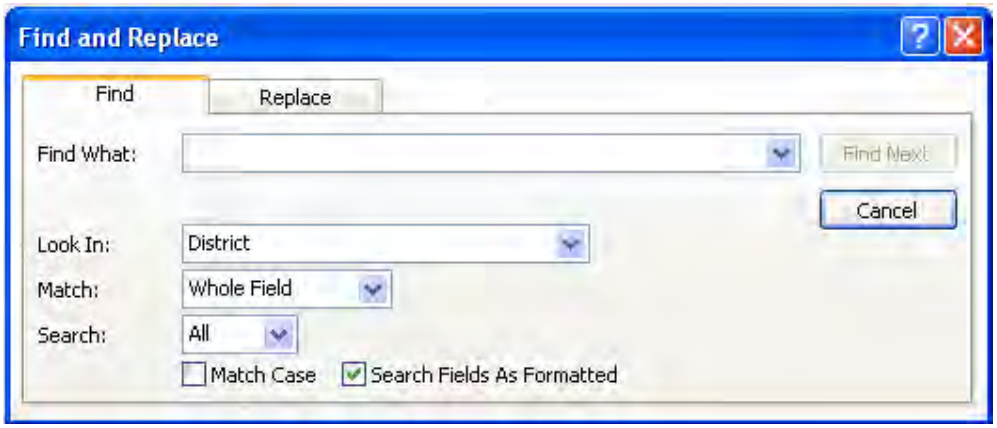
2.2. Navigating the CCEM Tool

When you select the **Enter/Edit Country Information** or the **Enter Inventory Data** options from the **Main Menu**, the following buttons will appear at the bottom of the screen to help navigate the CCEM tool.

Finding and replacing data

Use the "Find" function (the binoculars icon) to locate a particular record. Select the button and a **Find and Replace** dialogue box appears.





Use this function to search a specific field (for example, District) or the entire Health Facilities / Equipment Inventory. To find and replace data, select the **Replace** tab and follow the onscreen prompts.

1. Open a form and position the cursor in the desired search field.
2. Click the **Find** tab on the toolbar.
3. Enter the desired words or numeric value in the **Find What** field.
4. Use the **Look In** pull-down menu to search the selected field or the entire Health Facilities / Equipment Inventory.
5. Use the **Match** pull-down menu to select whether to search the "Any Part of Field," "Whole Field," or "Start of Field."
6. Select the options in the **Search** pull-down menu to search "All records" or only the records "above" or "below" the one displayed onscreen.
7. When the search is complete, select **Close**.

Adding a new record

The **New Record** button is located next to the binocular icon. In the CCEM tool, a record contains all the information associated with a specific health centre, including cold chain and equipment characteristics.

The New Record function can create a new health facility record. After completing the required data entry for a health facility and its cold chain equipment, use the **New Record** button to start a new health facility or equipment record.

The **New Record** button can also be used to enter new records in the **Enter / Edit Country Information** option**.** This includes adding a new vaccine to **Vaccines: country schedule** or a new piece of equipment to the three Standard Equipment Libraries.

Note:
Use the following options to add a new Health Facility or Equipment Inventory record:

Option 1. Select **Enter Inventory Data** from the menu bar at the top of the screen. Select **New Blank Record** from the pull-down menu.

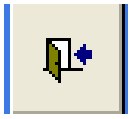
Option 2. To add a new, blank record from the Main Menu, click the **Enter Inventory Data** box**,** and then select the **New Health Facility Data** option.

Deleting a record

Select **Delete Record** (waste bin icon) to erase a record. Use caution with this button: Data are permanently deleted from the health facility and equipment inventory records and the CCEM database. After selecting the **Delete Record** button, a confirmation dialogue box appears. Click **OK** to delete the record or **Cancel** to keep the record.

Returning to the Main Menu

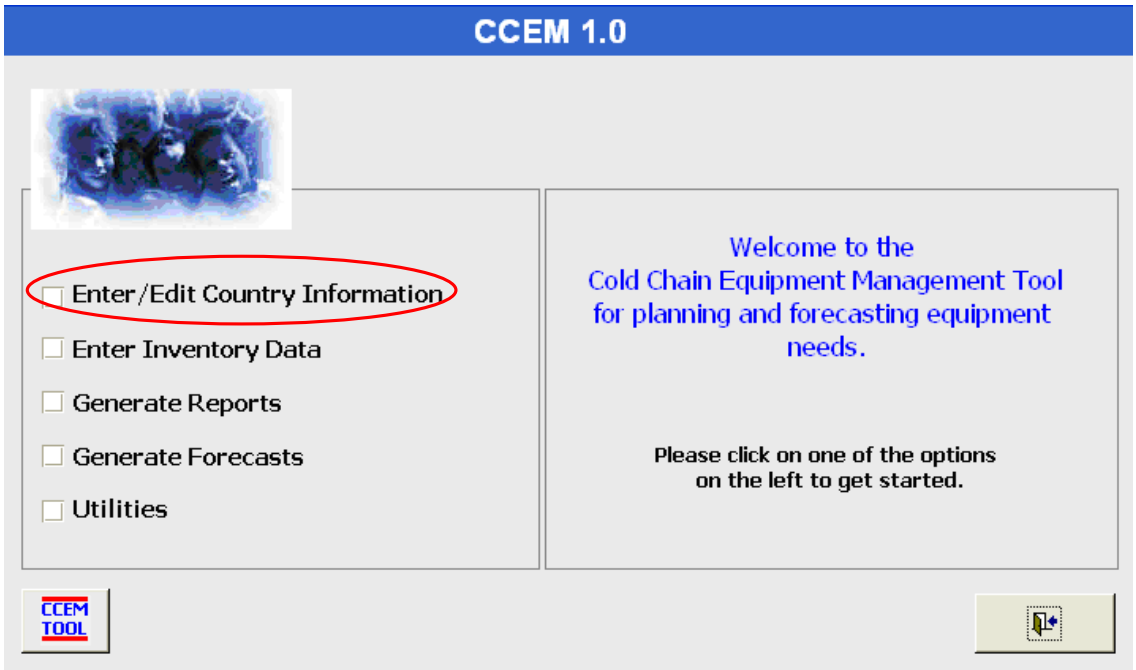
Select the **Return to Main Menu** button (door and arrow icon) to return the **Main Menu**. The CCEM tool automatically saves the data when users move to a new record or form.



3. Entering and Editing Country Information

The first step in setting up the CCEM tool is adding data about the national immunization program, administrative structures, and equipment. Only the national cold chain manager should complete this step.

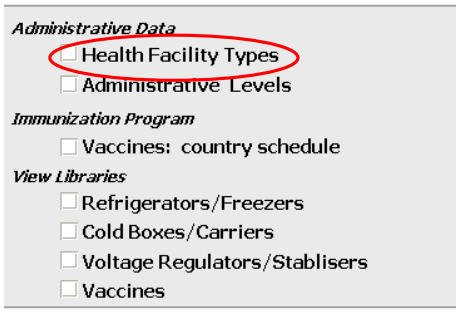
From the **Main Menu**, select **Enter/Edit Country Information.**



Choose a corresponding option from the right side of the screen to enter the administrative data, national immunization program information, or cold chain equipment details for the CCEM.

3.1. Administrative Data

Health facility types

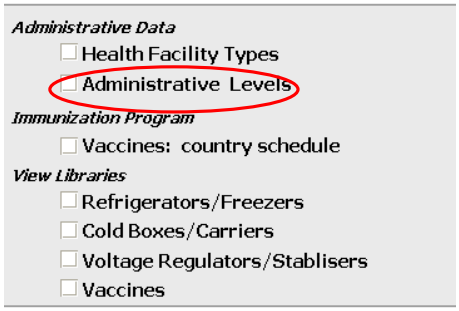


To add the types of health facilities found in your country to the CCEM tool, select **Health Facility Types**. A new screen appears for labelling and describing each facility type in the country. The national cold chain mangers need to enter the types of health facilities found in the country and the national policies for **Frequency of vaccine** and **Reserve vaccine stock** specified in weeks.

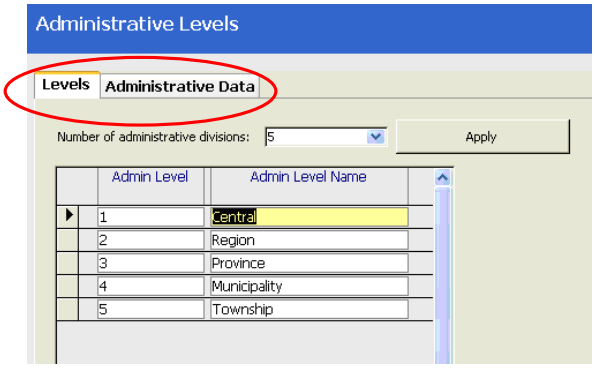
Facility Types

Facility type name	Frequency of vaccine	Reserve vaccine stock
Public HCIV	4	2
Private HCIV	4	2
NGO HCIV	4	2
Public HCIII	4	2
Private HCIII	4	2
NGO HCIII	4	2
Public HCII	4	2
Private HCII	4	2
NGO HCII	4	2
National Store	12	12
District Store	4	2
Sub-district Store	4	2
Public Hospital	4	2
Private Hospital	4	2
UVRI		
*		

Administrative levels

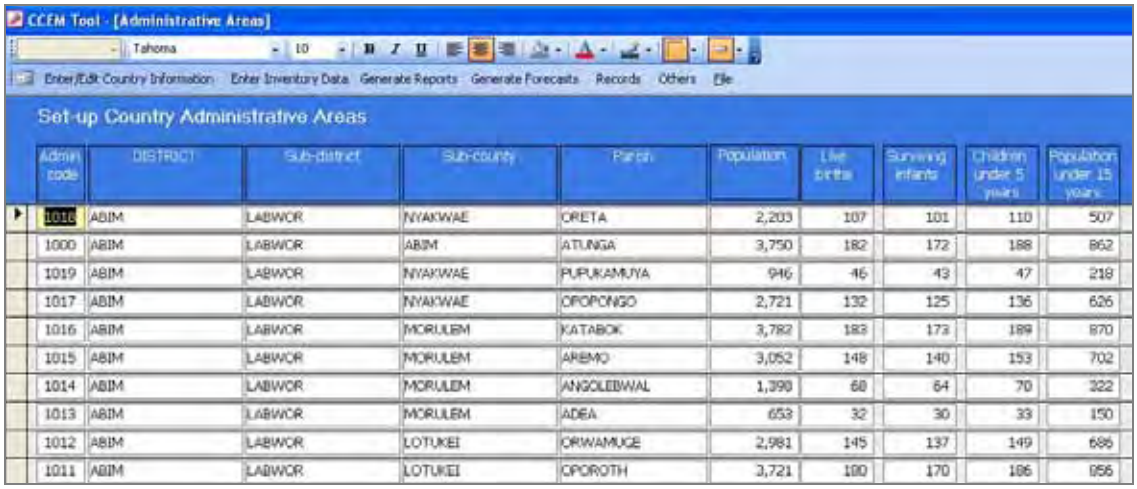


To enter information about the administrative structure for the country, use the two tabs at the top of the **Administrative Levels** screen: **Levels** and **Administrative Data**.



The **Levels** tab requires setting the administrative levels of the country. The first level is typically the central level. Setting the administrative levels provides a hierarchy for the vaccine supply system.

Use the **Administrative Data** tab to name and provide associated data for each administrative area in the country. Take considerable time and care to enter this information using the most updated and comprehensive national administrative data. Only experienced data managers should transfer country data from other sources (such as Excel) into the CCEM tool. From the **Administrative Data** screen, national cold chain mangers enter data for all administrative areas in the country and all populations below the central level.



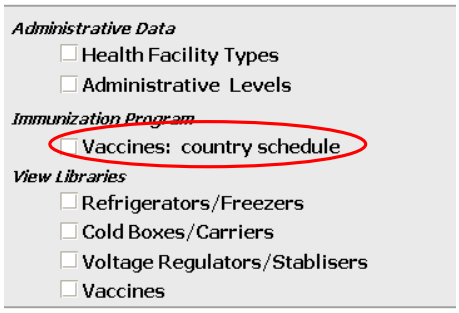
Admin code	DISTRICT	Sub-district	Sub-county	Parish	Population	Live births	Surviving infants	Children under 5 years	Population under 15 years
1018	ABIM	LABWOR	NYAKWAE	ORETA	2,203	107	101	110	507
1000	ABIM	LABWOR	ABIM	ATUNGA	3,750	182	172	188	862
1019	ABIM	LABWOR	NYAKWAE	PUPUKAMUYA	946	46	43	47	218
1017	ABIM	LABWOR	NYAKWAE	OPOPONGO	2,721	132	125	136	626
1016	ABIM	LABWOR	MORULEM	KATABOK	3,782	183	173	189	870
1015	ABIM	LABWOR	MORULEM	AREMO	3,052	148	140	153	702
1014	ABIM	LABWOR	MORULEM	ANGOLEBWAL	1,390	68	64	70	322
1013	ABIM	LABWOR	MORULEM	ADEA	653	32	30	33	150
1012	ABIM	LABWOR	LOTUKEI	ORWAMUGE	2,981	145	137	149	686
1011	ABIM	LABWOR	LOTUKEI	OPOROTH	3,721	180	170	186	856

Note:
To accurately calculate cold chain equipment capacity requirements, the CCEM tool must have access to a complete dataset, including all administrative and population data.

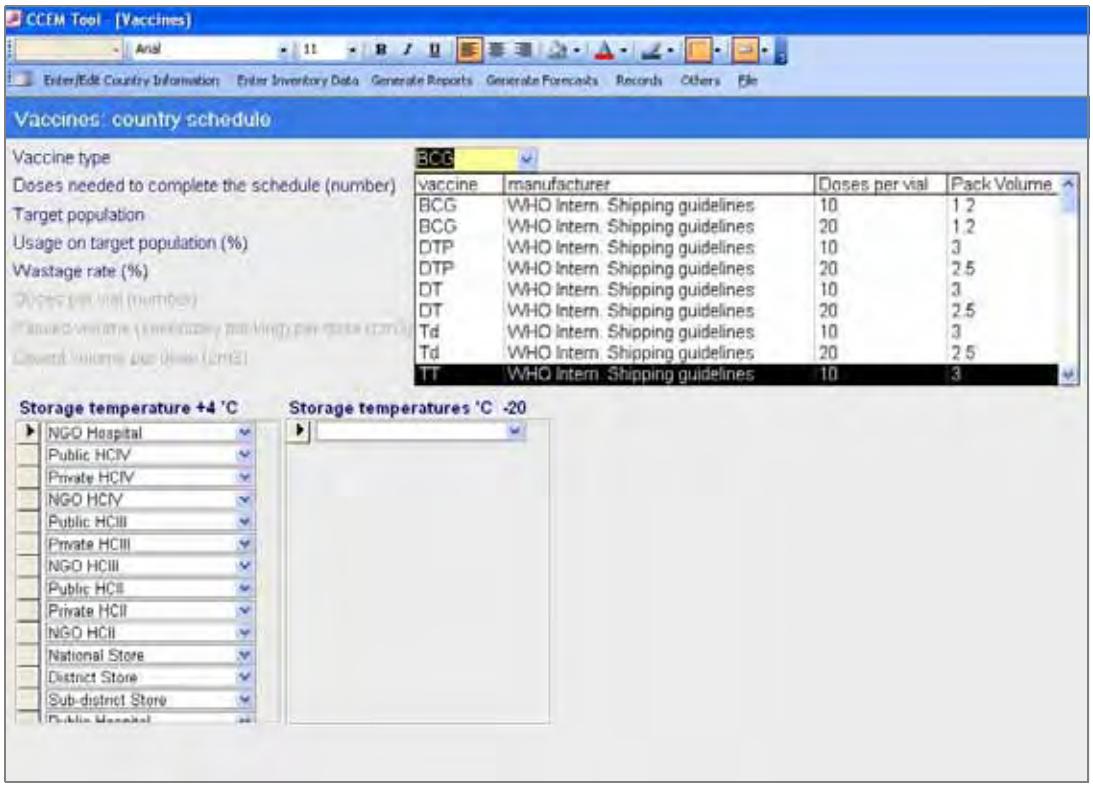
Do not leave any cells blank on the **Set-up Country Administrative Areas** screen.

Each "Admin code" (column 1) must contain a unique identifier; do not repeat the code for other records.

3.2. Immunization Program



From the **Main Menu,** select the **Enter/Edit Country Information** option. Then select **Vaccines: country schedule.** The national cold chain manager sets the specific vaccine criteria on the **Vaccines: country schedule** screen.



Vaccine types presented in the **Vaccines: country schedule** include all vaccines in the **Standard Equipment Library – Vaccines**, including WHO prequalified vaccine products in the WHO Vaccine Packaging and Shipping Guidelines. Other vaccine products used in the national immunization program can also be added to the **Standard Equipment Library – Vaccines**. See Section 3.4 for instructions on adding additional vaccines to the CCEM tool. Add any additional vaccines delivered or planned by the national immunization program to the CCEM Vaccine Library before setting the country schedule for vaccines.

The following details are needed for each vaccine: number of doses to complete the schedule, target populations, wastage rates, and cold chain storage requirements.

Setting the country schedule for vaccines:

1. Select a **Vaccine type** from the drop-down menu.
2. Enter the appropriate national data for:

    Doses needed to complete the schedule (determined by national immunization policy).

    Target population (choose from four target populations).

    Live Births

    Pregnant Women

    Total Population

    Child-Bearing Age (women of)

    Usage on target population (%)

    This field enables you to choose either 100% or a lower percentage of one of the four immunization target populations. (For example, the female target population for HPV vaccine is 1.8% of the Total Population in some countries).

    Wastage rate

    This field sets the nationally observed wastage rates for specific vaccines.

3. For each **Vaccine type**, select the health facility types where the vaccine will be stored at +4°C and where the vaccine will be stored at -20°C. For each temperature, select at least one health facility type or all health facility types.

The country schedule for future new vaccine introduction must be set for the CCEM tool to analyze and forecast the impact of these vaccines on cold chain capacity and equipment needs.

Note:
New vaccines or vaccine products purchased in-country but not listed on the WHO prequalified vaccine list must be entered into the CCEM **Standard Equipment Library – Vaccines**, as described in Section 3.4.

3.3. Viewing Libraries

The CCEM tool draws information from four libraries.[8]

1. Refrigerators/Freezers.
2. Cold Boxes/Carriers.
3. Voltage Regulators
4. Vaccines.

The CCEM tool comes installed with three CCEM libraries (records) for standard cold chain equipment obtained from the WHO/UNICEF Performance, Quality, and Safety (PQS) system and the Product Information Sheet (PIS) system preceding PQS.[9] The fourth library for vaccines contains the standard WHO list of vaccine products and generic vaccine products (from the WHO Vaccine Packaging and Shipping Guidelines).

These libraries must be expanded by the national immunization programs to include comprehensive, country-specific information related to:

1. Cold chain equipment models commonly found and procured by the national immunization program that do not exist in the PQS/PIS standards or are not prequalified by WHO.
2. Vaccine presentations purchased locally that are not on the WHO prequalified vaccine list.

Note:
The WHO/UNICEF PQS/PIS standards will be updated periodically by these organizations. These updates will be available on at http://www.path.org/projects/cold-chain-ccem.php and must be routinely installed by cold chain managers as discussed in Section 8.1.

Common local cold chain equipment models not found in the WHO/UNICEF PQS/PIS standards must be added to the libraries before the national cold chain equipment inventory survey.

[8] All six essential files must be downloaded into a single directory, as explained in section 1.5 for these libraries to operate correctly in CCEM.

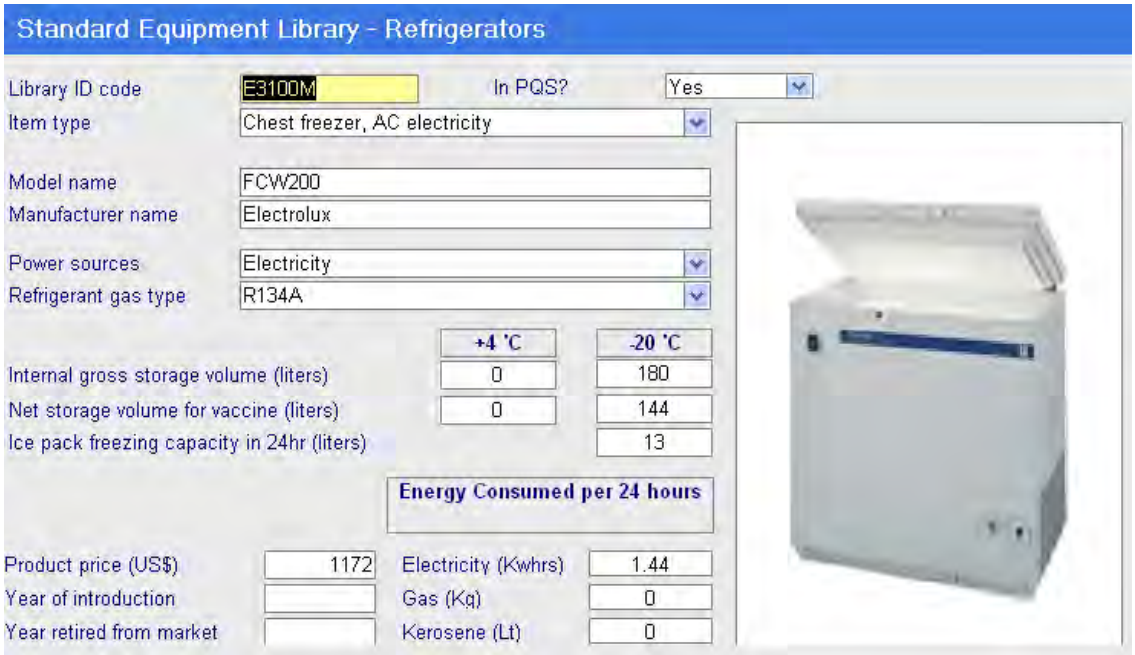
[9] With the CCEM tool, a product price (in US dollars) in the libraries indicates a product is still available on the market and may be procured to meet future needs. A price entry of "zero" indicates that the equipment model is no longer available.

3.4. Customizing the CCEM Standard Libraries

To develop accurate capacity calculations and forecasting, collect and update the four Standard Equipment Libraries with the most detailed information available.

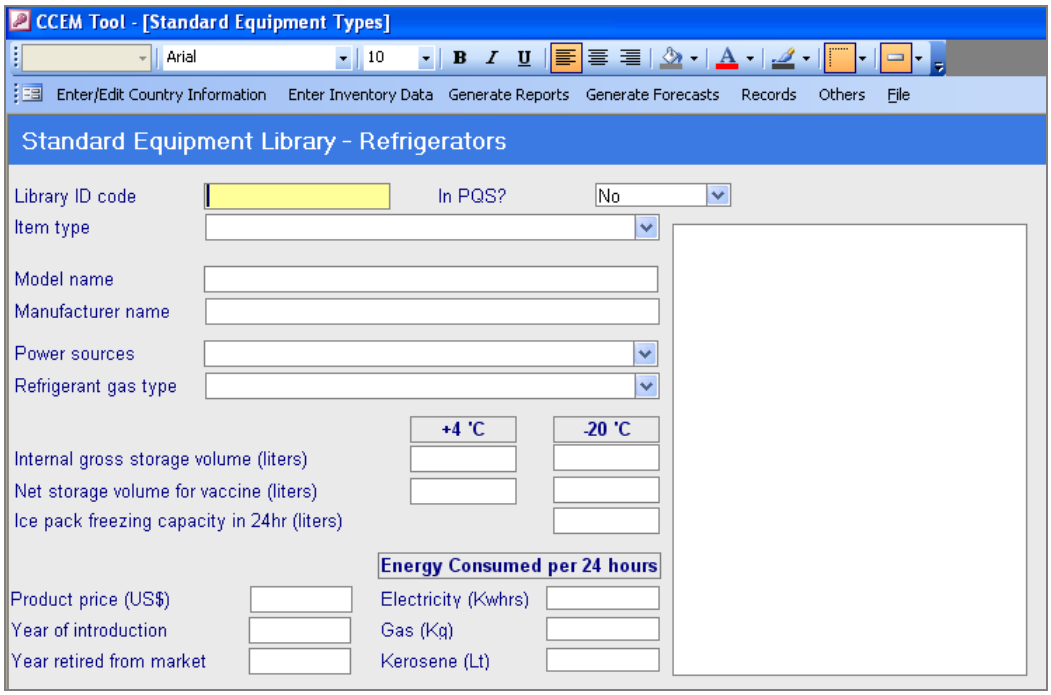
From the **Main Menu,** select the **Enter/Edit Country Information** function. You can either select the appropriate library from the right side of the screen or select the applicable library from the drop-down list.

