

# CCEI User Manual



---

© 2006-2016  
DHIS 2 Documentation Team

Revision 2409

2016-06-26 15:36:43  
Version 2.24

Warranty: THIS DOCUMENT IS PROVIDED BY THE AUTHORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHORS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS MANUAL AND PRODUCTS MENTIONED HEREIN, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

License: Permission is granted to copy, distribute and/or modify this document under the terms of the GNU Free Documentation License, Version 1.3 or any later version published by the Free Software Foundation; with no Invariant Sections, no Front-Cover Texts, and no Back-Cover Texts. A copy of the license is included in the source of this documentation, and is available here online: <http://www.gnu.org/licenses/fdl.html>.

-->

1. Cold Chain Equipment Inventory (CCEI) System .....	1
1.1. Cold Chain Equipment Inventory (CCEI) System .....	1
1.2. Conceptual Framework .....	1
1.3. CCEI Architecture .....	1
1.4. Data types in CCEI .....	1
1.5. Service Module: Cold Chain Equipment Inventory (CCEI) .....	2
1.5.1. Meta Data .....	2
1.5.2. Data flow .....	3
1.6. Model Attribute: Cold Chain Equipment Inventory (CCEI) .....	3
1.6.1. Model Attribute .....	3
1.6.2. Operations on Model Attribute .....	5
1.6.3. Add a new model attribute .....	6
1.7. Model: Cold Chain Equipment Inventory (CCEI) .....	7
1.7.1. Model .....	7
1.7.2. Operations on Model .....	7
1.7.3. Add New Model .....	9
1.8. Equipment Type Attribute: Cold Chain Equipment Inventory (CCEI) .....	10
1.8.1. Equipment Type Attribute> .....	10
1.8.2. Operations on Equipment Type Attributes .....	11
1.8.3. Add new Equipment Type Attribute .....	12
1.9. Equipment Type: Cold Chain Equipment Inventory (CCEI) .....	13
1.9.1. Equipment Type .....	13
1.9.2. Operations on Equipment Type Attributes .....	13
1.9.3. Add new Equipment Type .....	14
1.10. Aggregation Engine: Cold Chain Equipment Inventory (CCEI) .....	15
1.10.1. Aggregation Engine .....	15
1.10.2. Aggregation Query List .....	16
1.10.3. Operations on Aggregation Query List .....	16
1.10.4. Adding Aggregation Query .....	17
1.10.5. Use Cases .....	18
1.10.5.1. Storage Capacity .....	18
1.10.5.2. Refrigerator working status by model .....	18
1.10.5.3. Refrigerator utilization .....	19
1.10.5.4. Refrigerator working status by type .....	20
1.10.5.5. Refrigerator temperature alarms .....	21
1.11. Aggregation of Data .....	21



# Chapter 1. Cold Chain Equipment Inventory (CCEI) System

## 1.1. Cold Chain Equipment Inventory (CCEI) System

The Cold Chain Equipment Inventory (CCEI) System can be used to manage the cold chain equipment requirements from health facilities and to monitor the working status of the equipments by tracking, thereby timely action can be taken in cold chain supply management.

## 1.2. Conceptual Framework

The CCEI application is developed to manage cold chain equipment in health facilities through routine data form equipments and a timely reporting of working condition of the equipment which plays a crucial role in cold chain management.

## 1.3. CCEI Architecture

The system is built on the two inputs data forms namely model data, equipment type/equipment data and two output data forms namely periodic and non-periodic data.

In the model data, the initial step is to define model type attributes, model type. This enables the system to provide fields to enter required data for model. Each model type will have its own model data. In other terms model data is attached to its model type. The definition of model type attributes, model type can be modified/updated when the actual model type is introduced or a new model comes in the market in future at any facility.