Select **Refrigerators/Freezers**. The **Standard Equipment Library – Refrigerators** screen appears displaying the first record in the library.



To enter a new record into the library, click the **New Record** button (see Section 2.2) at the bottom of the screen.

A blank record appears on the **Standard Equipment Library – Refrigerators** screen.



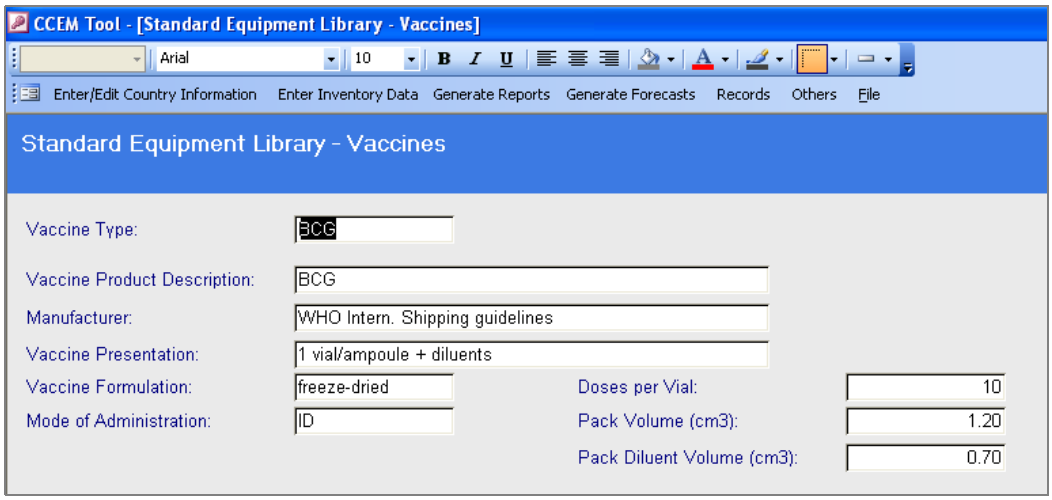
Fill in each field to ensure accurate analysis. When entering the **Library ID**, follow the rationale set by the cold chain manager using a unique[10] modifier that does not start with the letter "E."

A picture of the added equipment can be included on this screen and to an expanded **Equipment Identification Guide** (see Annex 4) to support identification of equipment of standard equipment by the national equipment survey team. To add a picture to the new equipment record in the three Standard Equipment Libraries, a digital picture taken locally should be saved as a *.bmp file and copied and pasted into the space available in the new equipment record in the **Standard Equipment Library –Refrigerators**.

Note:
Do not make any changes to the existing records or fields in the Standard Library records, including the first record that appears when accessing any of the four libraries. Because changes are saved automatically when you exit this screen, this information must be correct to provide accurate results from the CCEM tool.

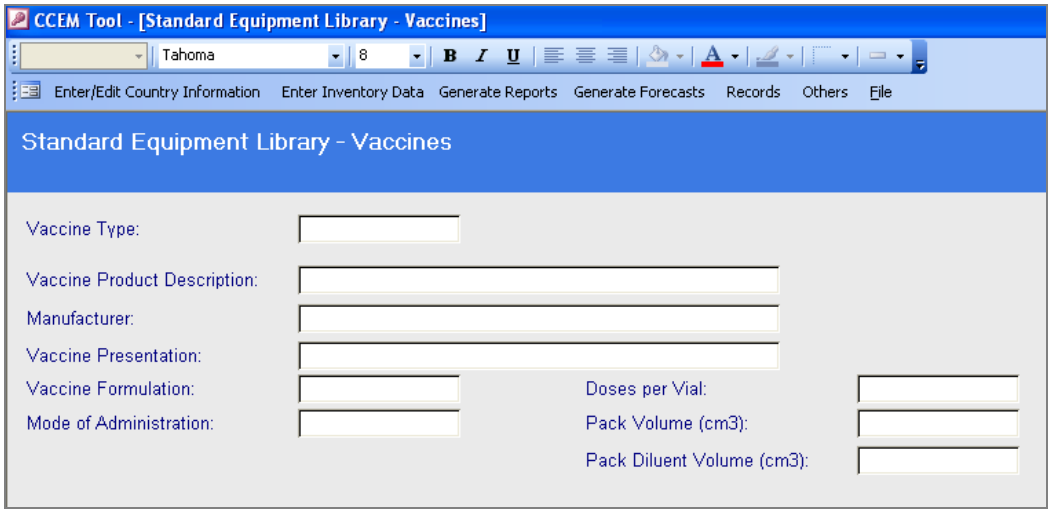
Use the New Record option to access a blank screen and enter new information about a new refrigerator, vaccine, voltage stabilizer, or cold box.

When accessing a library, the screen displays the first existing record. The **Standard Equipment Library – Vaccines** is shown below.

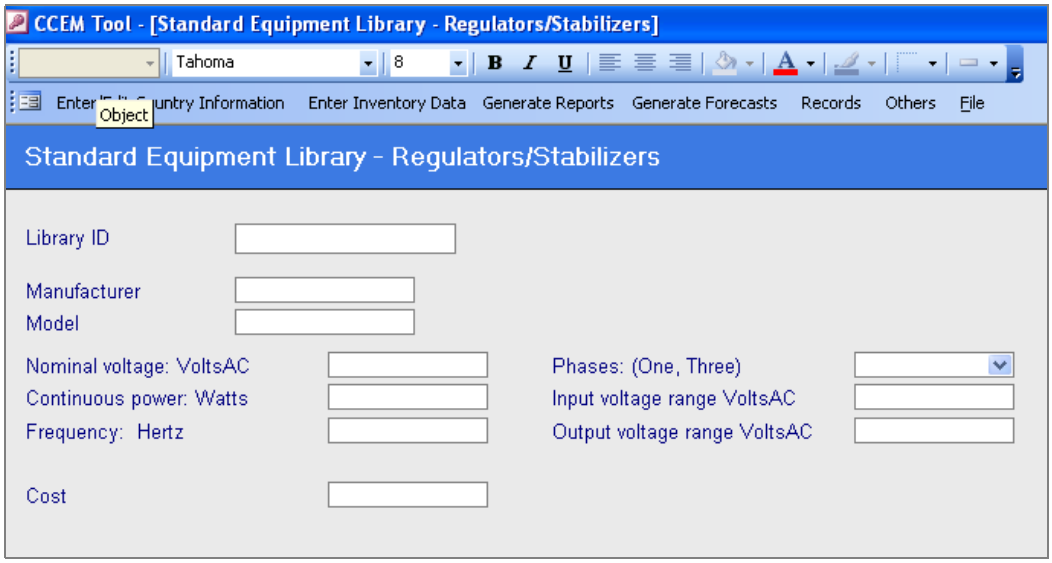


To add a new vaccine, use the **New Record** button at the bottom of the screen. A blank record screen appears in the **Standard Equipment Library – Vaccines**. Enter accurate data for each field to ensure accurate cold chain capacity analysis.

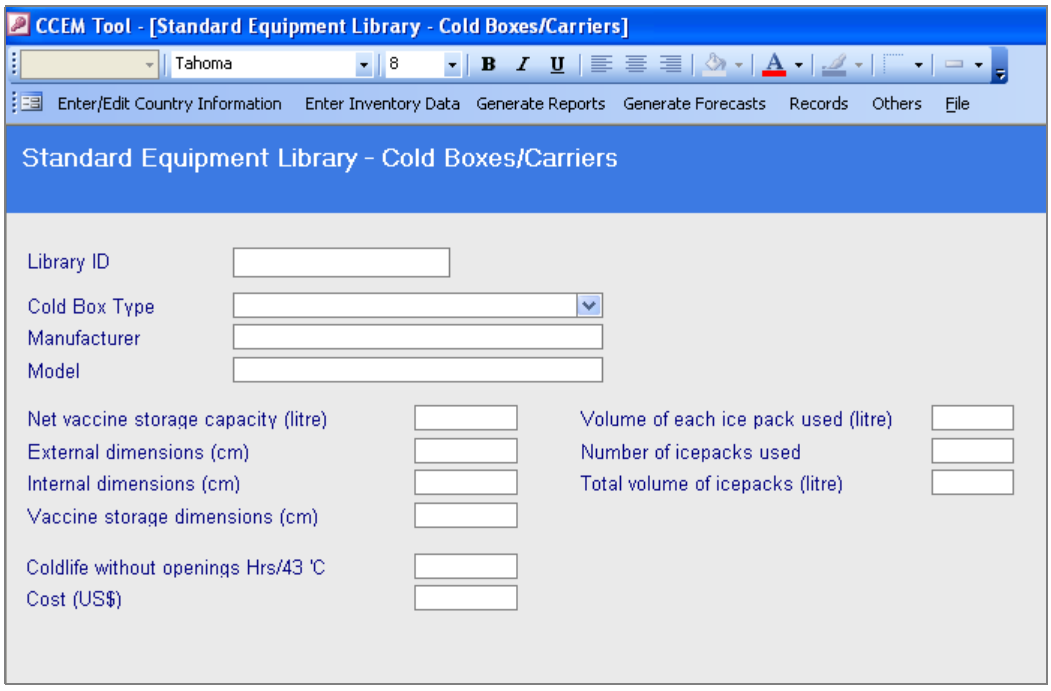
10 It is essential that this Libary ID is a unique identifier for equipment models. This Library ID Code rationale could be as simple as starting with 001 or U001 and sequentially increasing this number for new equipment.


CCEM Tool - [Standard Equipment Library - Vaccines]
Tahoma
8
Enter/Edit Country Information
Enter Inventory Data
Generate Reports
Generate Forecasts
Records
Others
File
Standard Equipment Library - Vaccines
Vaccine Type:
Vaccine Product Description:
Manufacturer:
Vaccine Presentation:
Vaccine Formulation:
Mode of Administration:
Doses per Vial:
Pack Volume (cm3):
Pack Diluent Volume (cm3):

When you select **Regulators/Stabilisers**, the first record in the library appears. To add new equipment for this category, use the **New Record** button at the bottom of the screen. A blank record screen appears for **Standard Equipment Library –Regulators/Stabilisers**. Enter accurate data for each field to ensure accurate cold chain capacity analysis.



When you select **Cold Boxes/Carriers**, the first record in the library appears. To add new equipment for this category, use the **New Record** button at the bottom of the screen. A blank record screen appears for **Standard Equipment Library –Cold Boxes/Carriers**. Enter accurate data for each field to ensure accurate cold chain capacity analysis.



4. Entering Inventory Data

After country information is complete for **Administrative Data, Immunization Program, and CCEM Standard Libraries**, the next step is generating and entering inventory data for every health facility in the country.

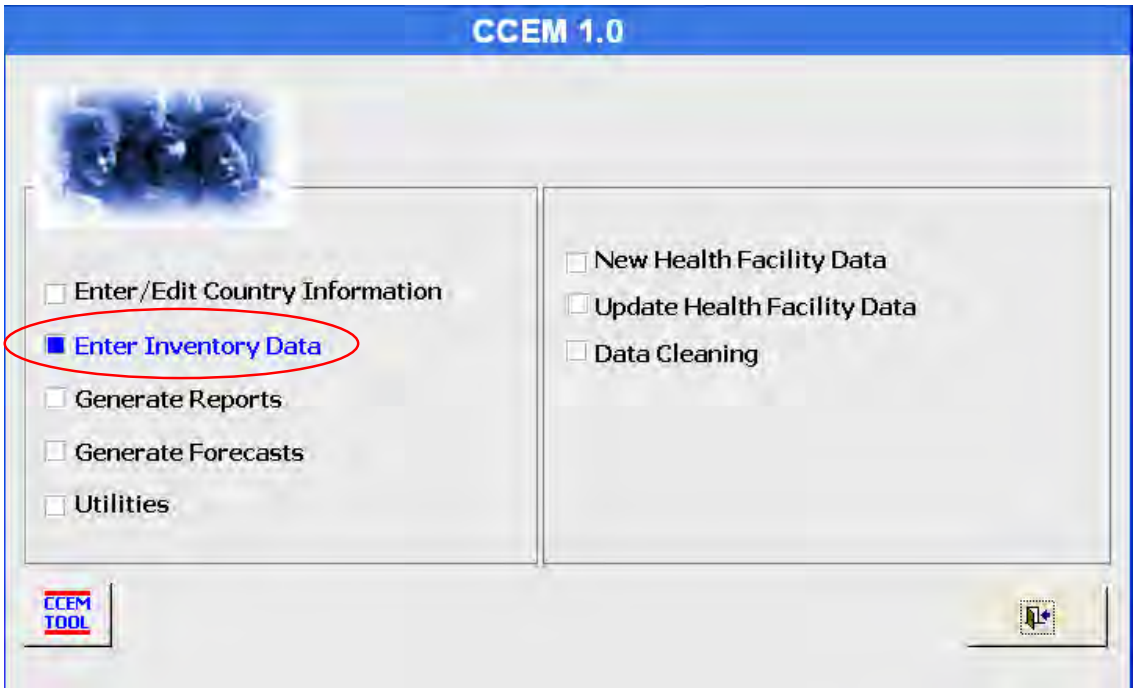
A comprehensive cold chain equipment inventory generates the needed information for the CCEM tool. This comprehensive survey will require time and planning to implement and it is important that survey teams receive proper training on how to collect data and that they are familiar with the **CCEM Questionnaire Guide**. Seven questionnaires can be found at http://www.path.org/projects/cold-chain-ccem.php that corresponds to the seven screens containing inventory data in CCEM. Not every health facility will contain all cold chain equipment (refrigerators, generators, voltage regulators/stabilisers, cold rooms, cold boxes, and spare parts/tools). However, a **Health Facility Questionnaire** (see Annex 3) must be conducted at every health facility.

A pre-test of the questionnaires and data quality from the survey teams should be performed in a single district or region to identify data collection problems that must be resolved prior to a national-scale inventory survey. During the data collection process, surveyors will utilize several different questionnaires at each health facility. It is important to keep each facility's set of forms separate.

After the questionnaires are checked for completeness by the surveyor and a team leader, return the completed forms to the central cold chain office for data entry into the CCEM tool. This is an important element of data cleaning, as explained in Section 4.3. It is important that the quality and completeness of data collection is verified by both the surveyor and team leader, as explained in Section 4.3.

From the **Main Menu**, select **Enter Inventory Data**. Three corresponding options appear on the right side of the screen:

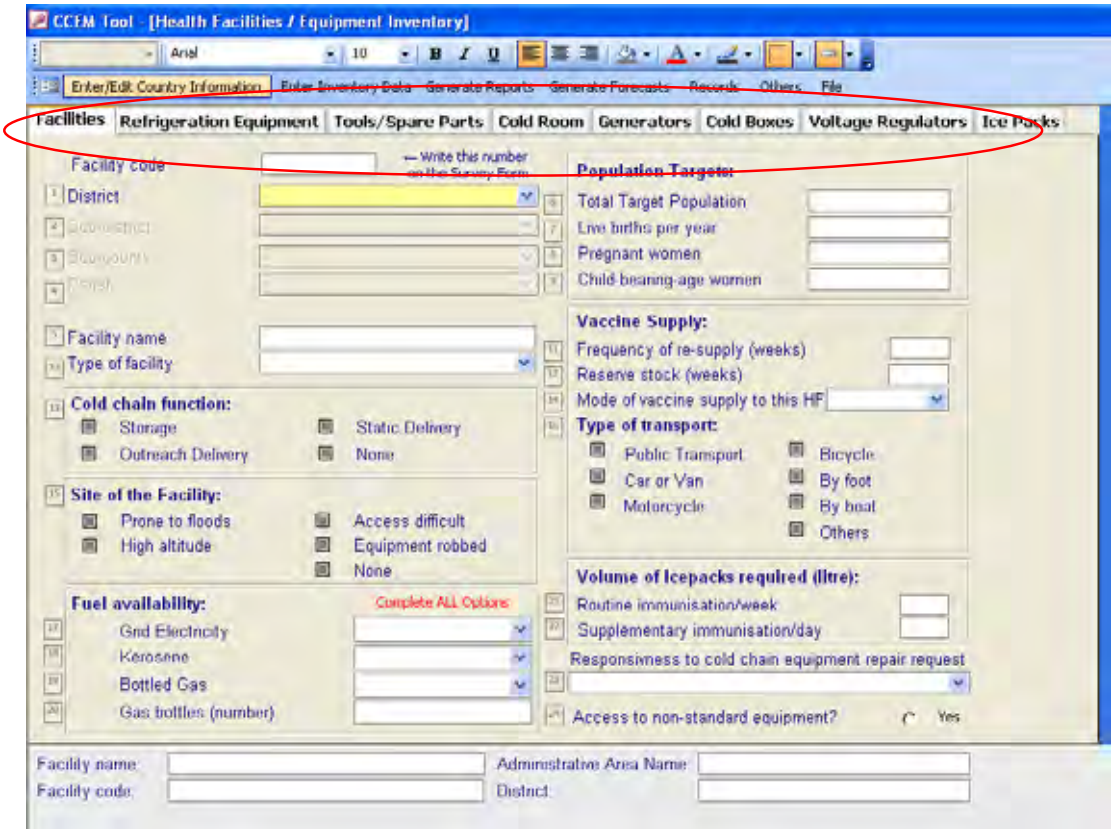
1. New Health Facility Data.
2. Update Health Facility Data.
3. Data Cleaning.



4.1. New Health Facility Data

Select **New Health Facility Data** to access a new, blank record. This record must contain data for each facility and include information on each piece of cold chain equipment located at each of these health facilities. Enter these data carefully.

Note:
At all times, completed sets of CCEM questionnaires for each health facility (and corresponding equipment) should be kept together. This will include a **Health Facility Questionnaire** and depending on the types and quantities of cold chain equipment, several additional questionnaires on: Refrigeration Equipment, Tools/Spare Parts, Cold Room, Generators, Cold Boxes, Voltage Regulators, and Ice Packs.



Before entering specific equipment details, enter information on the **Facilities** tab. Tabs appear at the top of the **Health Facilities/Equipment Inventory** screen for each type of equipment (Refrigeration Equipment, Tools/Spare Parts, Cold Room, Generators, Cold Boxes, Voltage Regulators, and Ice Packs.)

The data fields on each screens are numbered corresponding to applicable questions on the corresponding CCEM Questionnaires (Annex 3).

Note:
Each data field on the eight data entry screens is explained in the CCEM Questionnaire Guide (Annex 2).

Health Facilities

The Facilities screen captures attributes of a health facility's cold chain function, including populations served by this health facility, vaccine supply, and fuel availability. This information allows the CCEM tool to match the preferred equipment models—determined by the national cold chain manager—to facilities (for example, according to fuel or vaccine availability).

Entering data on the Facilities tab:

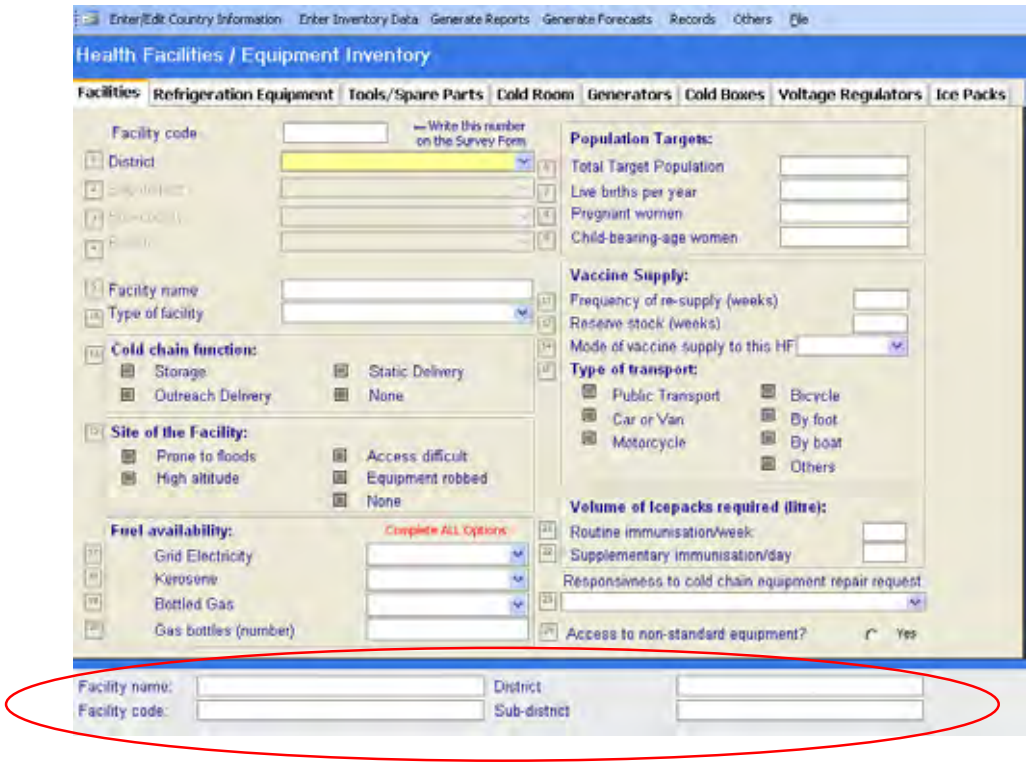
1. Begin by entering facility information using the drop-down menus provided in fields 1–4. (This administrative data is entered by the cold chain manager in the **Enter/Edit Country Information** function as described in section 3.1) After these fields are entered, the CCEM tool automatically generates a **Facility code**.
2. Enter the name of the health facility in field 5.
3. Select the type of health facility (This administrative data is entered by the cold chain manager in the **Enter/Edit Country Information** function as described in section 3.1)
4. Check all boxes that apply to the characteristics describing the mode of vaccine supply to the facility.
5. Check all boxes that apply to the characteristics describing the site of facility.
6. In the Fuel Availability area of the screen, check only one response from the drop-down menu for each box describing the access to electricity, kerosene, and gas cylinders. Enter the number of gas cylinders found at each facility for immunization services and the litres of available ice packs for routine and supplementary immunization services.
7. In the Population Targets area of the screen, enter the Total Target Population and press the Enter key on the keyboard. This number automatically generates estimates in the other target population cells according to preset national percentages. These estimates should be overwritten with data provided by the survey tool (if available).
8. In the Vaccine Supply area of the screen, enter the number of weeks for each facility related to its frequency of vaccine supply and reserve stock of vaccines. Also enter the mode of vaccine supply.
9. Enter all the types of transport available to this facility for vaccine supply in field 16.
10. Fields 21 and 22 request information about the volume of ice packs required for routine and campaign immunization activities.
11. Fields 23 and 24 request information about the responsiveness of cold chain repairs and whether non-standard (non- PQS/PIS) cold boxes, carriers, or ice packs were found at the facility.

Note:
After the Facility code appears, note this number on the top of all CCEM questionnaires completed for this health facility. This Facility code must be documented in the upper right corner of the Health Facility Questionnaire and on all of the attached questionnaires. This code will help staff match the questionnaires with a specific health facility during follow-up by the immunization program.

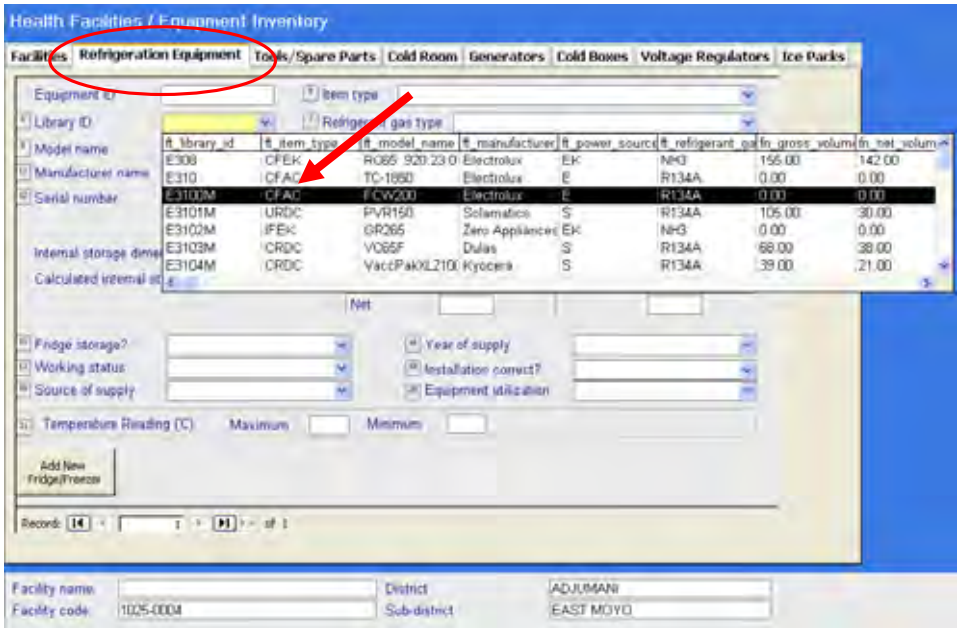
Refrigeration equipment

When the **Facilities** data entry screen is complete, you will be taken automatically to the **Refrigeration Equipment** tab. There will be one screen to describe one piece of cold chain equipment. This screen will contain data from one **Refrigeration Equipment Questionnaire**. If a health facility has multiple vaccine refrigerators, then there will be several **Refrigeration Equipment Questionnaires** (one questionnaire for each piece of refrigeration equipment). When this occurs, several refrigeration equipment records will exist for one facility. These multiple records will be reflected as several records in the following icon.

The CCEM tool automatically completes the first five fields describing the administrative location and name of the facility for a piece of equipment. This information appears at the bottom of the screen.



When the survey team goes to a health facility and finds a vaccine refrigerator shown in the **Equipment Identification Guide**, they will enter the correct **Library ID** in field 6 of the **Refrigeration Equipment Questionnaire** and then skip to question #12 and then #15-21. The data entry clerk will simply enter this **Library ID** from the questionnaire and CCEM will automatically enter equipment characteristics found in the **Standard Equipment Library – Refrigerators** in fields 7-11 and 13-14. The use of **Library ID** on the **Refrigeration Equipment** screen is shown below.



If a **Library ID** is not available, the data entry clerk will leave the field 6 blank and complete all other data fields for the refrigeration equipment. The CCEM tool uses this information to assess storage capacity and forecast equipment needs and decisions regarding the withdrawal of equipment.

It is important that the national cold chain manager update information in the **Standard Equipment Library–Refrigerators** and the corresponding **Equipment Identification Guide** prior to the cold chain equipment survey. A comprehensive **Standard Equipment Library–Refrigerators** and **Equipment Identification Guide** make data collection and entry much easier, faster, and improve data quality. The simplicity of entering data when there is a **Library ID** is shown below.

When there is a Library ID:

1. Enter the **Library ID** into field 6 (CCEM will automatically complete fields #7-11 and #13-14.)
2. Enter the serial number in field 12.
3. Complete fields 15 through 22.

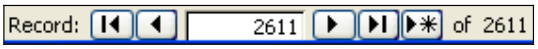
When there is no Library ID:

1. Enter the model name and manufacturer.
2. Enter the serial number for the equipment.
3. Enter the equipment type using the drop-down menu.
4. Enter the refrigerant gas type using the drop-down menu.
5. Enter the power source for the equipment using the drop-down menu.
6. Enter whether the equipment is CFC-free using the drop-down menu.
7. Enter the internal dimensions of the equipment. The CCEM tool automatically calculates the gross and net internal vaccine storage volumes.
8. Enter the supplies found in the refrigerator during inspection using the drop-down menu.

9. Enter the equipment type using the drop-down menu.
10. Enter the year the refrigerator equipment was supplied as a new piece of equipment to the health facility in the drop-down menu.
11. Enter the working status of the refrigerator equipment using the drop-down menu.
12. Enter the appropriate response for indicating if the equipment was correctly or incorrectly installed using the drop-down menu.
13. Enter the source of the equipment using the drop-down menu.
14. Enter the equipment type using the drop-down menu.
15. Enter the equipment utilization using the drop-down menu.
16. Enter the minimum and maximum temperatures recorded in the refrigeration equipment.

After entering data for one piece of equipment, click the **Add New Fridge/Freezer** button to enter a new item of refrigeration equipment for the same facility. This button is located at the lower left corner of the **Refrigeration Equipment** tab.

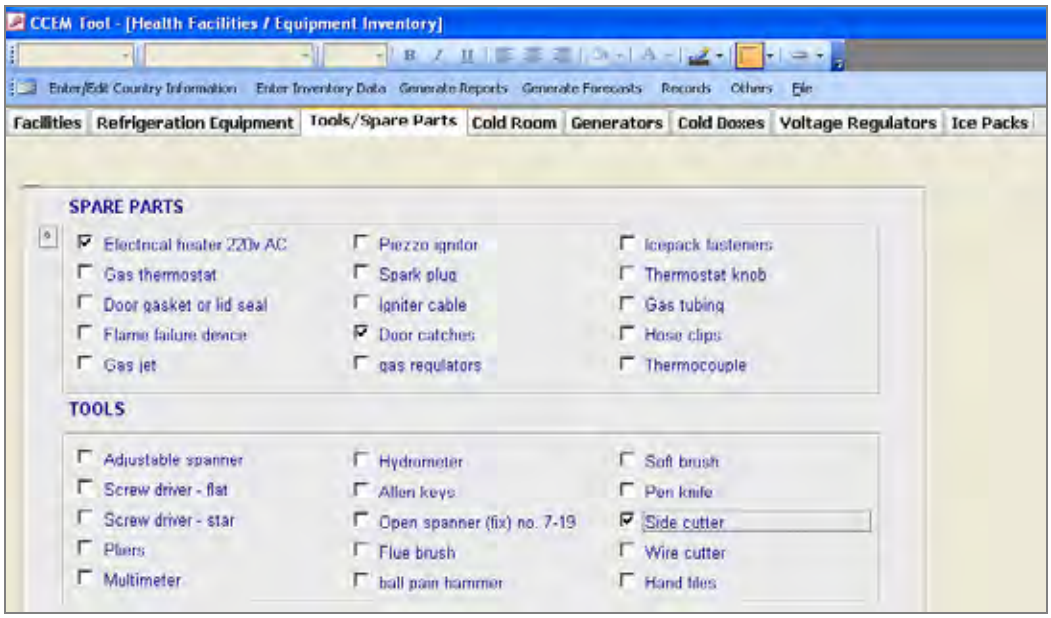
Navigate various refrigerator equipment records using the navigation bar at the bottom of the screen:



Tools and spare parts

The CCEM tool is not designed for stock control; however, it does document the presence or absence of generic spare parts and basic tools in each facility. This information indicates the quality of equipment management, relative to local cold chain policy.

Use the **Tools/Spare Parts** tab to check the appropriate boxes for the parts and tools found at each health facility.

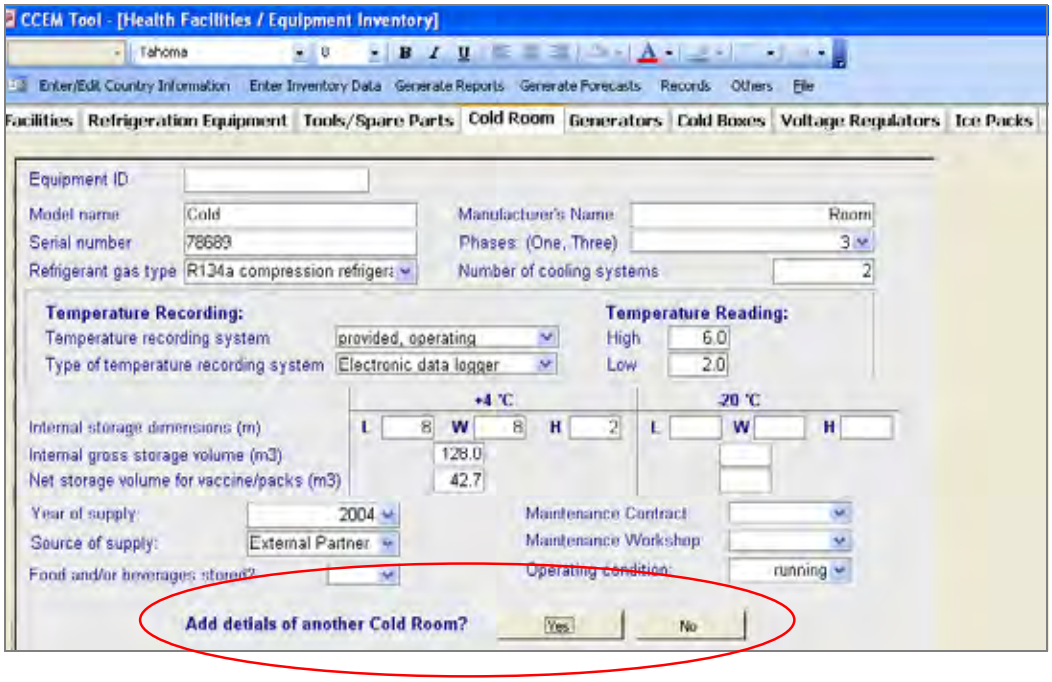


Cold rooms

Although cold room manufacturers usually comply with the WHO/UNICEF PQS/PIS system, cold rooms are sized to the specific needs of a client. Therefore, no standard library of cold room equipment exists in the CCEM tool.

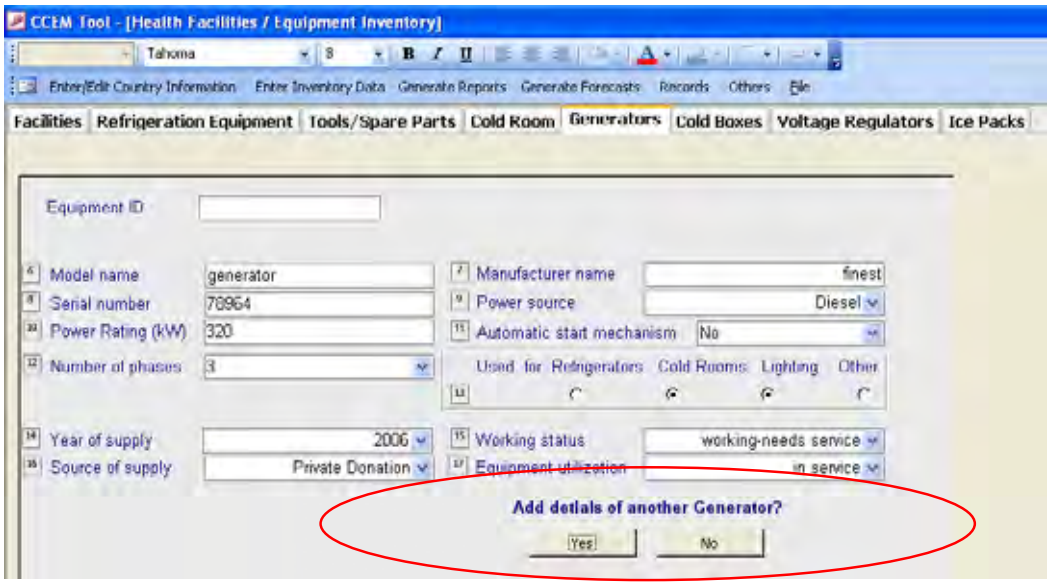
Cold rooms are designed for refrigeration (+2°C to +8°C) or for freezing (-15°C to -25°C) and storage dimensions are entered for only one temperature range for each individual cold room. When the internal storage dimensions are entered, the internal and net storage volumes are calculated automatically by the CCEM tool.

Enter details for additional cold rooms at the facility using the buttons at the bottom of the screen.



Generators

Generators and their corresponding serial numbers are entered individually. This information is helpful for ordering spare parts. The CCEM tool does not have a library for generators because this equipment is not in the PQS/PIS list. Enter details for additional generators at the facility using the buttons at the bottom of the screen.



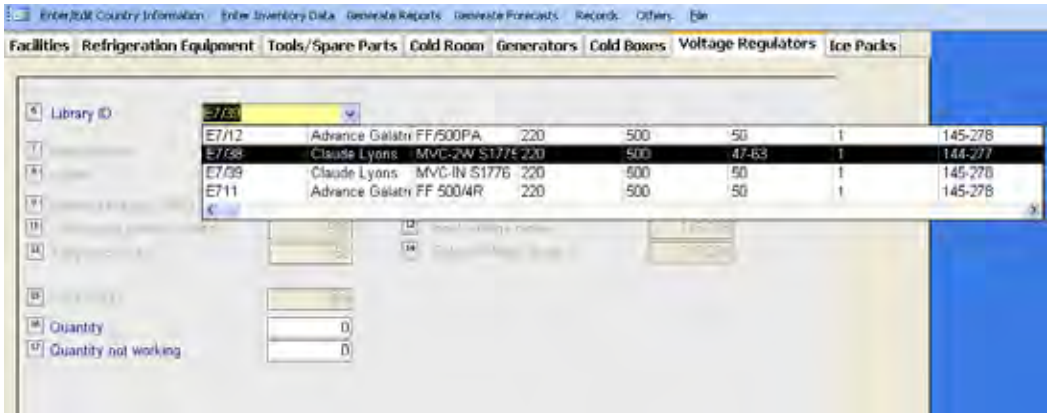
Cold boxes and vaccine carriers

Cold boxes and vaccine carriers are both entered under the **Cold Boxes** tab. Only cold box or vaccine carrier equipment noted in the **Equipment Identification Guide** and with the appropriate **Library ID** will appear on the questionnaire. When the data entry clerk enters this **Library ID**, characteristics such as manufacturer and storage capacity are automatically generated from the **Standard Equipment Library – Cold Boxes/Carriers**. Some fields must be filled by the data entry clerk, including the quantity of cold boxes at the health facility and the number in working condition.

After completing data entry for one type of cold box or vaccine carrier, continue adding details for other types of cold boxes or vaccine carriers found at the health facility.

Voltage regulators

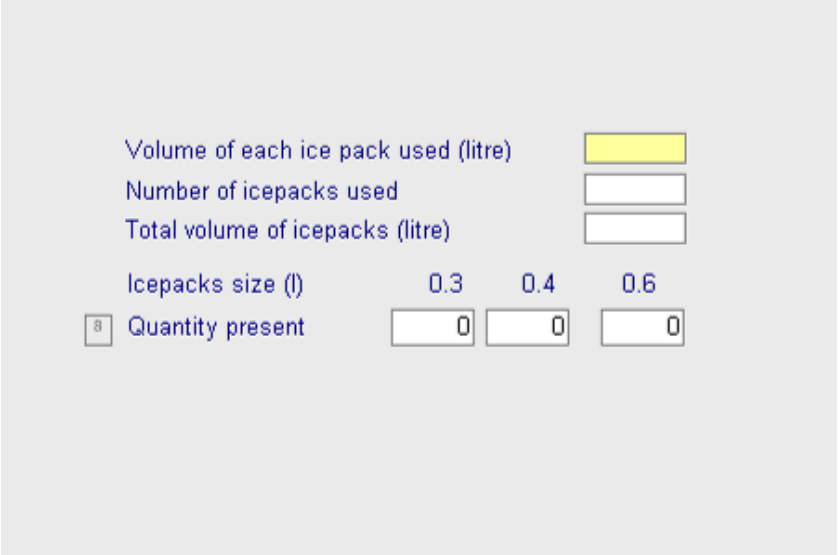
If the voltage regulator is identified from the **Equipment Identification Guide**, the **Library ID** will be noted by the survey team. After entering the appropriate **Library ID**, all data fields are automatically filled except for the total quantity of functioning and non-functioning regulators.



If there is no **Library ID**, enter all available details from the voltage regulator survey. After entering the requested data, continue adding details for other types of voltage regulators.

Ice packs

Use the **Ice Packs** tab to enter the quantity and type of ice packs found at each health facility.



4.2. Updating Health Facility Data

Locate or update a particular health facility record using the **Update Health Facility Data** option. Enter the **Facility code** or administrative area and select the **Find Health Facility** button. The CCEM tool generates and displays a list of facilities.

In the figure above, “District” and “Type” of facility were selected to generate the onscreen list. Select the **Open** button (to the left of the **Facility codes**) to view a particular data entry screen. Return

to the previous screen to begin a new search, or scroll through the list using the arrow button on the bottom of the screen.

4.3. Data Cleaning

The **Data Cleaning** option provides a final check to locate missing data or issues associated with the classification of equipment data. Data accuracy is extremely important for the CCEM tool to work properly. Several important data verification steps should be included as the inventory survey is carried out:

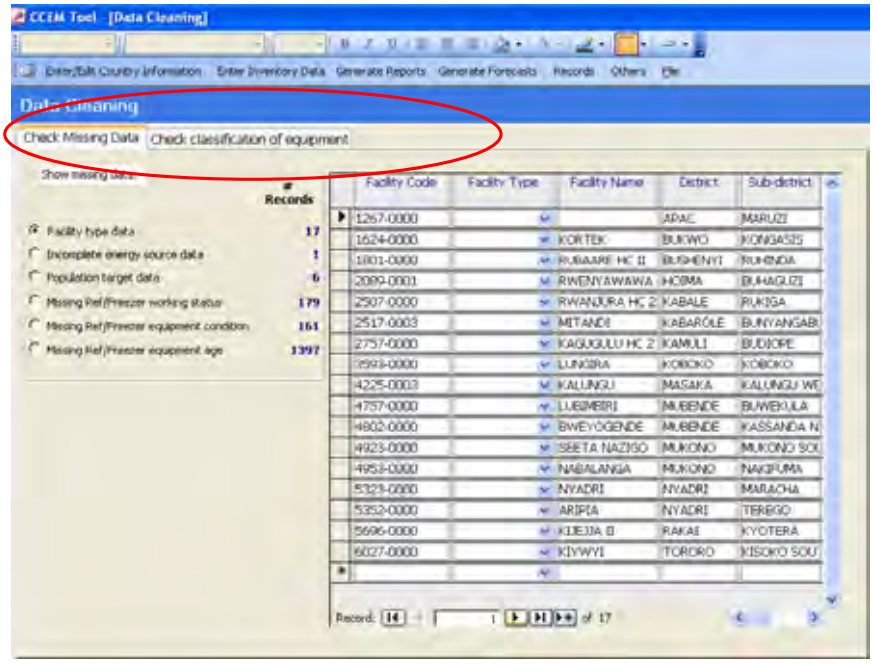
Survey teams must double check the data on the Health Facility Questionnaire, Refrigeration Equipment Questionnaire(s), Cold Boxes, Vaccine Carriers, and Ice Packs Questionnaire(s), Spare Parts / Tools Questionnaire, Voltage Regulator Questionnaire, Generator Questionnaire, and Cold Room Questionnaire(s). Which questionnaires are completed at each facility depends on what equipment is found at the health facility.

Supervisors must check all questionnaires to ensure all fields are complete and data are correct (for example, look for numbers that do not fit the parameters of the question). Supervisors should also verify questionable handwriting to avoid data entry errors.

Data entry clerks should be extremely careful when entering data to ensure data quality. For example, data can be read out loud by one clerk and carefully entered by another clerk.

After the inventory survey, the team should also conduct a series of data cleaning verification steps. In addition to previous data verification efforts, these steps also identify essential missing data. Equipment that is not recognized as a library standard should be checked to standardize the data for consistency of classification.

Data verification can be done from the **Enter Inventory Data** drop-down menu, by selecting the **Data Cleaning** option. A screen appears with two tabs: **Check Missing Data** and **Check Classification of Equipment**.



Checking missing data

The **Check Missing Data** option displays six parameters of missing data that are critical to the CCEM tool. A list of buttons corresponds to these parameters:

Facility type data.

Incomplete energy source data.

Population target data.

Missing Ref/Freezer working status.

Missing Ref/Freezer operating condition.

Missing Ref/Freezer equipment age.

Select any of these parameters to display a table of missing data on the right side of the screen. Alter and update information directly from this screen.

Checking the classification of equipment

During the health facility survey, an item of equipment could be mistakenly identified in the **Equipment Identification Guide** provided to surveyors. When this happens, the equipment is wrongly classified as a non-standard item of equipment.

Note:
It is important that the CCEM Standard Equipment Library – Refrigerators is updated with additional common vaccine refrigeration equipment found in country. This equipment and a photo must also be added to the Equipment Identification Guide. See Section 3.4 for more information.

Surveyors must also be actively trained by cold chain staff on accurately identifying standard equipment.

Although most equipment is found in the **Equipment Identification Guide** and the **Standard Equipment Library - Refrigerators**, it is likely that surveyors will find non-standard equipment refrigerator models. When this occurs, surveyors must accurately complete all fields in the **Refrigerator Questionnaire**. Slight differences in spelling or internal dimensions cause the equipment to be incorrectly identified by the CCEM tool. These classification discrepancies need to be corrected.

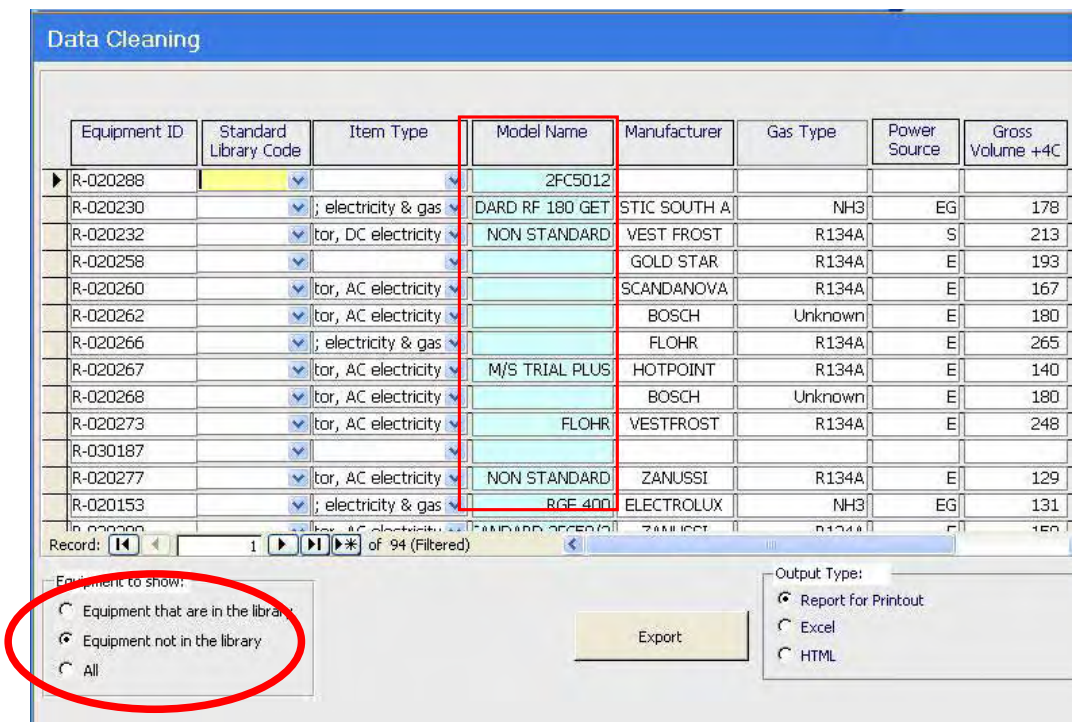
Correcting equipment classification

To correct equipment classifications, follow these steps:

1. Select the **Check classification of equipment** tab.
2. To choose equipment that is not in the library, check the corresponding button in the **Equipment to show** box in the bottom left corner of the screen.
3. To sort the equipment data by model name, click the "Model Name" column heading, and inspect the list looking for:

   - Refrigerator models from the standard library not identified by the survey team. Select the correct model from the drop-down list of **Standard Library Code** to correct the item in the CCEM inventory.