There are equipment type/equipment data with or without having model data. In order to capture equipment type data, define equipment type attributes and then add equipment type with its attributes. If the equipment type has model data, select the appropriate model type while adding equipment type and this enable to pull the data from the selected model type along with the data from equipment type. If the equipment type has no model data, then just define attributes and add equipment type with its attributes.

There are data related to equipment which need to be collected, processed and used for action. Every facility has some number of equipments and data needs to be captured from equipment. In order to monitor the working status of the equipment and its location (facility), periodic/non-periodic data is to be collected.

When it is periodic, equipment/facility wise dataset is designed and assigned to corresponding facilities. When it is non-periodic (for say, working status) data needs to be captured when there is any change in the process and this can be done using equipment type attributes. The user has to select the facility as the registering unit and the appropriate equipment type and the required data can be filled in equipment type attributes.

## 1.4. Data types in CCEI

Non-periodic data which is data recorded only when there is any change in the process. For example, working condition of the equipment in a facility will be recorded, when it is working well or Not working or under repair condition. These data are recorded using equipment type attributes.

Periodic data are data recorded periodically to monitor the equipment function, performance and its efficiency and to monitor for any requirements of equipments in health facilities.

## **1.5. Service Module: Cold Chain Equipment Inventory (CCEI)**

### **1.5.1. Meta Data**

In cold chain Equipment Inventory, the super user has to define the metadata in the application.

To define model, the super user has to create attributes for model and then add the attributes with its model. The model here for say refrigerator and freezers and the attributes are capacity, dimension etc. The super user can add more models.

The model indicates the model name, for say Electrolux FG 432. To add a new model, select the model type and then add model.

Equipment Type Indicates the equipment for say Refrigerator, Cold Box, Cold Room etc. Equipment type has a particular model but equipment have machine specific data with addition to the general data which is common among the models. In order to record the equipment specific data, the super user has to define attributes for the equipment for say Unique ID, Serial No, manufacturer etc. User can add many numbers of attributes for equipment.

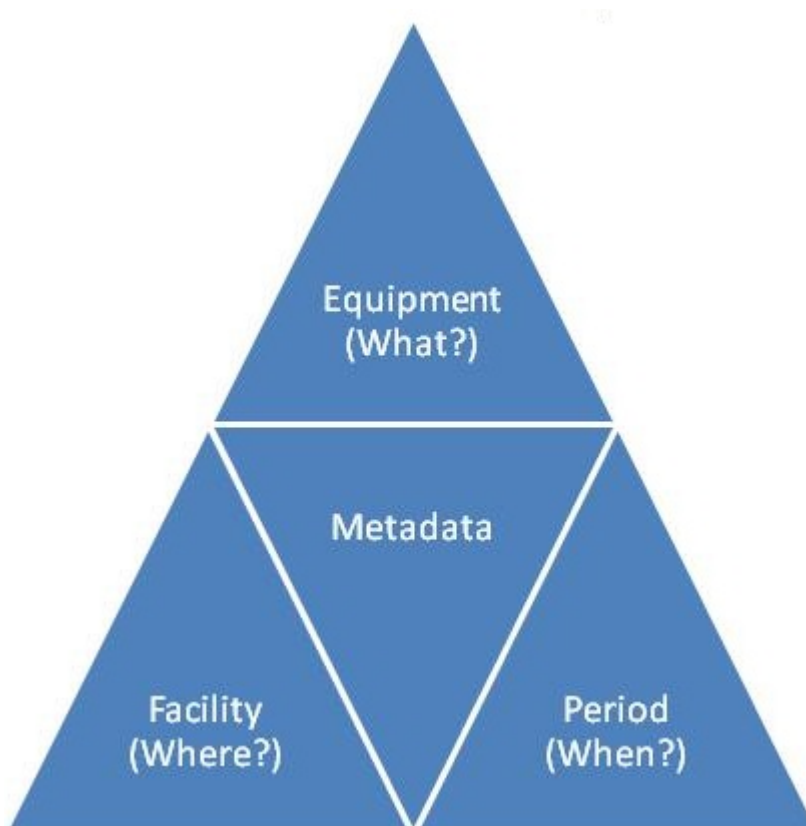
To add a new equipment type for say it is refrigerator and freezers, add it and select model for refrigerator and freezer. It will enable to pull data from selected model and also additional data which are specific to refrigerator and freezer by using equipment attributes.