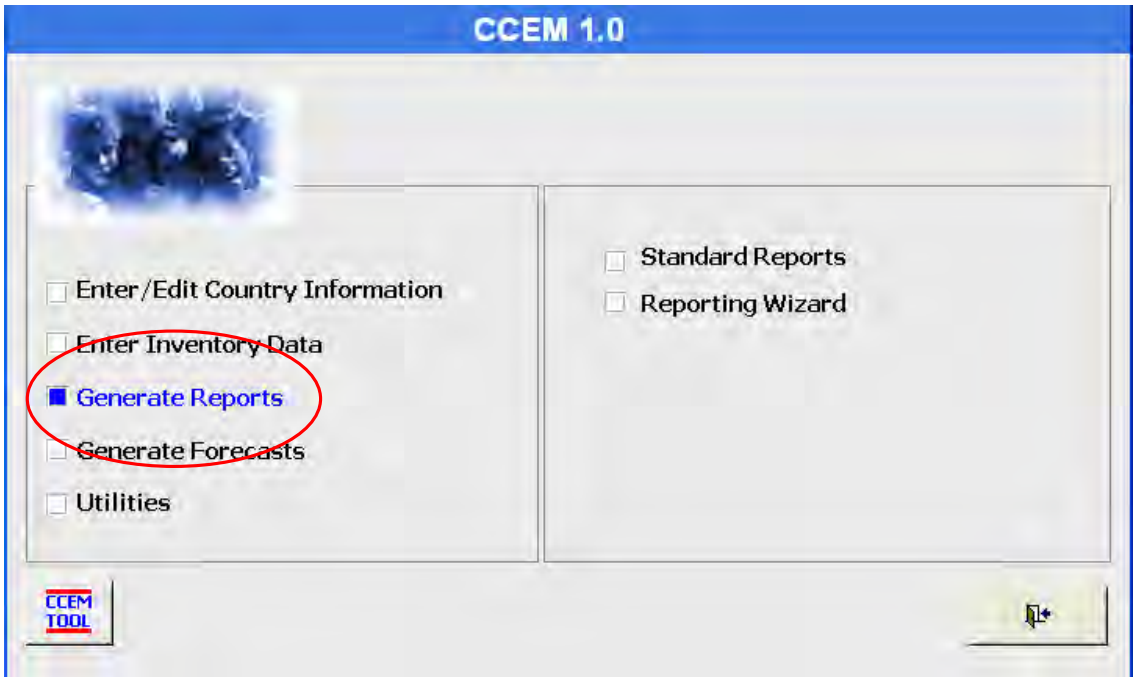
   - Equipment appearing frequently but not listed in **Standard Equipment Library—Refrigerators**. Create a new entry in the **Standard Equipment Library—Refrigerators** for this common model. After the entry is created, assign criteria to the equipment using the **Standard Library Code** drop-down list described above. This ensures consistency for all refrigerator entries.



5. Generating Reports

The CCEM tool **Generate Reports** option provides two options: **Standard Reports** and the **Reporting Wizard** (customized reports). With this report information, national cold chain managers can analyze and document several aspects of the national cold chain equipment inventory and management system.

From the **Main Menu**, select **Generate Reports.**



5.1. Standard Reports

Select the **Standard Reports** option to access common reports requested by national cold chain managers.

Five types of reports are available:

Performance Report by Admin Area: Status of cold chain performance indicators by area and by model of equipment.

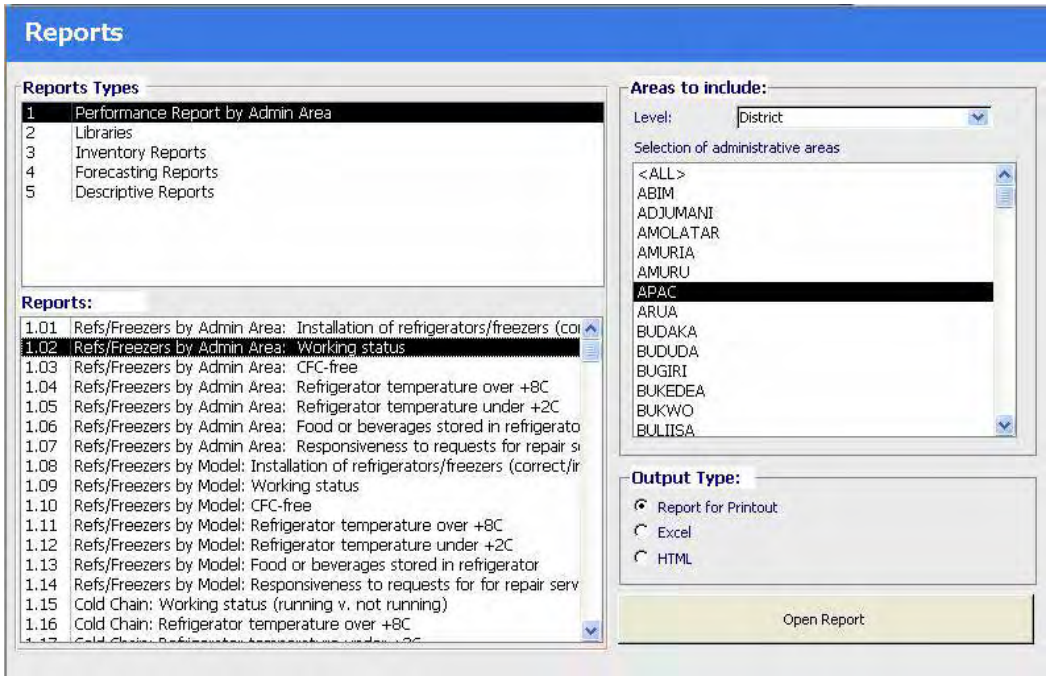
Libraries: Lists of library data (Refrigerators, Vaccines, Cold Boxes/Carriers, and Stabilizers).

Inventory Reports: Inventory survey findings.

Forecasting Reports: Equipment withdrawal and allocation forecasts.

Descriptive Reports: General attributes of facility and country data.

The screen below displays choices needed to generate a report on the working status of refrigerators and freezers in the APAC district:



Choosing and printing standard reports:

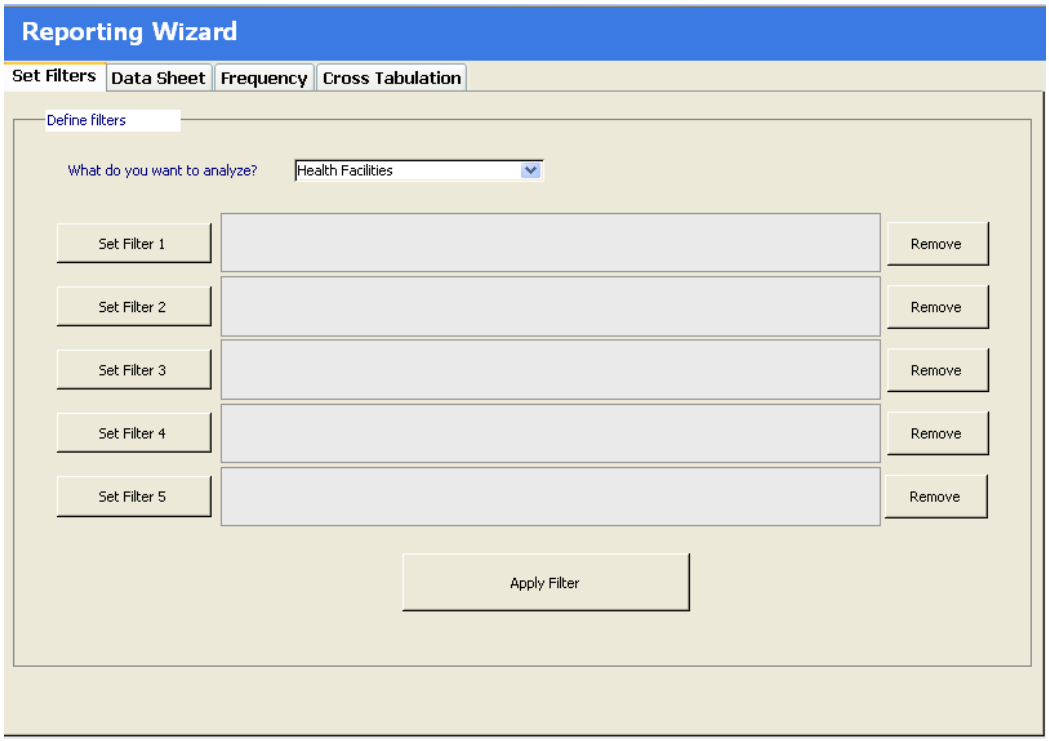
1. Select the type of report you want to generate from the Report Type box. A list of reports is generated and displayed in the Reports area of the screen.
2. Select a specific report from the list. Different report options are available for each type of report.
3. Select Areas to include in the top right part of the screen:

   When "Central" is selected under the **Level** drop-down menu, all areas in the country are selected.

   When a specific administrative level (Region, Province, Municipality, or Township) is selected, users can select <ALL> or multiple specific areas (hold the keyboard Ctrl key and select the desired administrative areas).
4. Select the preferred application for the report from the Output Type options.
5. Follow the onscreen dialogue box to save the report.

5.2. Reporting Wizard

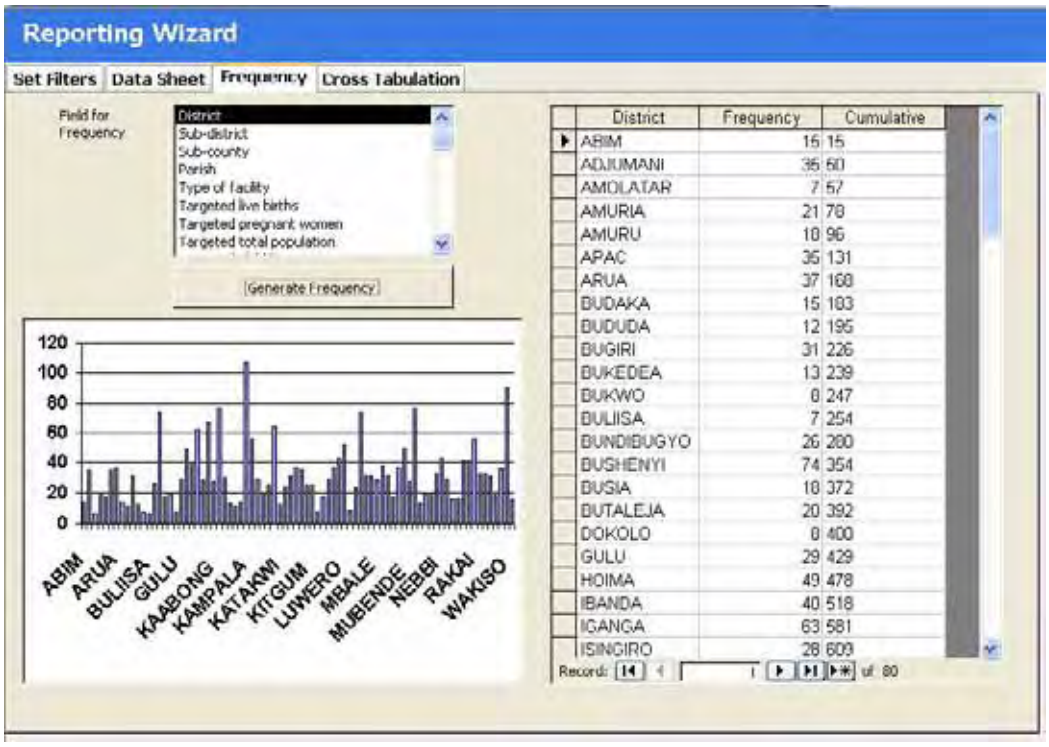
From the **Generate Reports** screen, select **Reporting Wizard** to create customized reports. The Wizard provides control over filtering, grouping, and presenting data. In addition to data listings, the Wizard allows for frequency tabulations and producing two-way tables, similar to EPI-Info.



Creating a customized report with the Reporting Wizard

1. Choose “Health Facilities” or “Refrigerator Model” from the main drop-down menu.
2. Define the filter using the **Set Filter** button. A pop-up dialogue box appears requesting the following information:
   - Choose data field.
   - Choose the logical operator (= equal to, <> not equal to, > greater than, < less than).
   - Choose a value or option.
3. Choose “Select” or “Cancel” (to redefine the filter).
4. After defining a filter, select the **Accept** button.
5. Continue defining additional filters following steps 2 and 3, which build on the previously defined filter(s).
6. After defining the filters, select **Apply Filter**.

A new screen appears with the following tab options: Data Sheet, Frequency, and Cross Tabulation.



After generating a custom report, the following options are available:

Data Sheet: Provides a table of data for records contained in the filtered records

Frequency: Generates a frequency table for the field selected in the filter records. To generate this custom report, choose a **Field for Frequency** from the list, and select **Generate Frequency**.

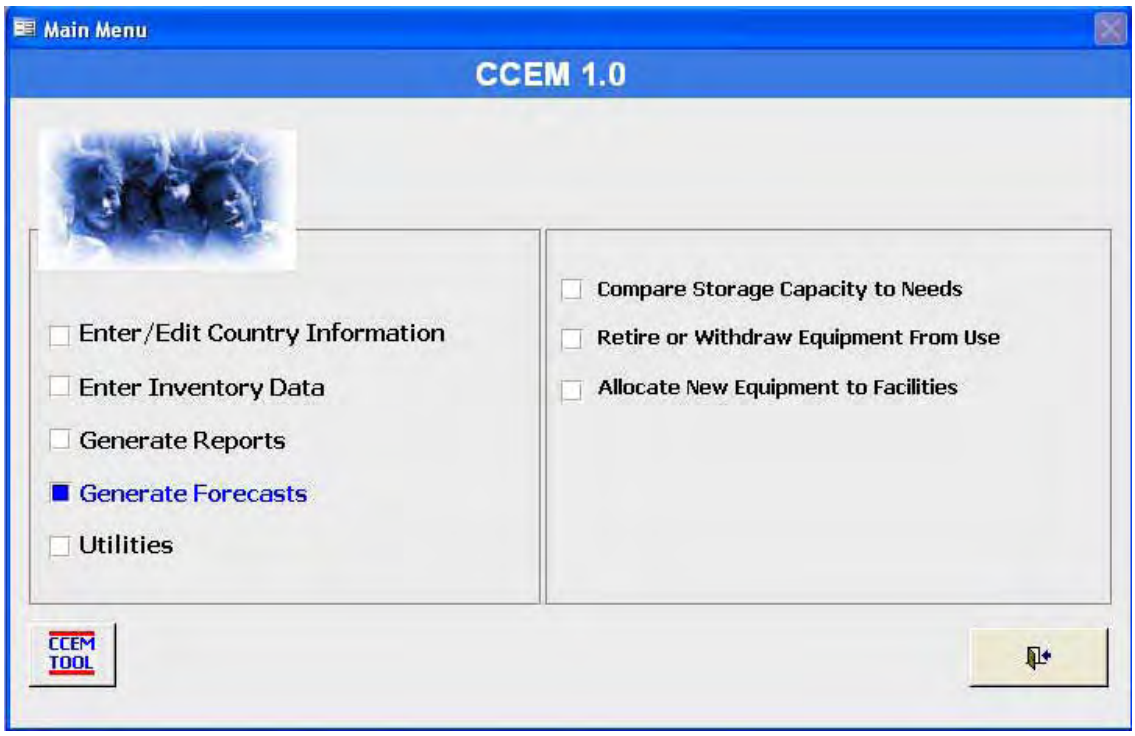
Cross Tabulation: Once you have set the field for frequency, you can generate a cross table by selecting an exposure field (up to 3), group totals, and an outcome field. (To select more than one option, hold down the Ctrl key and select additional options.)

Select the **Output Destination** (Excel spreadsheet or HTML) and follow the onscreen commands to export and save the report to your computer.

6. Generate Forecasts

From the **Main Menu**, select **Generate Forecasts** to access information related to vaccine storage capacity requirements and the associated need for specific quantities of refrigerators, freezers, and cold rooms. Cold boxes and vaccine carriers are currently excluded from these equipment forecasts.

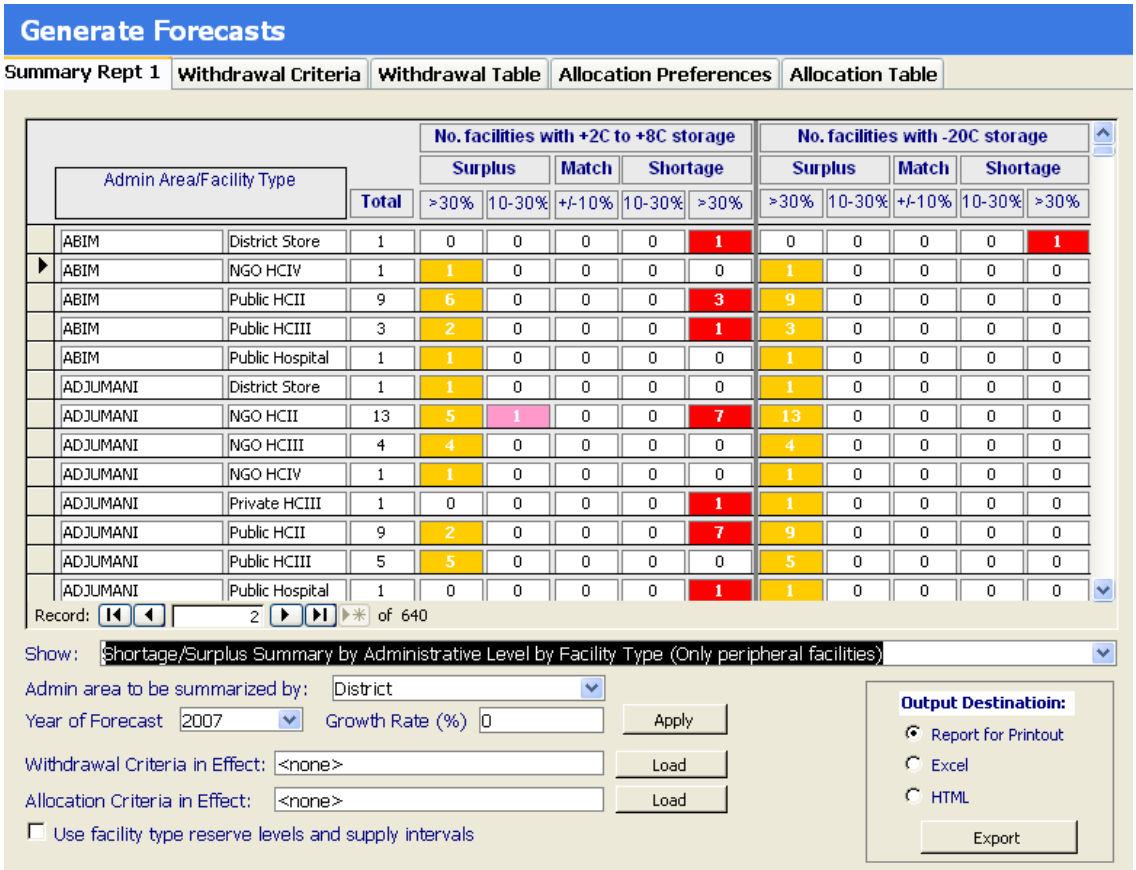
Forecasts are generated in three categories: **Compare Storage Capacity to Needs**, **Retire or Withdraw Equipment from Use**, and **Allocate New Equipment to Facilities**.



6.1. Compare Storage Capacity to Needs

The first forecasting option compares current vaccine storage capacity to the total expected vaccine storage capacity requirements if national policies—including the vaccine schedule—are followed.

Select the **Compare Storage Capacity to Needs** option to access this tool.



The **Summary Report** tab displays vaccine storage capacity for all facilities (by Administrative Area/Facility Type) in the national inventory. This report is divided into two types of calculations: one for refrigerated (+2°C to +8°C) vaccine storage and one for freezing (-20°C) vaccine storage. Health facilities are displayed in one of three categories:

Surplus: Vaccine storage capacity at the health facility exceeds cold chain requirements. This category is displayed in two columns, one for >10–30% and one for >30%.

Match: Vaccine storage capacity at the health facility meets cold chain capacity requirements (within +/- 10%).

Shortage: Vaccine storage capacity at the health facility is less than cold chain requirements. This category is displayed in two columns, one for >10–30% and one for >30%.

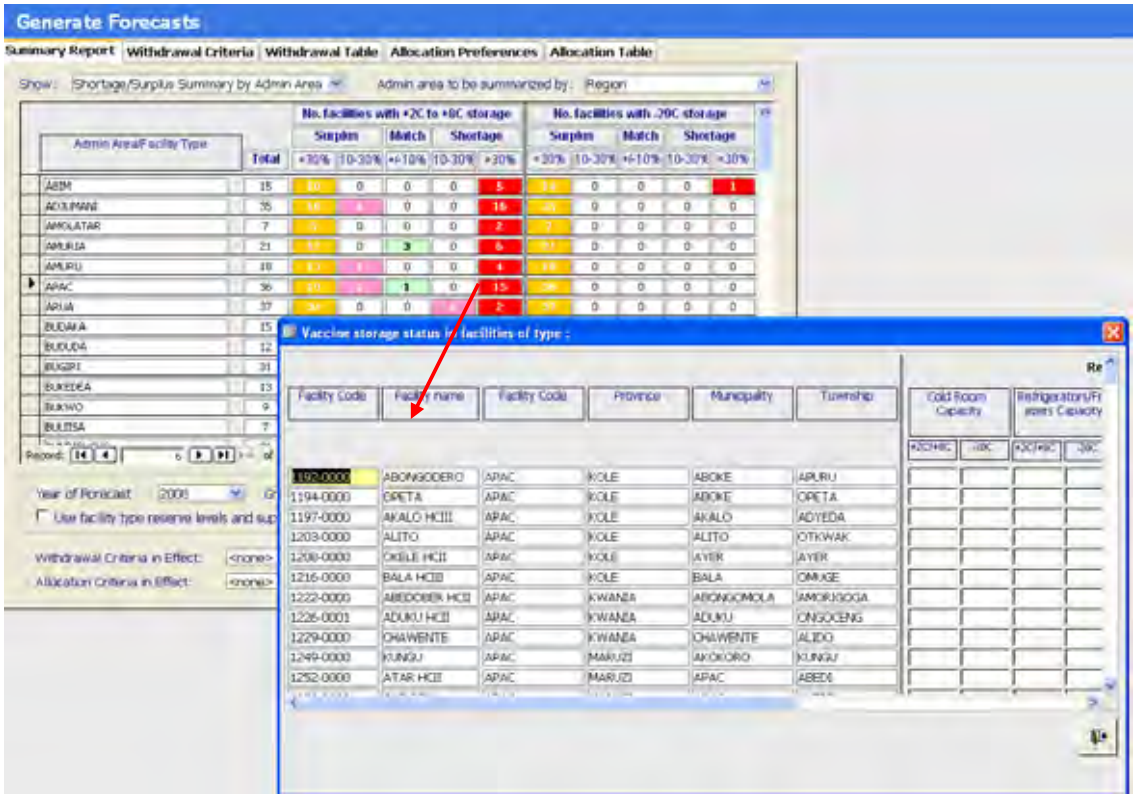
Note:
The Withdrawal Criteria, Withdrawal Table, Allocation Preference, and Allocation Table options (tabs) are used during the next two steps in the Generate Forecasts function:

1. Retire or Withdraw Equipment from Use.
2. Allocate New Equipment to Facilities.

You will name the sets of Withdrawal Criteria and Allocation Criteria as you create them for forecasting of equipment needs. You will be able to select whether to put them "in Effect" on the Summary Report screen. When these criteria are in effect, you will see them noted on the report.

Summary report options

Select the **Summary Report** tab of the **Compare Storage Capacity to Needs** option to view the number of facilities with vaccine storage capacity shortfalls or surpluses. Double-click on any cell in the table to view a detailed list of the facilities. The list of facilities will appear in a pop-up window, as shown below.



Using the list of facilities affected by shortages or surpluses, national cold chain managers can take the following actions:

Follow up with individual facilities with unexpected or extreme conditions.

Assess whether the shortage is widespread in a specific geographic area.

Assess whether a surplus may warrant moving equipment to another facility.

Decide if a detailed report on a specific facility or region might be made for local supervision or assessment.

On the **Summary Report** tab you can select one of the following three options for the summary report content in the **Show** field at the top of the screen:

Shortage/Surplus by Administrative Level

Shortage/Surplus by Administrative Level and Facility Type (number of facilities with storage capacity).

Vaccines Summary.

Several additional fields appear on the **Summary Report** screen:

Year of Forecast: Select a year from the drop-down menu to create a summary report for vaccine storage capacity (Shortage/Surplus/Match) for a future year. This calculation can be based on the year of the inventory but modified to reflect changes that will take place, including growth of the target population and any retiring of aged equipment. These changes may include the introduction of a new vaccine or a change in vaccine distribution policy.

Growth Rate (%): The growth rate must be entered to reflect changes in the target population. Enter the growth rate as a percentage (values can be negative rates).