In summary metadata defines

- Data about model attribute
- Data about model
- Data about equipment type attribute
- Data about equipment type

## 1.5.2. Data flow

### Periodic Data Flow



Periodic Data Flow monitors following :

- Equipment: Monitor for any changes in equipment like temperature
- Facility: Monitor facilities for any requirements
- Period: Monitor any change of event timely

## 1.6. Model Attribute: Cold Chain Equipment Inventory (CCEI)

### 1.6.1. Model Attribute

To specify the model geometry and properties the user has to create model attributes where properties of each model defined.

To access Model Attribute user has to go to Maintenance -> dhis-web-maintenance-ccei -> Model attributes

## Periodic Data Flow

**dhis2**

CCEI Laos

MaintenanceServices

CCEI Setup

Model attributes

Model

Equipment type attributes

Equipment type

Aggregation Builder

Aggregation Query List

Manual Aggregation

Lookups

Lookups

Transfer

Transfer facility data

Import / Export Data

Import Data

Cold chain equipment management

Equipment Manager

Model attributes ?

Filter by nameFilterClear

Name

CatalogID

Climate Zone

Cold Box Type

Data Source

Dimension Depth

Dimension Height

Dimension Width

Equipment Type

Freeze Gross Volume

Freeze Net Volume

Manufacturer



## 1.6.2. Operations on Model Attribute

### Operations on Model Attribute

The screenshot displays the 'Model attributes' page in the DHIS2 CCEI Laos system. The left sidebar contains a navigation menu with categories like 'CCEI Setup', 'Aggregation Builder', 'Lookups', 'Transfer', 'Import / Export Data', and 'Cold chain equipment management'. The main content area is titled 'Model attributes' and features a search bar labeled 'Filter by name' with 'Filter' and 'Clear' buttons. An arrow points to the search bar. Below the search bar, a list of model attributes is shown, including 'Name', 'CatalogID', 'Climate Zone', 'Cold Box Type', 'Data Source', 'Dimension Depth', 'Dimension Height', 'Dimension Width', 'Equipment Type', 'Freeze Gross Volume', 'Freeze Net Volume', and 'Manufacturer'.

Filter Clear - Quick search and list the model type with edit and show details options

Add new - Add new model attribute

Edit - To edit model attribute

Edit - To edit model attribute



Delete - To remove model attribute

Delete - To remove model attribute



Show details - List shows name, description etc

Show details - List shows name, description etc



### 1.6.3. Add a new model attribute

To add a new model attribute, the user has to click on 'Add new" button in the model type management page, user will be directed to the following screen as show below, where he/she can fill the details to add a new model attribute

Add Model Attribute

The screenshot shows the 'Add new model attribute' form in the DHIS2 CCEI Laos system. The left sidebar contains a navigation menu with the following items: CCEI Setup (with sub-items Model attributes, Model, Equipment type attributes, and Equipment type), Aggregation Builder (with sub-items Aggregation Query List and Manual Aggregation), Lookups (with sub-item Lookups), Transfer (with sub-item Transfer facility data), Import / Export Data (with sub-item Import Data), and Cold chain equipment management (with sub-item Equipment Manager). The main content area is titled 'Add new model attribute' and contains a 'Model attribute details' section with the following fields: Name \* (text input), Description \* (text input), Mandatory\* (dropdown menu with 'No' selected), Number of characters (text input), For display\* (dropdown menu with 'No' selected), and Value Type \* (dropdown menu with 'Number' selected). At the bottom right of the form are 'Add' and 'Cancel' buttons.

Model attribute details	
Name *	<input type="text"/>
Description *	<input type="text"/>
Mandatory*	No
Number of characters	<input type="text"/>
For display*	No
Value Type *	Number
<input type="button" value="Add"/> <input type="button" value="Cancel"/>	

## 1.7. Model: Cold Chain Equipment Inventory (CCEI)

### 1.7.1. Model

Model consists of geometry and properties of each equipment model type. To define model, the super user has to create attributes for model and then add the attributes with its model. The model here for say refrigerator and freezers and the attributes are capacity, dimension etc. The model indicates the model name, for say Electrolux FG 432.

To access the model, user needs to click on the 'Model option' as seen on the extreme top left corner of the screen and user will get following screen

Model

The screenshot shows the 'dhis2 CCEI Laos' interface. On the left is a sidebar menu with options: CCEI Setup, Model attributes, Model, Equipment type attributes, Equipment type, Aggregation Builder, Aggregation Query List, Manual Aggregation, Lookups, Lookups, Transfer, Transfer facility data, Import / Export Data, and Import Data. The 'Model' option is selected. The main content area is titled 'Model ?' and contains a 'Filter by name' input field with 'Filter' and 'Clear' buttons. Below this is a table with the following data:

Name
Cold Box Model
Refrigerator Catalog

At the bottom of the table, there are pagination controls: 'No. of pages: 1' and 'No. of rows per page: 50'.

### 1.7.2. Operations on Model

Filter Clear - Quick search and list the model type with edit and show details options

Add new - Add new model attribute

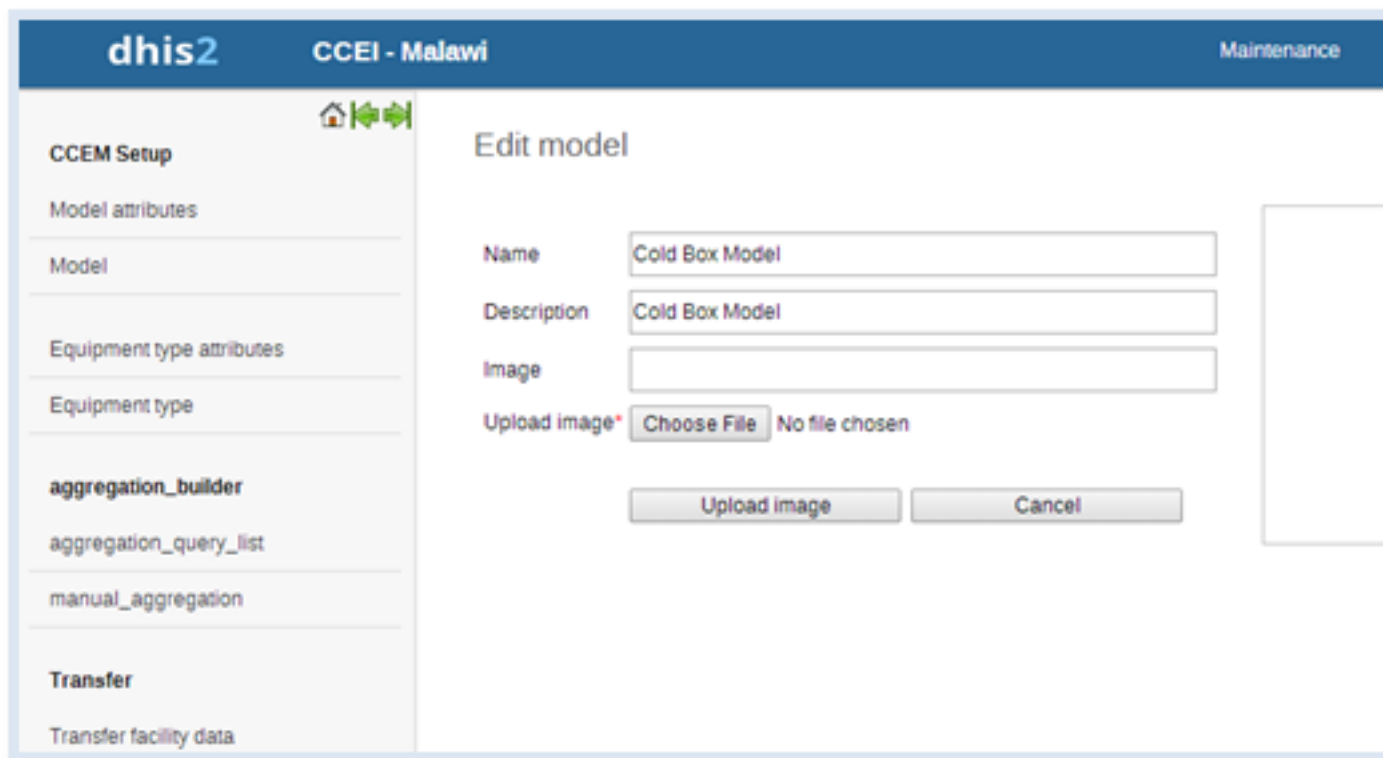
To upload an image for the Model click on following button