Withdrawal Criteria in Effect: The default setting for this option is always <none>, indicating that the summary report does not initially take into account any withdrawals of equipment from the existing inventory. Users can set withdrawal criteria and apply it to CCEM calculations to evaluate the impact of withdrawal criteria on equipment forecast calculations. See section 6.2 for guidance on setting withdrawal criteria.

Allocation Criteria in Effect: The default setting for this option is always <none>, indicating that the summary report does not initially take into account any allocation of new or additional equipment to the existing inventory. Users can set the allocation criteria and apply it to the CCEM calculations to evaluate the impact of equipment allocations. See section 6.2 for guidance on setting allocation criteria.

Use facility type reserve levels and supply intervals: This option controls the choice of values for reserve stocks and supply intervals in calculations. By default, the CCEM tool predicts requirements on the basis of actual reserve stock levels and supply intervals declared by each facility in the inventory survey. When this box is checked, the national policy on supply intervals and reserve stocks declared in the country data for each facility type can be used to calculate the actual inventory survey data. The effect of using actual health facility data, rather than national policy data, can be immediately viewed in the summary report.

6.2. Retiring or Withdrawing Equipment from Use

The second step in generating a forecast of cold chain capacity requirements is to retire or withdraw certain equipment. When equipment is used beyond its economic and functional life, breakdowns frequently occur or repair costs are high. In this case, routine equipment replacement is not planned and the inventory fails. To ensure that the national equipment stock is reliable and operates at minimal cost, the CCEM tool helps facilitate the strategic withdrawal of equipment on the basis of specific criteria, including:

Age (over set limits).

Poorly performing equipment model.

Working status (not working).

Models using CFC refrigeration gases.

Inappropriate energy source (for example, kerosene is used where other options exist).

A combination of selected criteria.

With the CCEM tool, equipment can be strategically and routinely retired and replaced at the same time new equipment is purchased, assuring cold chain reliability and minimal equipment operation costs. To create accurate estimates for operational costs, it is necessary to set the national unit prices for energy sources as described in Section 8.4.

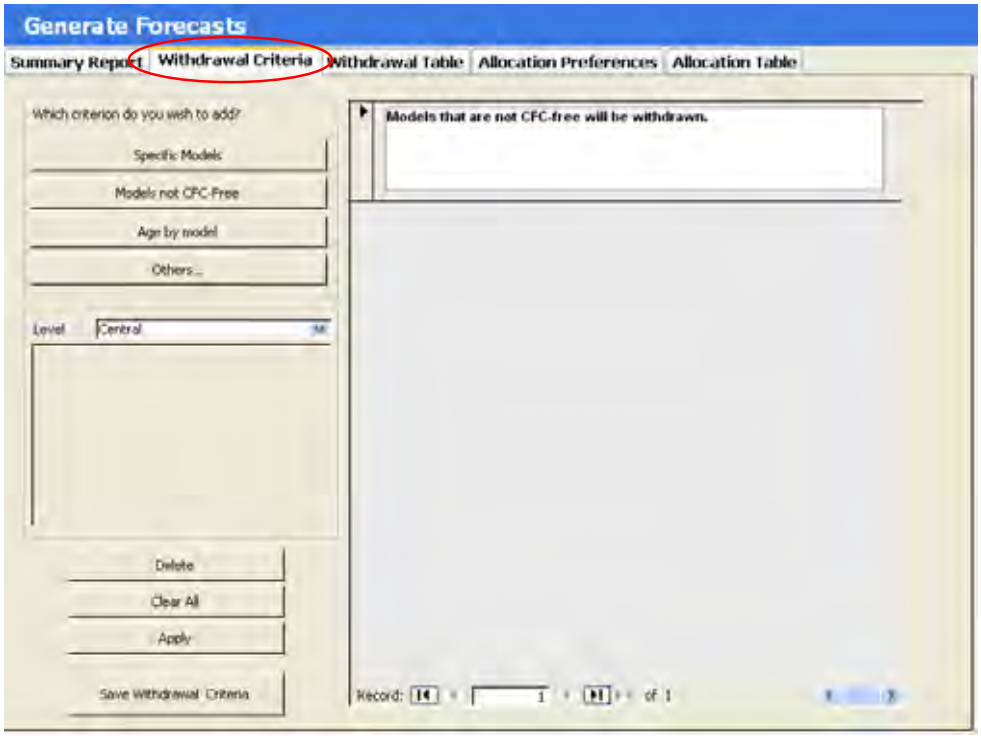
From the **Main Menu,** choose **Generate Forecasts** and then **Retire or Withdrawal Equipment from Use**. Users can also select the **Withdrawal criteria** tab from the **Generate Forecasts** screen.

Withdrawal criteria should be selected based on national policy governing the retirement of expired equipment. These criteria allow the CCEM tool to automatically apply the national cold chain policy and generate an accurate forecast that reflects national policies.

Note:
The CCEM tool allows users to manually withdraw specific cold chain refrigeration equipment. Select the **Withdrawal Table** tab to view lists of equipment to be withdrawn and manually cancel the withdrawal of specific items.

Setting withdrawal criteria

To select the withdrawal criteria, select the **Withdrawal Criteria** tab or select **Retire or Withdrawal Equipment from Use** from the **Main Menu**. The national cold chain manager can select different withdrawal criteria using the screen below.



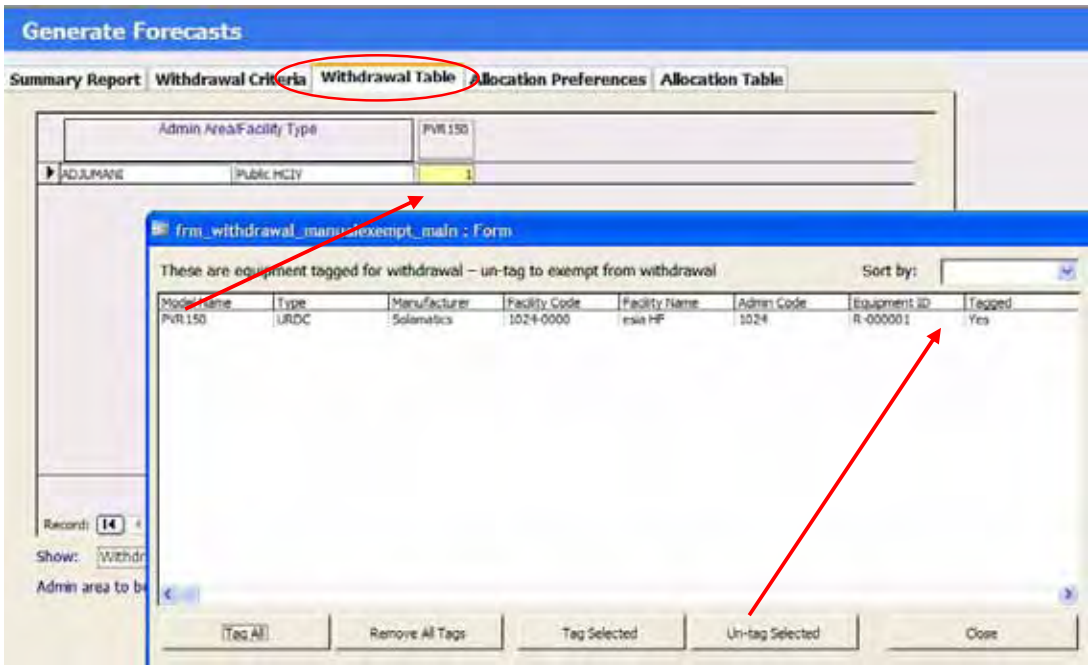
Steps to set equipment withdrawal criteria:

1. Following the onscreen dialogue boxes, input information for equipment models, age limits, or conditional statements for withdrawal. When you are satisfied with the criteria, click the **Accept** button. These criteria will display on right side of the screen.
2. Set other criteria to build a compete set of criteria for withdrawing cold chain equipment.

   A summary of withdrawal criteria appears on the right side of the screen. If you want to make changes to these criteria, use the **Clear All** or **Delete** buttons to change a specific criterion or set of criteria.
3. Use the drop-down **Level** option to limit withdrawal criteria to one or more administrative areas. Select from the list of areas, or hold the Ctrl key and select several administrative areas. The default **Level** is Central, which selects all areas in the country for the withdrawal criteria.
4. Select **Save Withdrawal Criteria** at the bottom of the screen and name and describe the set of criteria.
5. To immediately view the results, select **Apply**. Select the **Summary Report** tab to see how these criteria impact cold chain capacity.

Manually changing equipment withdrawals

After applying the saved sets of withdrawal criteria to the national cold chain equipment inventory, use the **Withdrawal Table** tab to inspect and cancel specific withdrawals.

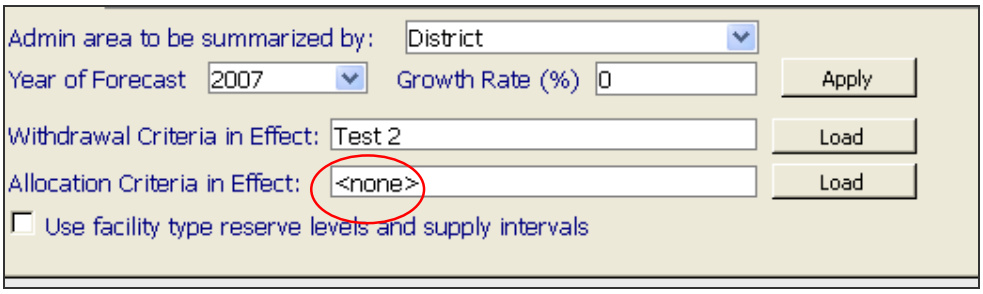


1. Select the administrative level for an equipment list.
2. Inspect the list of areas, models to be withdrawn, and quantities, checking for large quantities of withdrawals. Scroll through the results to find area names or right click on a column to sort and search for a facility. Verify or change areas as needed.
3. To verify or change the equipment in a specific facility, click on the quantity. A pop-up dialogue box appears displaying the equipment tagged for withdrawal.
4. Each item of equipment listed is tagged "Yes" or "No" depending on the withdrawal status. Use the buttons at the bottom of the dialogue box to change the tag. Select **Close** to close the dialogue box.
5. To capture the manual equipment changes to the set of criteria, select the **Withdrawal Criteria** tab and select **Save Withdrawal Criteria** using a new name.
6. To immediately view the results, select **Apply**. Set the new criteria from the Withdrawal Table or select **Load** to set the criteria on the **Summary Report** tab.

Select the **Summary Report** to view the **Withdrawal Criteria in Effect.** If the name of the new criteria set appears, the withdrawal criteria and manual changes are reflected in the report. The results can be viewed onscreen or summarized for the central level or a different administrative level. Results can also be generated and viewed in a report format, using a report type listed at the bottom of the screen.

Note:
At any time, use **Load** to define and apply different criteria to the forecast.

In the figure below from the **Summary Report** tab, there are no (<none>) allocation criteria. Therefore, no new equipment has been allocated to meet shortages; equipment has only been withdrawn from use. The next section explains how equipment is allocated.



6.3. Allocate New Equipment to Facilities

Refrigeration equipment selected for purchase to meet cold chain capacity and reliability standards should conform to national policies, including any standardization policy. Managers should select equipment that provides storage capacity appropriate for each facility type and runs on the optimum available energy source. The CCEM tool helps to select and allocate equipment according to these considerations.

The CCEM tool requires each facility type in the country to designate equipment model preferences. The CCEM tool then allocates new equipment to meet the vaccine capacity shortfalls listed in the **Summary Report**, taking into consideration the availability of energy sources at each facility in the following priority order:

Solar energy (specified first, for specific locations).[11]

Electricity >16 hours per 24-hour period.

Electricity >8 hours and <16 hours per 24-hour period.

Bottled gas where electricity <8 hours per 24-hour period.

Kerosene, where bottled gas and electricity are not available.

If more than one equipment model preference meets the energy availability of a health facility not using solar energy, the CCEM tool chooses the least expensive option, taking into account the quantity of equipment needed to meet capacity requirements.

[11] The manual selection of specific health facilities to receive solar vaccine refrigerators overrides all other allocation criteria. The process of selecting sites suitable for solar equipment requires additional technical information for each health facility. This technical process cannot be replicated by the automatic allocation functions of the CCEM tool.

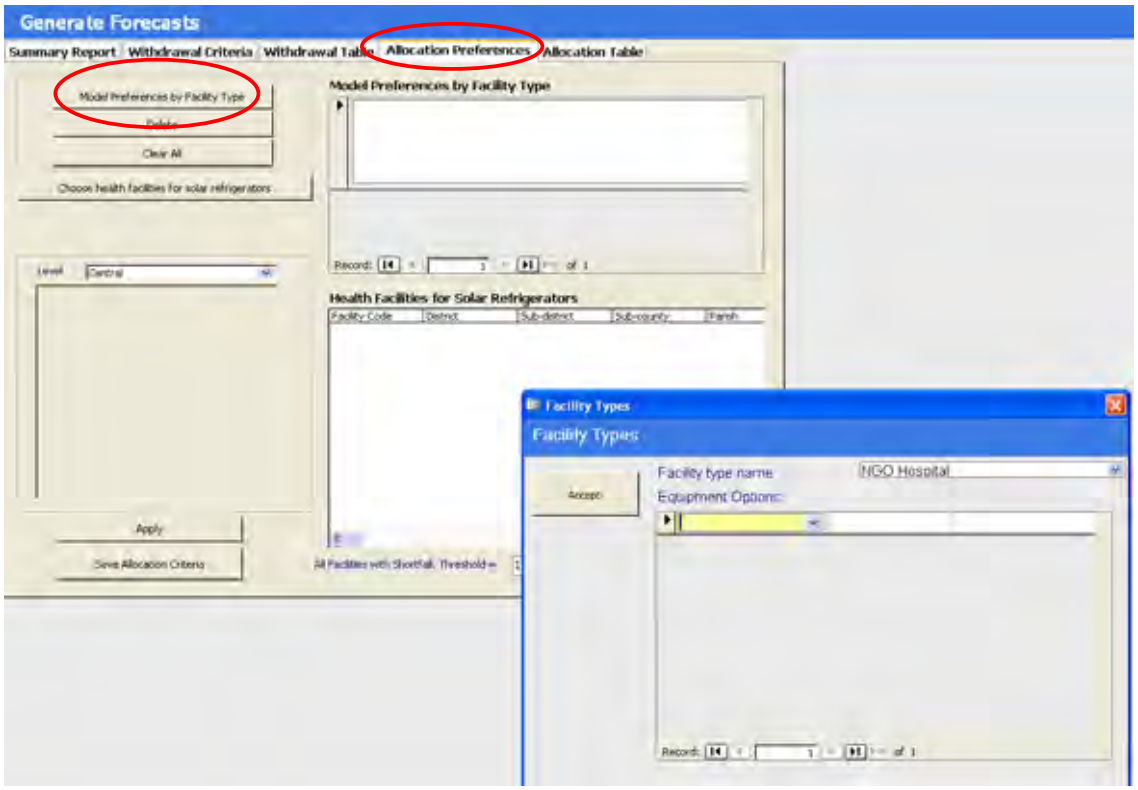
Refrigeration equipment is assigned to meet the shortfalls of vaccine storage capacity in health facilities in two steps:

Setting allocation preferences for each facility type and automatically allocating the least expensive preference according to the type of energy available.

Checking the allocation table manually and making changes to the equipment allocation.

Setting allocation preferences:

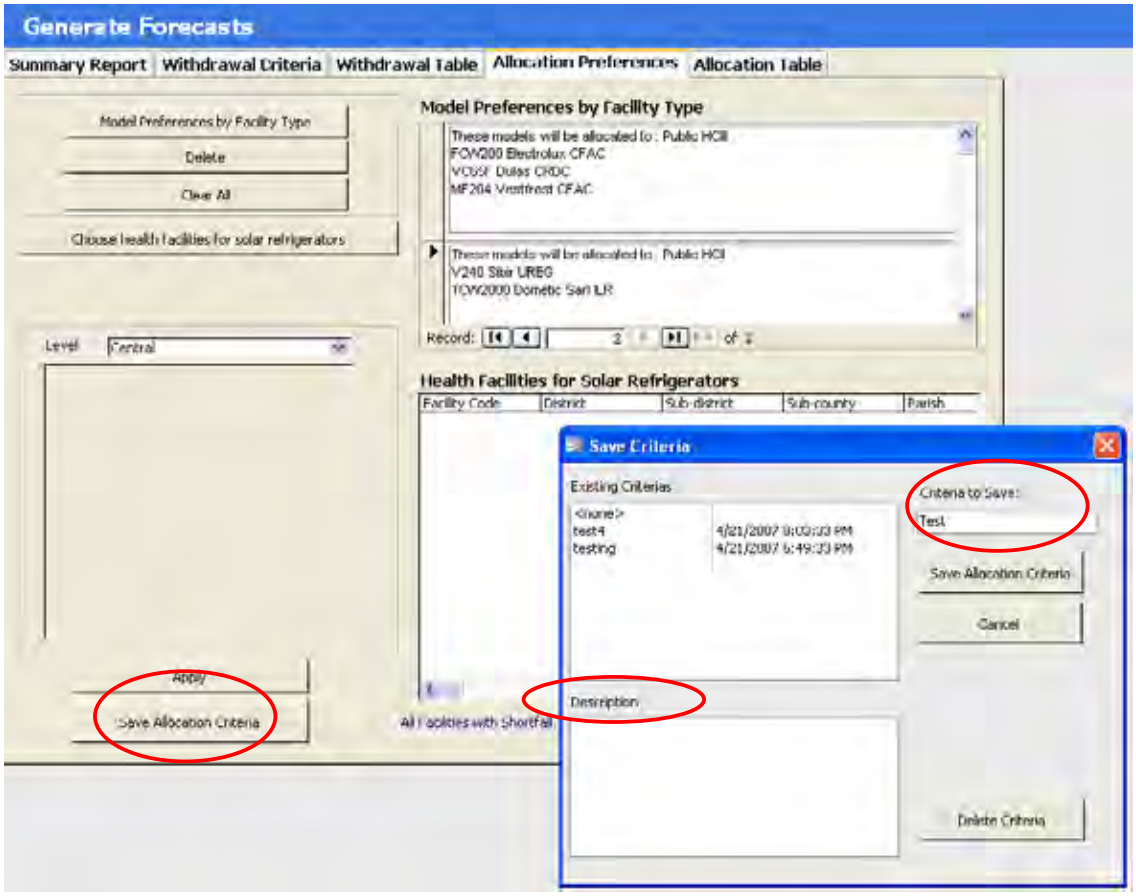
Select the **Allocation Preferences** tab at the top of the **Generate Forecasts** screen and follow these steps:



1. Select the **Model Preferences by Facility Type** option. The Facility Types dialogue box appears.
2. From the Facility Types dialogue box, select the **Facility type name** from the drop-down menu.
3. Select an equipment model from the **Standard Equipment Library –Refrigerator** in the **Equipment Options** drop-down box. More than one equipment option can be selected.
4. Select the **Accept** button when finished.
5. Repeat steps 1 through 4 for each facility type. These allocation preferences for each facility type appear in a scroll-down bar on the right.
6. Select **Choose health facilities for solar refrigerators** to identify facilities available to receive solar refrigeration equipment.
7. Select the **Accept** button when the list is complete.

8. To limit the allocation to a certain administrative area, select the desired level from the **Level** drop-down menu. Hold the keyboard Ctrl key to select more than one administrative area at one time.

9. Select **Save Allocation Criteria** to save the criteria with a specific name in the **Criteria to Save** box and enter a brief description in the **Description** text box.



Note:
If you choose a single refrigerator model operating on 24/7 electricity for a health facility type, the facilities in this health facility category that do not have reliable electricity will not receive any new equipment.

Therefore, when you set **Model Preferences by Facility Type** in the Allocation Criteria step of equipment forecasting, include a refrigerator model for health facilities that include options for settings without electricity.

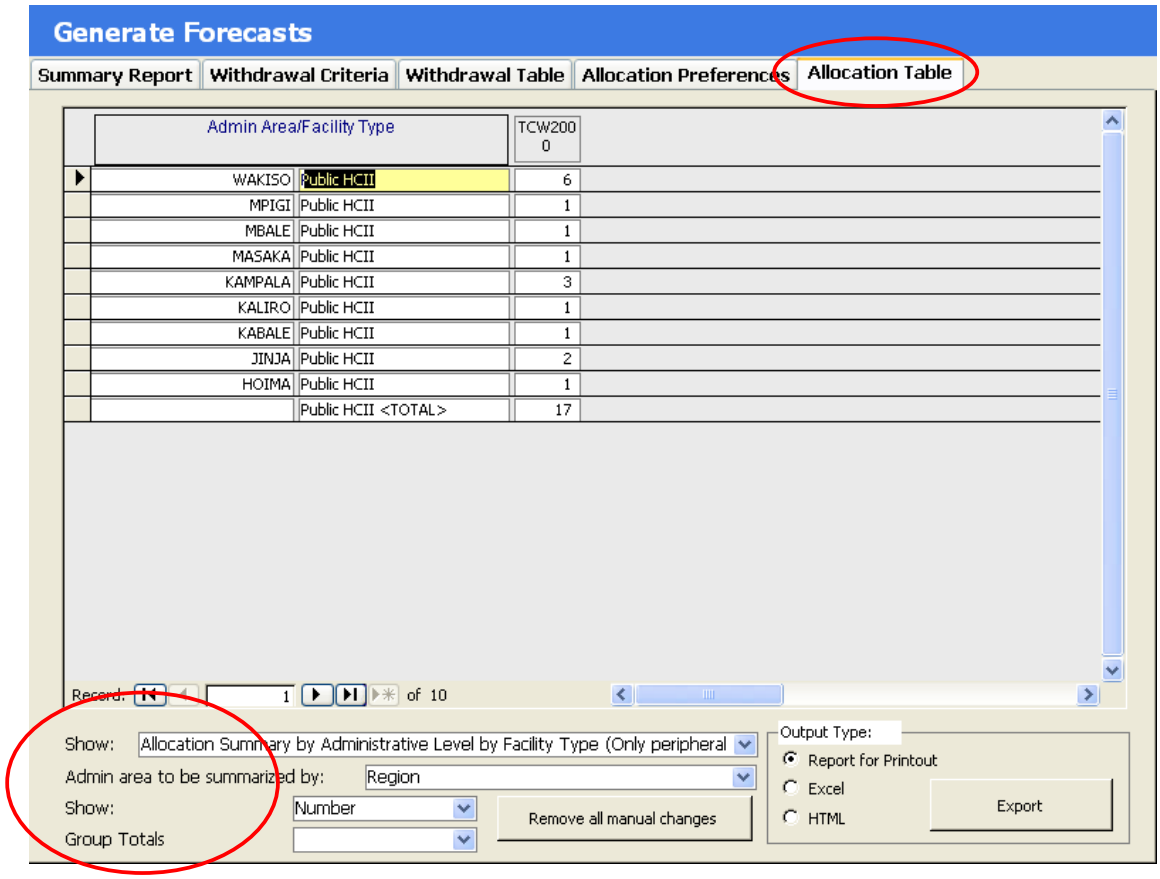
To see the impact of these criteria immediately:

Select Summary Report tab.

Choose the saved allocation criteria from the **Allocation Criteria in Effect** drop down menu and click **Load**. CCEM will allocate cold chain equipment to meet storage capacity shortages based on these criteria.

Checking and manually changing equipment allocation

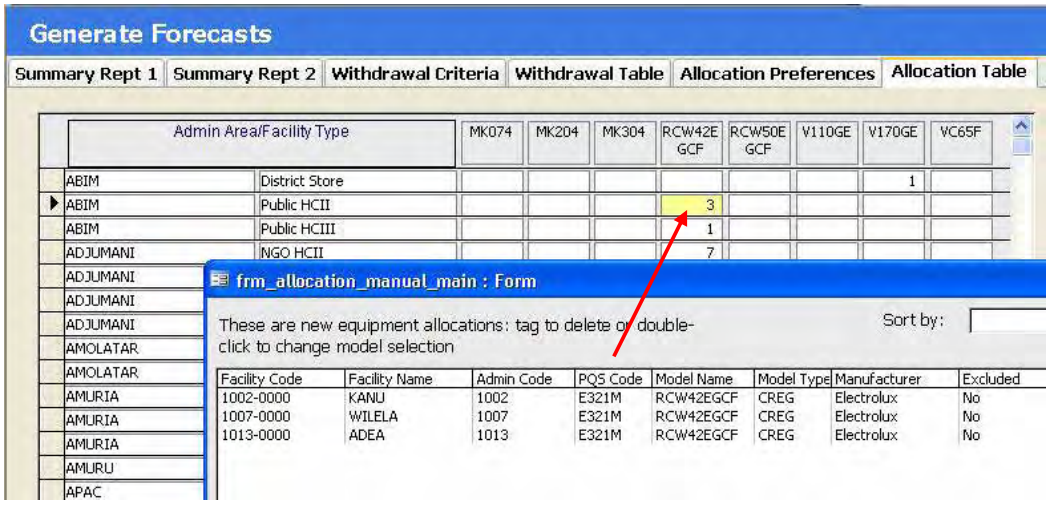
After the allocation criteria are applied, inspect and change specific equipment allocations, or check by facility, using the **Allocation Table** tab.



Follow these steps:

1. Choose **Show** to display either Allocation Summary by Administrative Level or Allocation Summary by Administrative Level and Facility Type.
2. Select the administrative level for an equipment listing from the **Admin area to be summarized** by drop-down menu at the bottom of the screen.
3. Inspect the lists of areas, facility types, and equipment that the CCEM automatically assigned. Check for large quantities of equipment allocated to a facility or geographical group of facilities. Scroll to area names to check, or right click on the column to access, search, sort, or filter facilities.
4. To verify or change the equipment for a specific facility, click on the quantity and a pop-up box with equipment details appears.
5. Under the right hand “Excluded” column, each item of equipment is marked “No”, indicating that it is tagged for allocation to this facility. To exclude it from the allocation, use the onscreen buttons in the pop-up box to change the exclusion to “Yes”.
6. To change the equipment model allocated by CCEM, click on the PQS code of a particular item and choose a different Library option from the drop-down menu.

7. Choose the **Allocation Preferences** tab and **Save Allocation Criteria (**with a new name) to reflect the current set of criteria and the manual equipment changes.
8. Select **Apply** to set the new criteria and inspect the results in the Summary Report.



Under the **Show** option at the bottom of the main allocation table, choose to view quantities of allocated equipment ("Number") or purchase costs of equipment ("Costs"). To generate a report on equipment costs, including recurrent costs of energy, select **Generate Reports** at the top of the screen. Then, select **Descriptive Reports** and click on report 5.08: **Summary of Equipment Running Costs by Administrative Level**.

When you select the **Summary Report** tab**,** the name used to save the set allocation preferences AND manual changes will be displayed as **Allocation Criteria in Effect.** This means that the Allocation Criteria specified are applied as well as the manual changes by CCEM and shown in the **Summary Report** results. These results can be viewed onscreen or summarized for the central level or different administrative levels. View the results in a report format, an Excel workbook, or as an HTML when you select the **Output Destination** from the bottom of the screen.

Note:
At any time, select **Load** on the **Summary Report** tab to select a different set of saved Withdrawal or Allocation criteria. After you select the criteria name, click the **Load** button. The **Summary Report** will immediately reflect these criteria. When the **Withdrawal** or **Allocation Criteria in Effect** are set to <none>, withdrawal or allocation criteria will not be applied.

Checking for sufficient ice-pack freezing capacity

Inspect the summary reports to assess the sufficiency of ice-pack freezing capacity in the cold chain system. The CCEM tool takes account of two parameters for ice-pack freezing capacity:

1. **Freezing capacity for routine immunization**: The average freezing rate per 24 hour period compared to the average requirement for ice packs per day over seven days.
2. **Freezing capacity for supplementary immunization activities, such as campaigns**: The total volume of ice packs in litres able to be stored in freezers compared to the total volume needed for a single day of Supplemental Immunization Activities (SIAs).

Ensure the desired Withdrawal Criteria and the Allocation Criteria are in effect on the **Summary Report** tab. Then, in **Inventory Reports,** select the report **Ice Pack Freezing Capacity (including withdrawal and allocation)** and follow these steps:

1. Make a note of the facilities where the icepack freezing capacity for routine or campaign use is insufficient.
2. Make a note of the facilities with extra needs.
3. Make the necessary changes in required equipment using the **Allocation Table**, by facility.
4. Inspect the impact in the **Summary Report**.

7. Preparing a Multi-year Plan

The process of forecasting described in Section 6 creates quantified lists of new refrigerator and freezer equipment requirements by facility or aggregated to any administrative level or facility type. As mentioned, this cold chain equipment forecast can be made for the survey year for any future year.

However, at this stage, the forecast does not take into account the existence of stocks of equipment in store, unused, or available for redistribution. These stocks may be found at the national level or, according to national policy, at any level below the national store. The distribution of these stocks to meet local needs in specific facilities is a managerial decision outside the scope of CCEM.

For the purpose of national procurement planning in the multi-year plan, the totals for new equipment requirements aggregated to national or sub-national levels need to be adjusted to account for existing equipment stocks.

1. From the **Main Menu,** select **Standard Reports** option**.** Then select **Forecasting Reports** option, select **Summary of operating equipment in store and equipment allocated by type**.
2. This report is produced for the first, sub-national level ("District" in the CCEM Practice.mdb data set). Check for existing equipment in store and available for redistribution
3. After locating a district with equipment in storage, check the allocation quantities for the same type of equipment and subtract the equipment in store from the allocation. Note this decision.
4. Adjust the district allocation totals in the multi-year plan according to these adjustments.

Admin Area	Facility Type	Equipment in store:			Equipment allocated:			
		Qty	+2/+8C Liters	-20C Liters	Qty	+2/+8C Liters	-20C Liters	Total Cost
KABAROLE								
	Chest refrigerator; electricity & gas				6	60	0	$5,388.00
	Icelined refrigerator				2	40	0	$1,014.00
	Upright refrigerator; electricity & gas				1	17	0	$711.00
KABERAMAIDO								
	Chest refrigerator; electricity & gas	1	10	0	5	50	0	$4,490.00
KALANGALA								
	Chest refrigerator; electricity & gas				4	40	0	$3,592.00
KALIRO								
	Chest refrigerator; electricity & gas				11	110	0	$9,878.00
	Icelined refrigerator				1	20	0	$507.00
KAMPALA								
	Chest refrigerator; electricity & gas				12	120	0	$10,776.00
	Icelined refrigerator	1	63	0	52	1040	0	$26,364.00
KAMULI								

In the example above, the district of Kaberamaido has one chest refrigerator in stock that may be subtracted from the five allocated chest refrigerators.

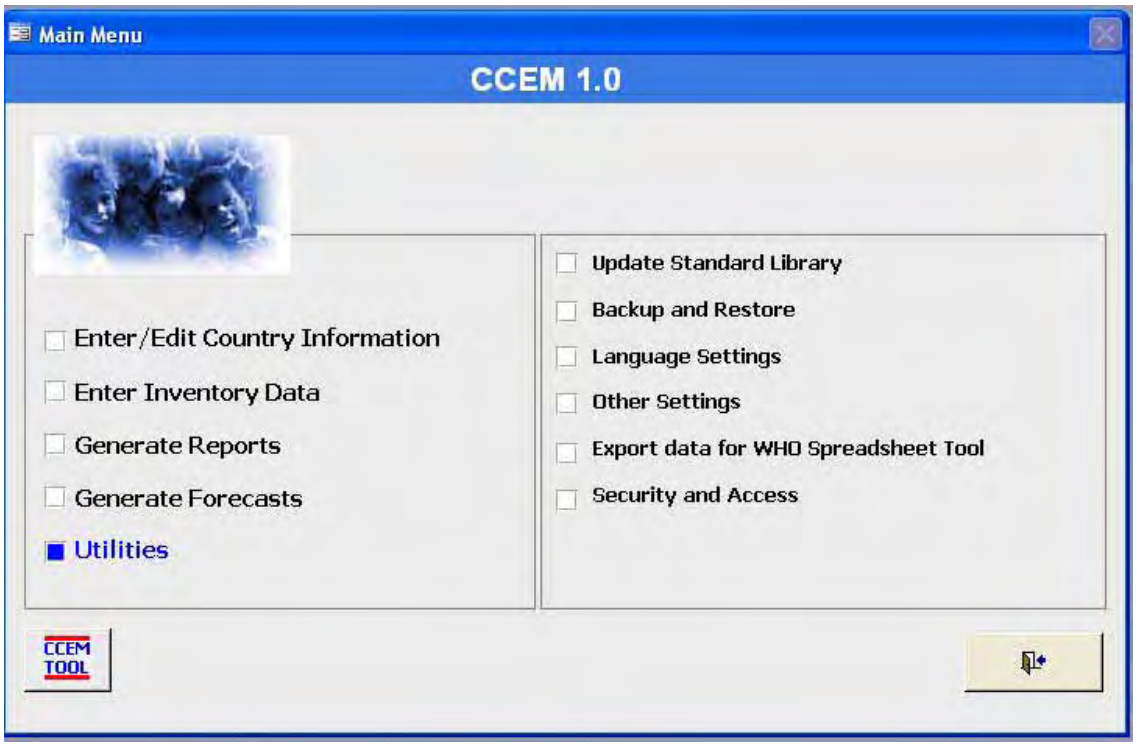
Creating multi-year plans of new equipment needs:

1. Generate a forecast of requirements for the last year of the multi-year plan by:
   - Specifying the growth rate and including any changes in vaccines used, distribution policy, etc.
   - Loading withdrawal and allocation criteria files into the Summary Report.
   - Generating reports on the equipment allocated.
2. Adjust totals of equipment required nationally to take account of existing equipment in store and available for redistribution.
3. Redistribute total equipment requirements for procurement over each year of the multi-year plan until the last year.
4. This redistribution may be equally parts new equipment supplied per year or the annual allocations may vary by year, according to budget possibilities or major changes in the program.

8. Utilities

The **Utilities** option in CCEM provides access to six functions:

1. Update Standards Library
2. Backup and Restore
3. Language Settings, Other Settings
4. Export data for WHO Spreadsheet Tool
5. Security and Access.



8.1. Updating Standard Library

Two standard libraries are updated using the **Update Standard Library** option:

1. WHO/PQS Standard Equipment Library, including:

   Refrigerators and freezers

   Cold boxes and vaccine carriers

   Voltage regulators/stabilisers

   Generators

2. WHO/Vaccine Packaging and Shipping Guidelines (generic vaccine volume norms).

A Patch Files.mdb file is located on the http://www.path.org/projects/cold-chain-ccem.php and should be downloaded periodically to keep the system up to date and allow for access to new equipment and vaccine options. After downloading a new Patch Files.mdb, follow these installation steps:

1. Select Update **Standard Library** from the **Utilities** menu.
2. Find and click the Patch Files.MDB file.
3. Confirm that the file information reflects the latest update.
4. Select the **Load patch** button.

8.2. Backup and Restore

There are three tabs (options) for the **Backup and Restore** utility: **Log summary**, **Backup**, and **Restore**.

The **Log Summary** provides a report of the previous backups including descriptions and dates.

The **Backup** option provides a list of information to identify the current copy of CCEM in use:

1. Fill in the date of the backup (default today's date).
2. Fill in a description of the backup for later retrieval.
3. Click on the **Create Backup File** button.
4. Enter a file name and press **Save**.

The **Restore** option allows users to load a backup file for CCEM:

1. Click the **Load Backup File** button.
2. Find and click on the backup file to restore
3. Click the **Continue** button.

WARNING!

CCEM will now begin using the restored file. Remember to backup older files if needed for future use!

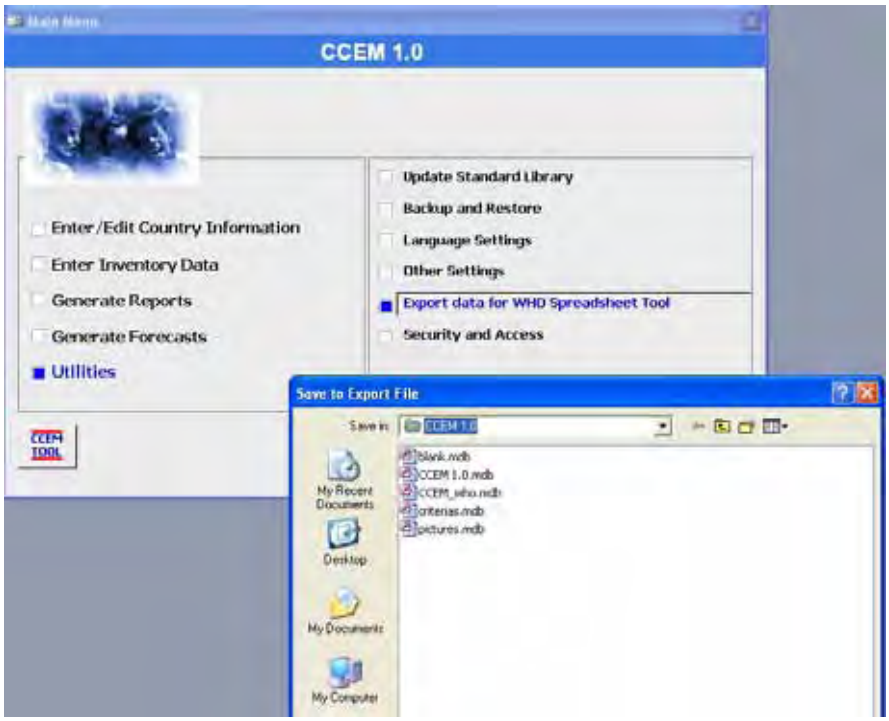
8.3. Language Settings

Choose this option to change the language of CCEM. A table opens to show you the languages currently supported by CCEM. You can select the **Active Language** at the bottom of the screen. On release, English, French and Spanish are available. You can add additional languages for the application of CCEM in this table.

8.4. Other Settings

Choose the **Other Settings** option to enter the national unit prices of energy sources such as electricity, bottled gas, and kerosene.

8.5. Exporting Data to the WHO Spreadsheet Tool



Export CCEM data to the WHO Equipment Inventory Spreadsheet (Excel) following these steps:

1. Click Export data for WHO Spreadsheet tool.
2. Select the CCEM_WHO.mdb file. This database file must exist in the same folder as the CCEM tool. If it is missing, download it from the CCEM download website.
3. The two tables in this new database contain the data and fields compatible with the WHO spreadsheet tool.
4. From this database, import the two tables into Excel.

8.6. Security and Access

Password protection can be added to four different categories of CCEM data and settings:

Facility and Inventory Data

Administrative Levels and Demographic Data

Facility Types

Country Vaccine Schedule

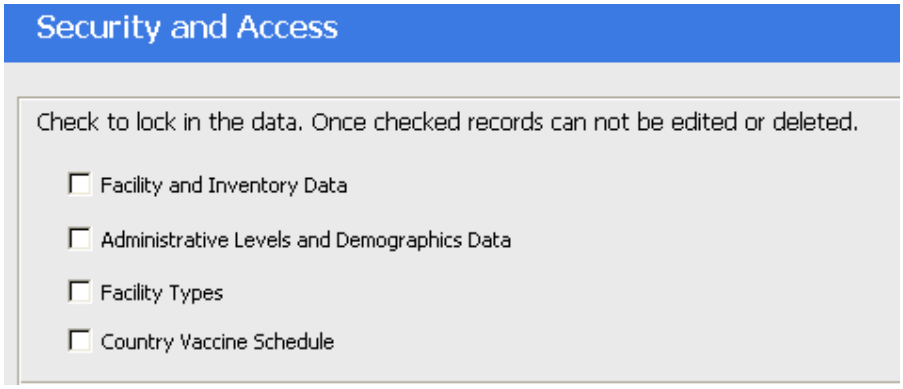
When the **Security and Access** utility is selected:

Enter the default password admin0001 in the password dialogue box and click the **Log In** button.

On the Security and Access screen that appears, change the password by selecting the **Change Admin Password** button.

Enter “admin0001” as the current password and enter the new password in the New Password and Confirm New Password boxes.

Select which of the four data categories to lock with this password. Once locked, this data cannot be edited, added, or deleted without the selected password.



9. Updating the Cold Chain Equipment Inventory

A national inventory survey is conducted with considerable investment of human effort and financial resources. The survey provides a picture of the system that is valid only on the day of the survey. From this day forward, the inventory data begins to change. Equipment is moved, withdrawn or supplied and the database gradually ceases to be accurate. Typically, inventories have been allowed to age and fall out of use and then perhaps 5-10 years later the necessary resources are mobilized again and the entire exercise is repeated.

This is neither economic nor is it an acceptable way to manage cold-chain equipment or to plan for expansion of immunization services or prepare for the introduction of new vaccines. The cold chain equipment inventory should by routinely updated as equipment is moved, is retired is added to facility stores. It is of prime importance that a routine system of updating be implemented as soon as possible after the national cold chain equipment survey to enable the following processes to occur in an efficient way:

Micro-planning of equipment changes in facilities at sub-national levels

Tracking of repairs requiring withdrawal and return of equipment

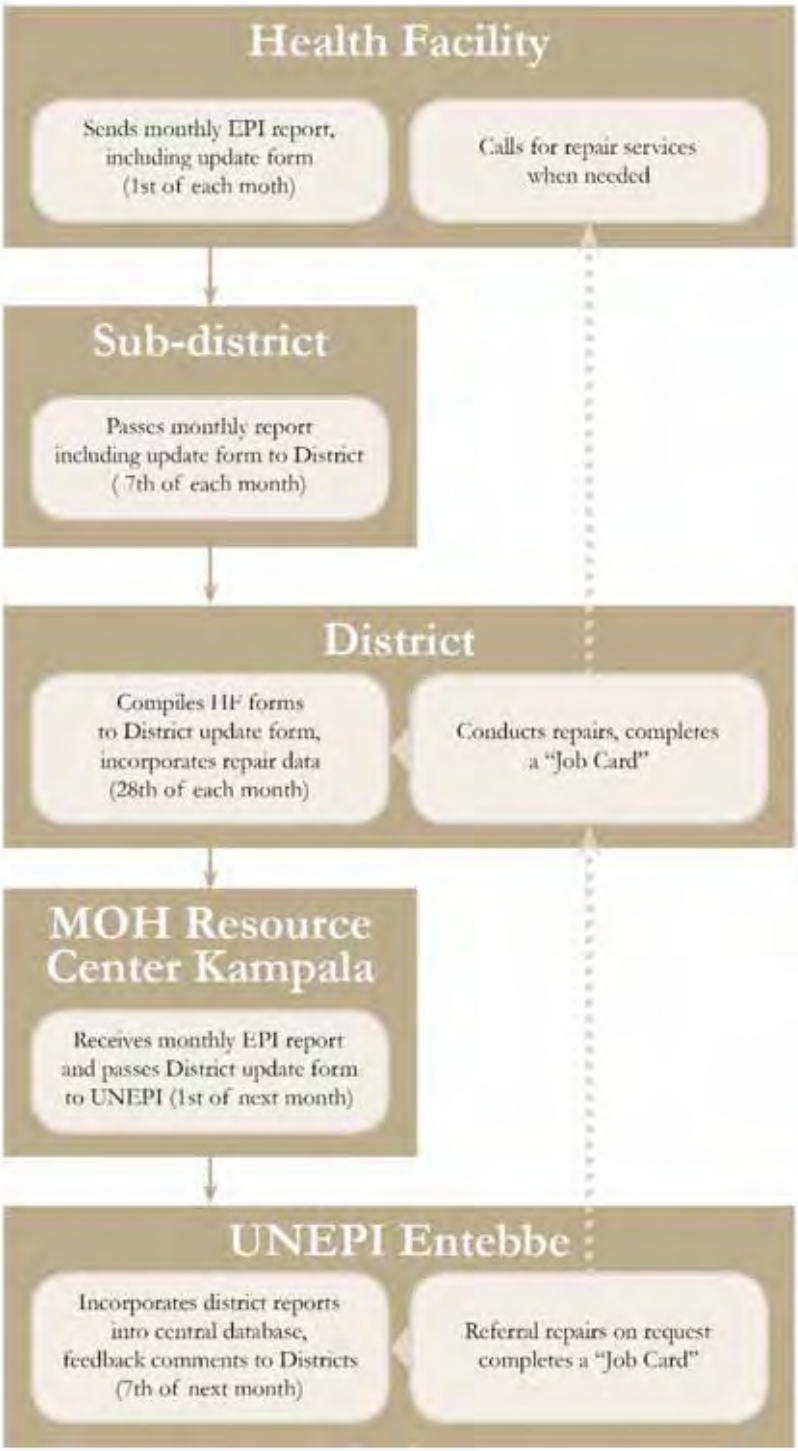
Monitoring of working status and requests for service

National planning to correct cMYPs annually

Assessment of impact of supplementary immunization or disease outbreak response

The update system for CCEM currently limited to a national paper-based reporting system. Paper forms must be designed, then completed and sent from the heath facilities to the key administrative level, region or district. At this level the data can be summarized onto sub-national reports and sent to the central level for incorporation of the data into CCEM. An example of a country updating system described in Figure2.

Figure 2: Flowchart of updating system for inventory data and equipment maintenance—Country-specific example



Note
The reporting system will depend on the national system in place and may not correspond to this flow chart

Updating Forms have been elaborated for health facility and regional levels and can be found in Annex 6 and at http://www.path.org/projects/cold-chain-ccem.php.

Annex 1: CCEM Datasets

Main Facility and Equipment Inventory Datasets

1. General and cold-chain specific information for each health facility

- Facility code
- Generic admin area level
- Generic admin area level
- Generic admin area level
- Generic admin area level
- Type of facility
- Geographic coordinate code
- Facility name
- Targeted live births
- Targeted pregnant women
- Targeted total population
- Targeted child bearing age women
- Cold chain function: Storage?
- Cold chain function: Service delivery?
- Cold chain function: Outreach?
- Mode of vaccine supply
- Fuel availability: electricity
- Fuel availability: kerosene
- Fuel availability: bottled gas
- Volume of icepacks to be stored at -20C for routine immunization
- Volume of icepacks to be stored at -20C for supplementary immunization
- Weeks interval between resupply
- Weeks of reserve stock
- Site of the facility: Floods?
- Site of the facility: High altitude?
- Site of the facility: Difficult access?
- Site of the facility: Equipment robbed or looted?
- Type of transport: Public transport
- Type of transport: Car or van
- Type of transport: By motorbike
- Type of transport: By foot
- Type of transport: By boat
- Responsiveness of cold chain repair services

2. Refrigeration equipment information about each vaccine refrigerator/freezer

- Facility code
- Library ID
- Refrigerator type

- Model name
- Manufacturer name
- Serial number
- Power source
- Refrigerant gas type
- CFC Free?
- Internal storage dimensions (+4 degrees C) - Height
- Internal storage dimensions (+4 degrees C) - Length
- Internal storage dimensions (+4 degrees C) - Width
- Internal gross storage volume (+4 degrees C)
- Net storage volume for vaccine (+4 degrees C)
- Internal storage dimensions (-20 degrees C) - Height
- Internal storage dimensions (-20 degrees C) - Length
- Internal storage dimensions (-20 degrees C) - Width
- Internal gross storage volume (-20 degrees C)
- Net storage volume for vaccine (-20 degrees C)
- Year of supply
- Source of supply
- Operating condition
- Working status
- Refrigerator temperature - high reading
- Refrigerator temperature - low reading
- Food or beverages stored?
- Equipment utilization
- Installed properly?

3. Cold Boxes, Vaccine Carriers, and Icepacks information for each facility

- Facility Code
- Library ID
- Cold Box/Vaccine Carrier Type
- Manufacturer
- Model
- Net vaccine storage capacity in liters
- External dimensions in cms
- Internal dimensions in cms
- Vaccine storage dimensions in cms
- Cold life without openings Hrs/43C
- Cost
- Total quantity
- Quantity not working

4. Spare Parts - Information about each spare part type for each health facility

- Facility code
- Item type
- Total number of each tool or spare part type at facility

5. Voltage Regulators - Information about voltage regulators at each facility

- Facility Code
- Manufacturer
- Model
- Nominal voltage: Volts AC
- Continuous power: Watts
- Frequency: Hertz
- Phases: (One, Three)
- Input voltage range Volts AC
- Output voltage range Volts AC
- Cost
- Quantity
- Quantity not working

6. Generators–Information about each generator for each health facility.

- Facility code
- Model name
- Manufacturer name
- Serial number
- Power Source
- Power Rating
- Automatic start mechanism
- Number of phases
- Used for refrigerators?
- Used for cold rooms?
- Used for lighting?
- Year of supply
- Source of supply
- Working status
- Equipment utilization

7. Cold Room information about each cold room in a health facility

- Facility code
- Model name
- Manufacturer name
- Serial number
- Number of phases
- Refrigerant gas type
- Number of cooling systems
- Temperature recording system
- Type of temperature recording system
- Internal storage dimensions (+4 degrees C) - Height
- Internal storage dimensions (+4 degrees C) - Length
- Internal storage dimensions (+4 degrees C) - Width
- Internal gross storage volume (+4 degrees C)

- Net storage volume for vaccine (+4 degrees C)
- Internal storage dimensions (-20 degrees C) - Height
- Internal storage dimensions (-20 degrees C) - Length
- Internal storage dimensions (-20 degrees C) - Width
- Internal gross storage volume (-20 degrees C)
- Net storage volume for vaccine (-20 degrees C)
- Year of supply
- Source of supply
- Operating condition
- Maintenance contract
- Maintenance workshop
- Refrigerator temperature - high reading
- Refrigerator temperature - low reading
- Food or beverages stored?

Standard Equipment Library Datasets

8. Library: Standard Cold Boxes

- Library ID
- Cold Box Type
- Manufacturer
- Model
- Net vaccine storage capacity in liters
- External dimensions in cms
- Internal dimensions in cms
- Vaccine storage dimensions in cms
- Volume of each ice pack used in liters
- Number of icepacks used
- Total volume of icepacks liters
- Coldlife without openings Hrs/43C
- Cost

9. Library: Refrigerants

- Identifier for each type of refrigerant
- Description
- Non-CFC?

10. Library: Standard Vaccine Refrigerators

- Item type
- Library ID code
- Part of standard PQS Library?
- Model name
- Manufacturer name
- Power sources
- Refrigerant gas type

- Internal gross storage volume (+4 degrees C)
- Net storage volume for vaccine (+4 degrees C)
- Internal gross storage volume (-20 degrees C)
- Net storage volume for vaccine (-20 degrees C)
- Product price
- Year of introduction
- Year of retirement

11. Library: Standard Voltage Regulators

- Library ID code
- Manufacturer
- Model
- Nominal voltage: VoltsAC
- Continuous power: Watts
- Frequency: Hertz
- Phases: (One, Three)
- Input voltage range VoltsAC
- Output voltage range VoltsAC
- Cost

12. Library: Standard Vaccine Presentations

- Vaccine type
- Number of doses per vial
- Packed volume (secondary packing) per dose
- Vaccine product
- Vaccine formulation
- Mode of administration
- Vaccine presentation
- Manufacturer

Country Information Datasets

13. National Administrative Areas

- Names for lowest geographic administrative area
- Codes for lowest geographic administrative area
- 2nd geographic administrative level names
- 3rd geographic administrative level names
- 4th geographic administrative level names
- 5th geographic administrative level names
- Population for lowest geographic admin area
- Live births for lowest geographic admin area
- Surviving infants for lowest geographic admin area
- Children under 5 for lowest geographic admin area
- Population under 15 yrs for lowest geographic admin area

14: National Vaccine Schedule

- Vaccine type
- Number of doses per vial
- Packed volume (secondary packing) per dose
- Number of doses needed to complete the schedule
- Target population
- Multiplier to target pop
- Wastage rate
- Storage temperature +4 deg C
- Storage temperature -20 deg C
- Diluent refrigerated
- Packed volume (secondary packing) per dose
- Facility type identifier for facilities storing this vaccine
- Facility type identifier

15. Facility Administration

- Facility type identifier
- Facility type name
- Weeks interval between resupply
- Weeks of working stock
- Level

Annex 2: CCEM Questionnaire Guide

Surveyors' Guide to CCEM Questionnaires

CCEM Document 2

This guide contains explanations for all questions within each of the seven CCEM questionnaires:

- Health Facility Questionnaire (CCEM Document 3)
- Refrigeration Equipment Questionnaire (CCEM Document 4)
- Cold Boxes, Vaccine Carriers, and Ice Packs Questionnaire (CCEM Document 5)
- Spare Parts and Tools Questionnaire (CCEM Document 6)
- Voltage Regulator/Stabilizer Questionnaire (CCEM Document 7)
- Generator Questionnaire (CCEM Document 8)
- Cold Room Questionnaire (CCEM Document 9)

Health Facility Questionnaire

(CCEM Document 3)

#	Question	Explanation
1	Region (level 2)	Enter the largest administrative region where health facility is located. **This field is mandatory.** *(These administrative levels are set by the cold chain manager in Enter / Edit Country Information option in CCEM. See CCEM Section 3.1 of the Users Manual.)*
2	Province (level 3)	Enter the province where the health facility is located. **This field is mandatory.**
3	Municipality (level 4)	Enter the municipality where health facility is located. **This field is mandatory.**
4	Township (level 5)	Enter the township where the health facility is located. **This field is mandatory.**
5	Health facility name	Enter the name of the health facility. **This field is mandatory.**
6	Total target population	Enter the total population currently living in the area serviced by this health facility. If these data are not available, use the population data obtained from the Township Epidemiology/Planning Unit. For Regional hospitals use an estimated percentage of the Provincial total population. Ask for the most recent data. **This is a mandatory field.**
7	Live births per year	Enter the number of live births that occur each year in the area serviced by this health facility. If these data are not available multiply the total target population by the 0.0485. **This not the same value as surviving infants less than one year**.
8	Number of pregnant women	Enter the number of pregnant women currently living in the area serviced by this health facility. If these data are not available, multiply the total target population by the factor of 0.05.
9	Number of women of child-bearing age	Enter the number of child-bearing age women currently living in the area serviced by this health facility. If these data are not available, multiply the total population by the factor 0.23.

<table>
<tr><td>10</td><td>Type of health facility</td><td>Mark only one box as appropriate for the type of health facility found in the country:

(These facility types are set by the cold chain manager in Enter / Edit Country Information option in CCEM. See CCEM Section 3.1 of the Users Manual.)

<table><tr><th>Description</th></tr><tr><td>National vaccine stores</td></tr><tr><td>Regional vaccine stores</td></tr><tr><td>Provincial vaccine stores</td></tr><tr><td>Public hospital</td></tr><tr><td>Private hospital</td></tr><tr><td>NGO hospital</td></tr><tr><td>Public health centre IV</td></tr><tr><td>Private health centre IV</td></tr><tr><td>NGO health centre IV</td></tr><tr><td>Public health centre III</td></tr><tr><td>Private health centre III</td></tr><tr><td>NGO health centre III</td></tr><tr><td>Public health centre II</td></tr><tr><td>Private health centre II</td></tr><tr><td>NGO health centre II</td></tr></table></td></tr>
<tr><td>11</td><td>Frequency of vaccine re-supply in weeks</td><td>Enter the average number of weeks between vaccine shipments actually experienced by the health facility.

Do not automatically enter the national policy, but rather what the health facility actually experiences.

Write “N/A” only if this facility does not provide immunizations and does not serve a cold chain function (question #13).

Note: Take the number of supply visits in the last year and divide by 52.</td></tr>
<tr><td>12</td><td>Reserve stock of vaccines in weeks</td><td>Indicate the number of weeks of vaccine working stock kept in reserve at the health facility to compensate for delays in supply or unexpected demand actually practiced by the health facility. Do not automatically enter the national policy.

Write “N/A” only if this facility does not provide immunizations and does not serve a cold chain function (question #13).</td></tr>
</table>

13	Cold chain function	Mark the box or boxes that correctly indicate if the health facility provides the following cold chain functions: **Storage:** Vaccines are stored at the facility. **Static delivery**: Immunizations are given at the facility. **Outreach delivery:** Provides immunization in outreach services. **None:** No immunization services or vaccine storage.
14	Mode of vaccine supply	Mark the box or boxes that correctly indicate how vaccines are supplied to this health facility: **Unknown:** Respondent is unaware of how the vaccine is supplied. **Delivered:** Vaccines are delivered to this health facility by the store at a higher administrative level. **Collected:** Vaccines are collected by this health facility from the store at a higher administrative level. **Both:** Vaccines are delivered and collected by this health facility. **None:** Vaccines are not supplied or collect at this health facility
15	Site of facility	Mark box or boxes if the health facility has the following site conditions: **Prone to floods:** This facility may be exposed to flooding incidents. **High altitude:** Location is at risk of low ambient temperatures because of high altitude – causing freezing in the refrigerator. **Access difficult:** Facility is without direct access to road network, or road network routinely disabled for long periods of time. **Equipment stolen**: Immunization equipment was stolen in the last 5 years. **None:** None of above conditions apply to this health facility.

16	Type of transport	Mark all boxes that indicate all types of transport used to carry vaccines to this store: **Public transport:** Bus / taxi / boda-boda or personal cars etc. are used to carry vaccines **Car or van** **Motorcycle** **Bicycle** **By foot** **By boat** **Other (transport type is not listed)**
17	Grid electricity availability	Mark only one box as appropriate: **Less than 8 hours per day**: Electricity available, but for less than 8 hours per day. **8-16 hours per day:** Electricity available for between 8 and 16 hours each 24 hours, continuously or interrupted. **Not Available:** No access to mains grid or locally generated electricity. **More than 16 hours per day:** Electricity is available for more than 16 hours each 24 hours, continuously or interrupted.
18	Kerosene availability	Mark only one box as appropriate: **Available and clean:** Reliable kerosene supply that does not contain water or silt. **Available but dirty:** Reliable kerosene supply, but it contains water or needs filtering. **Not available:** No available or unreliable kerosene supply. **Unknown**
19	Bottled gas availability	Mark only one box as appropriate: **Available, reliable:** Reliable bottled gas supply is available. **Available, not reliable:** Bottled gas is available but the supply source is not reliable. **Not available**: No available or unreliable supply of bottled gas. **Unknown**
20	Number of gas bottles	Enter the number of gas bottles available at the health facility for immunization services.

21	Routine immunization icepacks for services during one week. (Maximum litres per week)	Indicate the maximum volume (litres, not number) of all icepacks that are frozen for use in fixed or outreach immunization services over one week. (1) Ask how many icepacks are used per immunisation session and how many sessions are conducted each week. (2) Identify the size/volume of the typical icepack used by the health facility. (3) Multiply the icepacks per session by the number of session per week by the average volume of icepack used. **This will give you the maximum volume of icepacks to be frozen each week in litres**. If no information is available or health facility does not serve a cold chain function, enter 0.
22	Supplementary immunization icepacks for services during one week. (Maximum litres per day)	Enter the maximum volume (litres not number) of icepacks frozen onsite during one day of a Polio SNID/NID. This can be calculated by multiplying the volume of each ice pack type (0.3 litres, 0.4 litres or 0.6 litres) by the number of ice packs needed. If no information is available or health facility does not serve a cold chain function, enter 0.
23	Responsiveness to cold chain repair requests	Mark only one box: **Less than 1 week:** Repair technician or handy-man will come/take equipment to next level for repair within a week of your request. **Less than 1 month:** Repair technician or handy-man will come/take equipment to next level for repair within a month of your request. **More than 1 month / never:** It takes more than a month for a repair technician or handy-man to come/take equipment to next level for repair when requested. Or, help never arrives.
24	Non-standard equipment (cold boxes, vaccine carriers, icepacks)	Mark 'Yes" if health facility uses non-standard (not in the **Equipment Identification Guide**) cold boxes, vaccine carriers, or icepacks. Mark 'No' if health facility only uses standard cold boxes, vaccine carriers, or icepacks.
25	Contact information	Write the name of the person in charge of immunization, their designation, and telephone number.
26	Surveyor name, signature, and date of survey	Write name, sign and date survey.

Refrigeration Equipment Questionnaire

(CCEM Document 4)

#	Question	Remark
1	Region (level 2)	Enter the largest administrative region where health facility is located. **This field is mandatory.** *(These administrative levels are set by the cold chain manager in Enter / Edit Country Information option in CCEM. See CCEM Section 3.1 of the Users Manual.)*
2	Province (level 3)	Enter the province where the health facility is located. **This field is mandatory.**
3	Municipality (level 4)	Enter the municipality where health facility is located. **This field is mandatory.**
4	Township (level 5)	Enter the township where the health facility is located. **This field is mandatory.**
5	Health facility name	Enter the name of the health facility. **This field is mandatory.**
EQUIPMENT RECORD _____OF _____		Fill in one form for each piece of vaccine refrigeration equipment at the health facility. Indicate order and total number of records made.
6	Library ID	If refrigerator is in the **EQUIPMENT IDENTIFICATION GUIDE**, enter the designated library code and proceed to answer question #12 and #15-22. If the refrigerator is not identified in the **EQUIPMENT IDENTIFICATION GUIDE,** then leave this field blank.
7	Refrigerant gas type	Find information on refrigerant gas type on the identification plate, usually on the back of the equipment near the base or on the compressor. Mark the appropriate box for the gas type.
8	Refrigerator type	Mark only one box for the type of refrigerator recorded in this record: **Description** Chest freezer, AC electricity Chest freezer, electricity & gas Chest freezer, electricity and kerosene Chest refrigerator, AC electricity Chest refrigerator, DC electricity Chest refrigerator, electricity & gas Chest refrigerator, electricity & kerosene Icepack freezer, electricity Icepack freezer, electricity & gas Icepack freezer, electricity & kerosene Ice-lined refrigerator Solar, photovoltaic refrigerator Upright refrigerator, electricity Upright refrigerator, electricity & gas Upright refrigerator, electricity & kerosene

9	Model name	Find the refrigerator model on the identification plate, usually on the back of the equipment near the base or inside the equipment.
10	Power source	Mark the appropriate box for the type of power used to operate the refrigerator at this health facility. Choices include: • Electricity • Electricity and kerosene • Electricity and gas • Kerosene only • Gas only • Solar
11	Manufacturers name	Find manufacturer's name on the identification plate, usually on the back of the equipment near the base or inside the equipment.
12	Serial number	Find the serial number on the identification plate, usually on the back of the equipment near the base or inside the equipment. If the identification plate is missing or serial number is unavailable, write 'unknown'. If a Library ID (#6) is available, go to #15-22.
13	CFC-free sticker?	Mark **'Yes'** if you find a sticker indicating that this equipment is CFC-free. If you do not find a CFC-free sticker on the **outside** of the refrigerator, mark '**No / unknown'**.
14	Internal storage dimensions or gross storage volumes	Is the refrigerator compartment +2-8°C and is the freezer compartment -20°C? Inspect refrigerator for a designation of gross volume data by the manufacturer, often indicated on the identification plate near the base or inside the equipment. Enter in correct table and move on to question #15**.** **If gross volume data is not available**, measure internal dimensions excluding the door shelves and the vegetable drawer(s) at the base of the refrigerator and record these measurements for Length (L), Width (W), and Height (H).
15	What do you find in the refrigerator?	Mark all boxes that apply to materials you find in the refrigerator (not freezer) when inspected: Mark '**Vaccines'** if only vaccines are stored in the refrigerator. Mark **'Drugs or reagents'** if items such as insulin, blood testing kits, anti-venom are found in the refrigerator. Mark **'Food and Vaccine'** if food/beverages AND vaccines are stored in the refrigerator. Mark **'Nothing / empty'** if the refrigerator is empty.

16	Year of supply	Enter the year that the equipment was supplied as a new piece of equipment in the health facility – use the full format (i.e. 1999). **If the immunization staff does not know the year of supply, leave this field blank**.
17	Working status	Mark only one box. Mark box **'Working, needs service'** if equipment is not able to operate normally and minor servicing is needed. Mark box **'Not working'** if equipment is not operable and major repairs are needed. Mark box **'Working well'** if the equipment is able to operate and maintain correct temperatures. Note: If refrigerator is not in operation, turn it on and check for cooling.
18	Installation of the refrigerator	Mark the box **'Incorrect'** if ANY of the following conditions are met: 1) Distance from the wall is less than 30 centimetres. 2) Equipment is not level (view spirit level if available). 3) Placed in a poorly-ventilated room. 4) Vaccine cabinet does not have area underneath for ventilation (does not have legs and is not placed on a pallet). 5) Gas connection tubes are cracked or damaged, have loose clips, or a gas odour is present. 6) Electricity connections have naked wires. 7) Voltage stabiliser is available, but not used. (Only for electric equipment) If all conditions are met, mark **'Correct'**.
19	Source of supply	Mark the source of supply for the refrigeration equipment. Choices include: • MOH • Private donation • NGO • Unknown

20	Equipment utilization	**Please ask the immunization representative directly if any equipment not in use is available for allocation**. Use this information to correctly mark the proper box. Mark **'In use'** if the equipment is currently used for vaccine storage Mark **'In store, for allocation'** if equipment is held in storage for allocation to other health facilities. Mark **'Not in use'** if the equipment is not used for vaccine storage.
21	Temperature reading (°C)	Measure the temperature in refrigerator with a thermometer at the top of the vaccine storage space and at the bottom of the vaccine storage space. >>If equipment is +2 to 8°C AND -20°C, then measure in refrigeration space. >>If equipment is -20°C ONLY, then measure in freezer space. >>If the equipment is +2 to 8° ONLY, then measure in the refrigerator space. Record the higher temperature under 'maximum' and the lower temperature under 'minimum'.
22	Surveyor name, signature, and date of survey	Write name, sign and date survey.

Cold Boxes, Vaccine Carriers, and Icepacks Questionnaire (CCEM Document 5)

#	Question	Remark
1	Region (level 2)	Enter the largest administrative region where health facility is located. **This field is mandatory.** *(These administrative levels are set by the cold chain manager in Enter / Edit Country Information option in CCEM. See CCEM Section 3.1 of the Users Manual.)*
2	Province (level 3)	Enter the province where the health facility is located. **This field is mandatory.**
3	Municipality (level 4)	Enter the municipality where health facility is located. **This field is mandatory.**
4	Township (level 5)	Enter the township where the health facility is located. **This field is mandatory.**
5	Health facility name	Enter the name of the health facility. **This field is mandatory.**
6	(a) Cold box library ID	In the **EQUIPMENT IDENTIFICATION GUIDE**, find the Library ID of each type of cold box found at the health facility.
	(b) How many cold boxes	Enter the number of cold boxes of this type. Do not count converted refrigerators unless they are provided by UNEPI.
	(c) How many not working	Enter the number of cold boxes of this type that no longer support safe vaccine transport (maintains safe temperature). This may mean that the hinge is broken, the casing is split, or the gasket is missing / broken.
7	(a) Vaccine carrier library ID	In the **EQUIPMENT IDENTIFICATION GUIDE**, find the Library ID of each type of vaccine carrier at the health facility.
	(b) How many vaccine carriers?	Enter the number of vaccine carriers of this type at the health facility.
	(c) How many not working?	Enter the number of vaccine carriers of this type that no longer support safe vaccine transport (maintains safe temperature). This may mean that the hinge is broken, the casing is split, or the gasket is missing / broken.
8	Standard icepacks at health facility	Enter the number of standard icepacks available at the health facility of each size: **0.3 Litre** **0.4 Litre** **0.6 Litre** If they are too many to count, estimate the total volume of icepacks in a freezer (e.g. 50 Litres) and divide by the size of icepack (e.g. 0.6) to estimate the number of icepacks (e.g. 83).
9	Surveyor name, signature, and date of survey	Write name, sign and date survey.

Spare Parts and Tools Questionnaire

(CCEM Document 6)

#	Question	Remark
1	Region (level 2)	Enter the largest administrative region where health facility is located. **This field is mandatory.** *(These administrative levels are set by the cold chain manager in Enter / Edit Country Information option in CCEM. See CCEM Section 3.1 of the Users Manual.)*
2	Province (level 3)	Enter the province where the health facility is located. **This field is mandatory.**
3	Municipality (level 4)	Enter the municipality where health facility is located. **This field is mandatory.**
4	Township (level 5)	Enter the township where the health facility is located. **This field is mandatory.**
5	Health facility name	Enter the name of the health facility. **This field is mandatory.**
6	Item type	Mark one or more boxes that indicate the types of spare parts and tools that are found at this health facility. Count items marked and write on the line following each item type. Only count items that you visually confirm as belonging to the health facility. Note: Spare parts may relate to one or more models of cold chain equipment.

SPARE PARTS	TOOLS
Electrical heater	Adjustable spanner
Gas thermostat	Screw driver – flat
Door gasket or lid seal	Screw driver – star
Flame failure device	Pliers
Gas jet	Multimeter
Piezzo ignitor	Hydrometer
Spark plug	Allen keys
Igniter cable	Open spanner No 7 – 19
Door catches	Flue brush
Gas regulators	Ball pain hammer
Icepack fasteners	Soft brush
Thermostat knobs	Pen knife
Gas tubing	Side cutter
Hose clips	Wire stripper
Thermocouple	Hand files

7	Surveyor name, signature, and date of survey	Write name, sign and date survey.

Voltage Regulator Questionnaire

(CCEM Document 7)

#	Question	Remark
1	Region (level 2)	Enter the largest administrative region where health facility is located. **This field is mandatory.** *(These administrative levels are set by the cold chain manager in Enter / Edit Country Information option in CCEM. See CCEM Section 3.1 of the Users Manual.)*
2	Province (level 3)	Enter the province where the health facility is located. **This field is mandatory.**
3	Municipality (level 4)	Enter the municipality where health facility is located. **This field is mandatory.**
4	Township (level 5)	Enter the township where the health facility is located. **This field is mandatory.**
5	Health facility name	Enter the name of the health facility. **This field is mandatory.**
VOLTAGE REGULATOR RECORD _____OF _____		Fill in one form for each type of voltage regulator found at the health facility. Indicate order and total number of records made.
6	Library ID	If voltage regulator is included in the **EQUIPMENT IDENTIFICATION GUIDE**, enter the library code ID and proceed to answer questions #16 -18. If this equipment is not in the **EQUIPMENT IDENTIFICATION GUIDE,** leave this field blank and continue to questions #7-18.
7	Manufacturer	Find information on the identification plate or in the manufacturer's user guide.
8	Model	Find information on the identification plate or in the manufacturer's user guide.
9	Nominal voltage (Volts AC)	Find information on the identification plate or in the manufacturer's user guide.
10	Number of phases	Find information on the identification plate or in the manufacturer's user guide.
11	Continuous power (Watts)	Find information on the identification plate or in the manufacturer's user guide.
12	Input voltage range (Volts AC)	Find information on the identification plate or in the manufacturer's user guide.
13	Frequency (Hertz)	Find information on the identification plate or in the manufacturer's user guide.
14	Output voltage range (Volts AC)	Find information on the identification plate or in the manufacturer's user guide.
15	Cost	Enter if the cost is known. Leave blank if unknown.
16	Quantity	Indicate the number of this type of voltage regulator available at this health facility.
17	Quantity not working	Indicate the number of this equipment that is not working.
18	Surveyor name, signature, and date of survey	Write name, sign and date survey.

Generator Questionnaire

(CCEM Document 8)

#	Question	Remark
1	Region (level 2)	Enter the largest administrative region where health facility is located. **This field is mandatory.** *(These administrative levels are set by the cold chain manager in Enter / Edit Country Information option in CCEM. See CCEM Section 3.1 of the Users Manual.)*
2	Province (level 3)	Enter the province where the health facility is located. **This field is mandatory.**
3	Municipality (level 4)	Enter the municipality where health facility is located. **This field is mandatory.**
4	Township (level 5)	Enter the township where the health facility is located. **This field is mandatory.**
5	Health facility name	Enter the name of the health facility. **This field is mandatory.**
GENERATOR RECORD _____OF_____		Indicate the order and total number of generator inventory records for this health facility. One record per page. Use additional pages if necessary.
6	Model name	Note the generator model name as identified on the equipment.
7	Manufacture name	Note the generator manufacturer identified on the equipment.
8	Serial number	Note the serial number for the generator from the identification plate.
9	Power source	Mark 'Diesel' if the generator operates on diesel fuel. Mark 'Petrol' if the generator runs on petrol.
10	Power rating	Indicate the power rating of the generator as identified on the equipment identification plate.
11	Automatic start mechanism	Ask the generator operator if there is an automatic start mechanism. Mark the appropriate box.
12	Number of phases	Ask the generator operator if the generator operates on one phase or three phase electricity. Mark the appropriate box.
13	Use	Indicate all functions for which this generator is used: • Refrigerators • Cold rooms • Lighting in health facility • Other
14	Year of supply	Note the year that the generator was supplied to the MOH – use the full format i.e. 1999. If the immunization staff does not know the year of supply year, leave blank.

15	Working status	Mark box **'Working well'** if the equipment is able to operate and maintain correct temperatures. Mark box **'Working, needs service'** if equipment not able to operate normally and minor servicing is needed. Mark box '**Not working'** if equipment not operable and major repairs are needed.
16	Source of supply	Mark the source of supply for the generator. Choices include: • MOH • Private donation • NGO • Unknown
17	Equipment utilisation	Mark **'In use'** if the equipment is currently used for vaccine storage Mark **'In store, for allocation'** if equipment is held in storage for allocation to other health facilities. Mark **'Not in use'** if the equipment is not used for vaccine storage. Clarify directly with cold chain representative if generator is not in use, if it is available for allocation.
18	Surveyor name, signature, and date of survey	Write name, sign and date survey.

Cold Room Questionnaire

(CCEM Document 9)

#	Question	Remark
1	Health facility name	Enter the name of the health facility. **This field is mandatory.**
COLD ROOM RECORD _____OF _____		Indicate the order and total number of cold room inventory records for this health facility. One record per page. Use additional pages if necessary.
2	Model name	Note the cold room model name as identified on the equipment.
3	Manufacture name	Note the cold room manufacturer identified on the equipment.
4	Serial number	Note the serial number for the cold room from the identification plate.
5	Number of phases	Find information on the identification plate or in the manufacturer's user guide.
6	Refrigerant gas type	Find information on refrigerant gas type on the identification plate, usually on the back of the equipment near the base or on the compressor. Mark the appropriate box for the gas type.
7	Number of cooling systems	Find information on the identification plate or in the manufacturer's user guide.
8	Temperature recording device	Is there a device to measure the temperatures in the cold room automatically?
9	Temperature reading	Measure the temperature in the cold room with a thermometer at the top of the vaccine storage space and at the bottom of the vaccine storage space. Record the higher temperature under 'high' and the lower temperature under 'low'.
10	Type of recording system	Ask the cold stores manager about the type of temperature recording system used to monitor the cold room.
11	Internal storage dimensions	For a walk-in cold room (+2-8°C) measure the internal dimensions of the cold room and record these dimensions in the measurements for Length (L), Width (W), and Height (H). Leave the -20°C measurements empty. For a walk-in freezer (-20°C) measure the internal dimensions of the cold room and record these dimensions in the measurements for Length (L), Width (W), and Height (H). Leave the +2-8°C measurements empty.
12	Year of supply	Enter the year that the cold room was supplied as a new piece of equipment in the health facility – use the full format (i.e. 1999). **If the immunization staff does not know the year of supply, leave this field blank**.

13	Maintenance contract	Does the health facility or MOH have a contract from the manufacturer or local distributor for the maintenance of the cold room?
14	Source of supply	Mark the source of supply for the cold room. Choices include: • UNICEF • MOH • Private donation • NGO • Unknown
15	Maintenance workshop	Was a maintenance workshop conducted to train local cold chain technicians on the maintenance of the cold room?
16	What do you find in the cold room?	Mark all boxes that apply to materials you find in the cold room when inspected: Mark '**Vaccines'** if only vaccines are stored in the cold room. Mark **'Drugs or reagents'** if items such as insulin, blood testing kits, or anti-venom are found in the cold room. Mark **'Food and Vaccine'** if food/beverages AND vaccines are stored in the cold room. Mark **'Nothing / empty'** if the cold room is empty.
17	Working status	Mark only one box. Mark box **'Working, needs service'** if equipment is not able to operate normally and minor servicing is needed. Mark box **'Not working'** if equipment is not operable and major repairs are needed. Mark box **'Working well'** if the equipment is able to operate and maintain correct temperatures. Note: If cold room is not in operation, turn it on and check for cooling
18	Surveyor name, signature, and date of survey	Write name, sign and date survey.

Annex 3: CCEM Questionnaires

The following CCEM Questionnaires can be downloaded from http://www.path.org/projects/cold-chain-ccem.php. Snapshots of the questionnaires are included in this manual for your reference.

- Health Facility Questionnaire (CCEM Document 3)
- Refrigeration Equipment Questionnaire (CCEM Document 4)
- Cold Boxes, Vaccine Carriers, and Ice Packs Questionnaire (CCEM Document 5)
- Spare Parts and Tools Questionnaire (CCEM Document 6)
- Voltage Regulator/Stabilizer Questionnaire (CCEM Document 7)
- Generator Questionnaire (CCEM Document 8)
- Cold Room Questionnaire (CCEM Document 9)

CCEM Document 3 *Please write clearly*

HEALTH FACILITY QUESTIONNAIRE

1. **Region**: *Mandatory data*	6. **Total target population** in area serviced by facility: *Mandatory data*
2. **Province**: *Mandatory data*	7. **Live births per year** in area serviced by facility:
3. **Municipality**: *Mandatory data*	8. **Pregnant women** (Number of) in area serviced by facility:
4. **Township**: *Mandatory data*	9. **Women of child-bearing age** (Number of) in area serviced by facility:

5. **Health facility name**:

Mandatory data

10. **Type of health facility**:
(Mark only ONE box)

- ☐ National vaccine stores
- ☐ District vaccine stores
- ☐ Sub-district vaccine stores
- ☐ Public hospital
- ☐ Private hospital
- ☐ NGO hospital
- ☐ Public HC IV
- ☐ Private HC IV
- ☐ NGO HC IV
- ☐ Public HC III
- ☐ Private HC III
- ☐ NGO HC III
- ☐ Public HC II
- ☐ Private HC II
- ☐ NGO HC II

11. **Frequency of re-supply** of vaccines (weeks):

12. **Reserve stock** of vaccines (weeks):

13. **Cold chain function:**
(Mark ALL boxes that apply)

- ☐ Storage
- ☐ Outreach delivery
- ☐ Static delivery
- ☐ None

14. **Mode of vaccine supply:**
(Mark ALL boxes that apply)

- ☐ Unknown
- ☐ Collected
- ☐ Delivered
- ☐ None

15. **Site of facility**:
(Mark ALL boxes that apply)

- ☐ Prone to floods
- ☐ High altitude
- ☐ Access difficult
- ☐ Equipment stolen (last 5 years)
- ☐ None

16. **Type of transport:**
(Mark ALL boxes that apply)

- ☐ Public transport
- ☐ Car or van
- ☐ Motorcycle
- ☐ Bicycle
- ☐ By boot
- ☐ By boat
- ☐ Others

17. **Grid electricity:** (Does this facility have access) (Mark only one box)
☐ Less than 8 hours per day ☐ 8–16 hours per day ☐ Not available ☐ More than 16 hours per day

18. **Kerosene:** (Does this facility have access) (Mark only one box)
☐ Available and clean ☐ Available but dirty ☐ Not available ☐ Unknown

19. **Bottled gas**: (Does this facility have access) (Mark only one box)
☐ Available, reliable ☐ Available, unreliable ☐ Not available ☐ Unknown

20. **Number of gas bottles:**
(Available on-site for immunization services)

21. **Routine immunization**:
Volume of icepacks required for (litres/week) **-20°C:_____(Litres)**
(Enter 0 if no static or outreach services provided)

22. **Supplementary Immunization**:
Volume of icepacks required for (litres/day) **-20°C:_____(Litres)**
(Enter 0 if no static or outreach services provided)

23. **How long until a response to equipment repair requests:** (Mark only one box)

- ☐ Less than 1 week
- ☐ Less than 1 month
- ☐ More than 1 month / never

24. **Non-standard equipment** (Cold box, carriers, icepacks) in facility?
(Mark only one box)

- ☐ Yes
- ☐ No

25. Fill in with the appropriate information

Person in charge of immunization:_____

Designation:_____

Telephone number:_____

26. Fill in the information below:

Surveyor name:_____

Signature:_____

Date (dd/mm/yyyy):_____

CCEM Document 4 *Please write clearly*

REFRIGERATION EQUIPMENT QUESTIONNAIRE

1. **Region**: *Mandatory data*	2. **Province**: *Mandatory data*
3. **Municipality**: *Mandatory data*	4. **Township**: *Mandatory data*
5. **Health facility name**: *Mandatory data*	

EQUIPMENT RECORD _____ OF _____

6. **Library ID:**

(When item is found in the Equipment Identification Guide, enter ID, and skip to question #12 and #15 – 22)

7. **Refrigerant gas type**: *Mark one box*
- ☐ NH_3
- ☐ R12
- ☐ R134a
- ☐ R22
- ☐ R404a
- ☐ Unknown

8. **Refrigerator type**: *Mark one box*
- ☐ Chest freezer, AC electricity
- ☐ Chest freezer, electricity & gas
- ☐ Chest freezer, electricity & kerosene
- ☐ Chest refrigerator, AC electricity
- ☐ Chest refrigerator, DC electricity
- ☐ Chest refrigerator, electricity & gas
- ☐ Chest refrigerator, electricity & kerosene
- ☐ Icepack freezer, electricity
- ☐ Icepack freezer, electricity & gas
- ☐ Icepack freezer, electricity & kerosene
- ☐ Ice-lined refrigerator
- ☐ Solar, photovoltaic refrigerator
- ☐ Upright refrigerator, AC/DC electricity
- ☐ Upright refrigerator, electricity & gas
- ☐ Upright refrigerator, electricity & kerosene

9. **Model name**: *Mandatory data*

11. **Manufacturer name**: *Mandatory data*

10. **Power source**:
- ☐ Electricity
- ☐ Electricity and kerosene
- ☐ Electricity and gas
- ☐ Kerosene only
- ☐ Gas
- ☐ Solar

Mark one box

12. **Serial number**:

(If there is a library ID, enter and then skip to #15))

13. Is there a **CFC-free sticker** on the equipment?
- ☐ Yes
- ☐ No / unknown

Mark one box

14. **Internal storage dimensions** in centimetres:

+2 to 8°C			-20°C		
L	W	H	L	W	H

If available on information plate, gross volume:

+2 to 8°C	-20°C

15. **Stored in Fridge:**
- ☐ Vaccines
- ☐ Drugs or reagents
- ☐ Food and vaccine
- ☐ Nothing/empty

Mark all that apply

16. **Year of supply:**

Leave blank if unknown

17. **Working status**:
- ☐ Not working
- ☐ Working needs service
- ☐ Working well

Mark one box

18. **Installation of refrigerator**:
- ☐ Correct
- ☐ Incorrect

Mark one box

19. **Source of supply:**
- ☐ MOH
- ☐ Private donation
- ☐ NGO
- ☐ Unknown

Mark one box

20. **Equipment utilization:**
- ☐ In use
- ☐ In store for allocation
- ☐ Not in use

(Clarify with cold chain representative if available for allocation.) Mark one box

21. **Temperature reading** (°C):

_____(Maximum) _____(Minimum)

22. **Fill in the information below:**

Name:_____ Date (dd/mm/yyyy):_____

Signature:_____

CCEM Document 5 *Please write clearly*

COLD BOXES, VACCINE CARRIERS, AND ICE PACKS QUESTIONNAIRE

1. **Region:** *Mandatory data*	2. **Province:** *Mandatory data*
3. **Municipality:** *Mandatory data*	4. **Township:** *Mandatory data*

5. **Health facility name:**
Mandatory data

STANDARD COLD BOXES, VACCINE CARRIERS, AND ICEPACKS AT THIS HEALTH FACILITY

6. Count all cold boxes that can be identified in the **Equipment Identification Guide**:

(a) Library ID:	(b) How many of this type?	(c) How many of this type are not working?

7. Count all vaccine carriers that can be identified in the **Equipment Identification Guide**:

(a) Library ID:	(b) How many of this type?	(c) How many of this type are not working?

8. **Count all standard icepacks available at the health facility:**

How many 0.3 Litre packs?	How many 0.4 Litre packs?	How many 0.6 Litre packs?

9. **Fill in the information below:**
Surveyor name:_____
Signature:_____
Date (dd/mm/yyyy):_____

Page _____ of _____

For use at district level facilities only

CCEM Document 6 *Please write clearly*

SPARE PARTS AND REPAIR TOOLS SECTION

1. **Region**: *Mandatory data*	2. **Province**: *Mandatory data*
3. **Municipality**: *Mandatory data*	4. **Township**: *Mandatory data*
5. **Health facility name**: *Mandatory data*	

6. **Item type**

SPARE PARTS

☐ Electrical heater, 200 VAC ____	☐ Piezzo ignitor _____	☐ Icepack fasteners _____
☐ Gas thermostat _____	☐ Spark plug _____	☐ Thermostat knobs _____
☐ Door gasket or lid seal _____	☐ Igniter cable _____	☐ Gas tubing _____
☐ Flame failure device _____	☐ Door catches _____	☐ Hose clips _____
☐ Gas jet _____	☐ Gas regulators _____	☐ Thermocouple _____

TOOLS

☐ Adjustable spanner _____	☐ Hydrometer _____	☐ Soft brush _____
☐ Screw driver – flat _____	☐ Allen keys _____	☐ Pen knife _____
☐ Screw driver – star _____	☐ Open spanner (Fix) No 7 – 19__	☐ Side cutter _____
☐ Pliers _____	☐ Flue brush _____	☐ Wire stripper _____
☐ Multimeter _____	☐ Ball pain hammer _____	☐ Hand files _____

7. **Fill in the information below:**

Name:_____

Signature:_____

Date (dd/mm/yyyy):_____

Page _____ of _____

CCEM Document 7 *Please write clearly*

VOLTAGE REGULATOR QUESTIONNAIRE

1. **Region:** *Mandatory data*	2. **Province:** *Mandatory data*
3. **Municipality:** *Mandatory data*	4. **Township:** *Mandatory data*
5. **Health facility name:** *Mandatory data*	
VOLTAGE REGULATOR RECORD _____ OF _____	
6. **Library ID:** (When item is found in the Equipment Identification Guide, enter ID and skip to questions #16-18)	
7. **Manufacturer:**	
8. **Model:**	
9. **Nominal voltage (Volts AC):**	10. **Phases (Number of):** ☐ One ☐ Three
11. **Continuous power (Watts):**	12. **Input voltage range (Volts AC):**
13. **Frequency (Hertz):**	14. **Output voltage range (Volts AC):**
15. **Cost:**	
16. **Quantity:**	
17. **Quantity not working:**	
	18. **Fill in the information below:** Surveyor name:_____ Signature:_____ Date (dd/mm/yyyy):_____

Page _____ of _____

For use at district level facilities only

CCEM Document 8 *Please write clearly*

GENERATORS QUESTIONNAIRE

1. **Region**: *Mandatory data*	2. **Province**: *Mandatory data*
3. **Municipality**: *Mandatory data*	4. **Township**: *Mandatory data*
5. **Health facility name**: *Mandatory data*	

GENERATOR RECORD _____ OF _____

6. **Model name**:		7: **Manufacturer name**:
8. **Serial number**:		9. **Power source**: ☐ Diesel ☐ Petrol
10. **Power rating (kW)**:		11. **Automatic start mechanism:** ☐ Yes ☐ No
12. **Number of phases**: ☐ One ☐ Three		
13. **Used for**: ☐ Refrigerators ☐ Cold rooms ☐ Lighting ☐ Other	14. **Year of supply:**	15. **Working status:** ☐ Working well ☐ Working, needs service ☐ Not working
	16. **Source of supply:** ☐ MOH ☐ Private donation ☐ NGO ☐ Unknown	17. **Equipment utilization:** ☐ In use ☐ In store, for allocation ☐ Not in use (Clarify directly with cold chain representative if the equipment is not in use or if allocation is possible. Mark appropriately.)
	18. **Fill in the information below:** Surveyor name:_____ Signature:_____ Date (dd/mm/yyyy):_____	

Page _____ of _____

CCEM Document 9 *Please write clearly*

COLD ROOM QUESTIONNAIRE

1. **Health facility name**:
This is mandatory data

COLD ROOM RECORD _____ OF _____

2. **Model name**:

3: **Manufacturer name**:

4. **Serial number**:

5: **Number of phases**: ☐ One ☐ Three

6. **Refrigerant gas type**: (mark only one)
☐ NH_3
☐ R12
☐ R134a
☐ R22
☐ R404a
☐ Unknown

7. **Number of cooling systems:**

8. **Temperature recording system**: (mark only one)
☐ Not provided
☐ Provided, operating
☐ Provided, not operating
☐ Unknown

9. **Temperature reading** (°C):
_____(high)
_____(low)

10. **Type of recording system**:
☐ Thermometer(s) only
☐ Chart recording device (clockwork)
☐ Chart recording device (electric)
☐ Electronic data logger
☐ Computer based recorder
☐ Manual
☐ Unknown

11. **Internal storage dimensions** (cms):

+2 to 8°C			-20°C		
L	**W**	**H**	**L**	**W**	**H**

12. **Year of supply:**

13. **Maintenance contract?** ☐ Yes ☐ No

14. **Source of supply:**
☐ UNICEF ☐ NGO
☐ MOH ☐ Unknown
☐ Private donation

15. **Maintenance workshop?** ☐ Yes ☐ No

16. **Food and/or Beverages Stored**:
☐ Yes
☐ No
(Mark all that apply)

17. **Working Status**:
☐ Working, needs service
☐ Not working
☐ Working well

18. **Fill in the information below:**
Surveyor name:_____
Signature:_____
Date (dd/mm/yyyy):_____

Page _____ of _____

Annex 4: Equipment Identification Guide

Equipment Identification Guide

			
U3003 LEC 144DL Ice-lined refrigerator, electric	**E342** Electrolux RC65 EG Chest refrigerator, gas	**E321M** Electrolux RCW42EG (Blue) Refrigerator gas/electric	**E321** Electrolux RCW42EG (White) Refrigerator, gas/electric
			
E362M Electrolux TCW1990 Ice-lined refrigerator/freezer, electric	**E324M** Electrolux TCW1152-CF Ice-lined refrigerator/freezer, electric	**E382M** Vestfrost MK304 Ice-lined refrigerator, electric	**E397** Vestfrost MF214 Chest freezer, electric

			
E324 Electrolux TCW 1151 Ice-lined refrigerator, electric	**E364M** LEC VC139 Ice-lined refrigerator, electric	**U3003** Sibir V240 Refrigerator/freezer, gas/electric	**E384M** Sibir V170 Refrigerator/freezer, gas/electric
			
E386M Sibir V110 Refrigerator/freezer, gas/electric	**E398M** Vestfrost MF314 Chest freezer, electric	**E327** Vestfrost SB302 Chest freezer, electric	**U3001** Vestfrost MF304 Chest freezer, electric

			
E310 Electrolux TC 1860 Chest freezer, electric	**E326** Electrolux TFW791 Icepack fast-freezer, electric	**E388M** Electrolux RCW50EG Refrigerator/Icepack freezer, electric/gas	**E337M** BP VR50 Chest refrigerator/freezer, solar PV
			
E377M Sunfrost RFVB Refrigerator/freezer, solar PV	**E370M** Fortum AES, CFS49 ICI Refrigerator/freezer, solar PV	**E3104M** Kyocera VacPak XL2100 Refrigerator/freezer, solar PV	**E331M** Electrolux RCW42 DC Refrigerator/icepack freezer, solar PV

			
E3106M Bright Light Solar PS65 Refrigerator/freezer, solar PV	**E3103M** Dulas VC6EF Refrigerator/freezer, solar PV	**S309** Polar Products RR2 Refrigerator/freezer, solar PV	**E381M** Vestfrost MK204 Ice-lined refrigerator, electric
			
U3002 Vestfrost MF204 Chest freezer, electric			

PIS/PQS COLD BOX AND VACCINE CARRIER IDENTIFICATION GUIDE

			
E405M Electrolux RCW25M-CF Long range cold box (Blue)	**E472M** Apex Continental ICB-11F (Grey)	**E475M** Apex Continental ICB-8F Small, long range cold box (Grey)	**E452M** Giostyle Large vaccine carrier
			
E488M Blow Kings CB/10-CF Long range cold box	**E469M** Blow Kings VDC-24-CF Small vaccine carrier	**E483M** Blow Kings BK-VC 1.6-CF Large Vaccine Carrier	**E467M** Apex Continental IVC-9AF Large vaccine carrier

			
E453M Electrolux RCW2 day vaccine carrier (2 packs)			

PIS/PQS VOLTAGE STABILIZER/REGULATOR IDENTIFICATION GUIDE

			
U7001 Sollatek SVS-04/22 Voltage Stabilizer for compression refrigerators			

Annex 5: CCEM Vaccine Storage Capacity Equations

Required vaccine volumes are calculated for each health facility. These volumes are compared to existing storage capacity at each health facility.

For each health facility the volume calculation is performed twice:

1. To aggregate the volumes of those vaccines that will be stored at +4C and
2. To aggregate the volumes of those vaccines that will be stored at -20C.

The CCEM vaccine volume calculation functions as follows:

1. Determine packed vaccine volume (secondary packing) per dose in cm^3 from the **Standard Library - Vaccines**.
2. Multiply this volume by the number of doses to complete the schedule as determined in the **Vaccine: country schedule**.
3. Multiply this value by the specific Target Population identified in **Vaccine: country schedule** and the value for this target population found in the Facilities records.
4. Multiply by the wastage rate determined in the **Vaccine: country schedule**.
5. Multiply by the frequency of vaccine resupply (weeks converted into fraction of a year) as determined either in the Facilities records or in the **Administrative Data** values entered by the cold chain manager.
6. Multiply by the reserve vaccine stock (weeks converted into fraction of a year) as determined either in the Facilities records or in the **Administrative Data** values entered by the cold chain manager.
7. Divide by 1000 to convert from cm^3 to litres of required capacity for packed vaccine volume.

Annex 6: CCEM Updating Reports

COLD CHAIN INVENTORY UPDATE - MONTHLY REPORT - HEALTH FACILITY LEVEL

District:	**Date:** ……/……/……..
Sub-district:	**Date report sent to District:** ……/……/……..
Sub-county:	**Date report received at district level:** ……/……/……
Parish:	**Received by:**
Health facility name:	

New equipment received this month: *tick appropriate box.* YES [ ] NO [ ]

If yes fill the form "Cold chain Equipment Inventory - REFRIGERATION EQUIPMENT SECTION, COLD BOXES, VACCINE CARRIERS, AND ICEPACKS SECTION and attached it to this form.

Equipment transferred this month: *tick appropriate box.* YES [ ] NO [ ]

If yes fill the case bellow
If more than one item, use more forms

Model Name:	**Working status:**
Manufacturer name:	**Transferred to:**
Serial number:	**Library ID:**

Equipment discarded this month: *tick appropriate box.* YES [ ] NO [ ]

If yes fill the case bellow
If more than one item, use more forms

Model Name:	**Working status:**
Manufacturer name:	**Transferred to:**
Serial number:	**Library ID:**

Equipment stolen this month: *tick appropriate box.* YES [ ] NO [ ]

If yes fill the case bellow
If more than one item, use more forms

Model Name:	**Working status:**
Manufacturer name:	**Library ID**
Serial number:	

Comments:

Name _____ **Signature** _____

COLD CHAIN INVENTORY UPDATE - QUARTERLY REPORT - DISTRICT LEVEL

District:	**Date:** ……../……../……..
Name:	**Reporting period** Q1 Q2 Q3 Q4
Position:	**Date report sent to central level:** ……../……../……..

Received by:	**Date report received at central level:** ……../……../……..

Health Facilities reporting equipment received this quarter: YES [ ] NO [ ]
tick appropriate box.
If yes attach the forms "Cold chain Equipment Inventory - REFRIGERATION EQUIPMENT SECTION, COLD BOXES, VACCINE CARRIERS, AND ICEPACKS SECTION filled by each Health Facility.

Equipment transferred this quarter from/to HFs: YES [ ] NO [ ]
tick appropriate box.
If yes fill the table below
If not enough space, use more forms

HF Name	Sub-county	Library ID	Eqpnt Code	from/to	Sub-county

Equipment discarded this quarter from HFs: YES [ ] NO [ ]
tick appropriate box.
If yes fill the table below
If not enough space, use more forms

HF Name	Sub-county	Library ID	Eqpnt Code	Disposed at

Equipment stolen this quarter from HFs: YES [ ] NO [ ]
tick appropriate box.
If yes fill the table below
If not enough space, use more forms

HF Name	Sub-county	Library ID	Eqpnt Code	Remarks

Remarks:

Name _____ **Signature** _____