Upload Image



Once user has clicked the Image, following screen will appear. User has to browse for the image of particular Model and click on Upload button, once the image is uploaded it will be displayed on the screen. The image uploaded once can later be updated by the same procedure.

### Uploading Image



Edit - To edit model attribute

Edit - To edit model attribute



Delete - To remove model attribute

Delete - To remove model attribute



Design Data Entry Screen - Data needs to be entered against the model attribute for particular model, user can design data entry screen for data entry by clicking on following icon.

Design Data Entry screen



Once data entry screen design button is clicked following screen will appear to design data entry screen. User will get the list of all model attribute of selected Model by clicking on "Model Attribute" button on Top right corner

## Design Data Entry screen

The screenshot shows the DHIS2 CCEI - Malawi interface. The left sidebar contains a menu with the following items: CCEM Setup, Model attributes, Model, Equipment type attributes, Equipment type, aggregation\_builder, aggregation\_query\_list, manual\_aggregation, Transfer, Transfer facility data, Import / Export Data, Import Data, Cold chain equipment management, and Equipment Manager. The main content area is titled 'Edit Model Dataentry: Cold Box Model'. It includes a 'Data entry form details' section with a 'Name' field. Below this is the 'Design data entry form' section, which features a rich text editor with a toolbar containing various icons for text formatting, alignment, and insertion.

Model attributes can be grouped as sections. To make a group list, the user should click on the required icon

Group List



Show details - List shows name, description etc

Show details - List shows name, description etc



### 1.7.3. Add New Model

To add new Model, user has to click on "Add new" button in model management page, once user has clicked on button he/she will be redirected to following page where user can fill detail to add new model.

Show details - List shows name, description etc

The screenshot shows the 'Add new model' form in the dhish2 CCEI - Malawi system. The form is divided into several sections:

- Header:** dhish2 CCEI - Malawi, Maintenance, Service
- Left Sidebar:** CCEM Setup, Model attributes, Model, Equipment type attributes, Equipment type, aggregation\_builder, aggregation\_query\_list, manual\_aggregation, Transfer, Transfer facility data, Import / Export Data, Import Data, Cold chain equipment management, Equipment Manager.
- Main Form:**
  - Add new model:** Name \* (text input), Description \* (text input).
  - Available model attribute:** Filter (text input), Filter (button), Clear (button).
  - Attributes:** A list of attributes: CatalogID, Climate Zone, Cold Box Type, Data Source, Dimension Depth, Dimension Height, Dimension Width, Equipment Type, Freeze Gross Volume, Freeze Net Volume, Manufacturer, Model, Net Storage, Power Source, Ref Gross Volume.
  - Buttons:** Add, Cancel.

User will get the list of all available model attributes, user can select the model attribute from the list which he/she wants to use for the model.

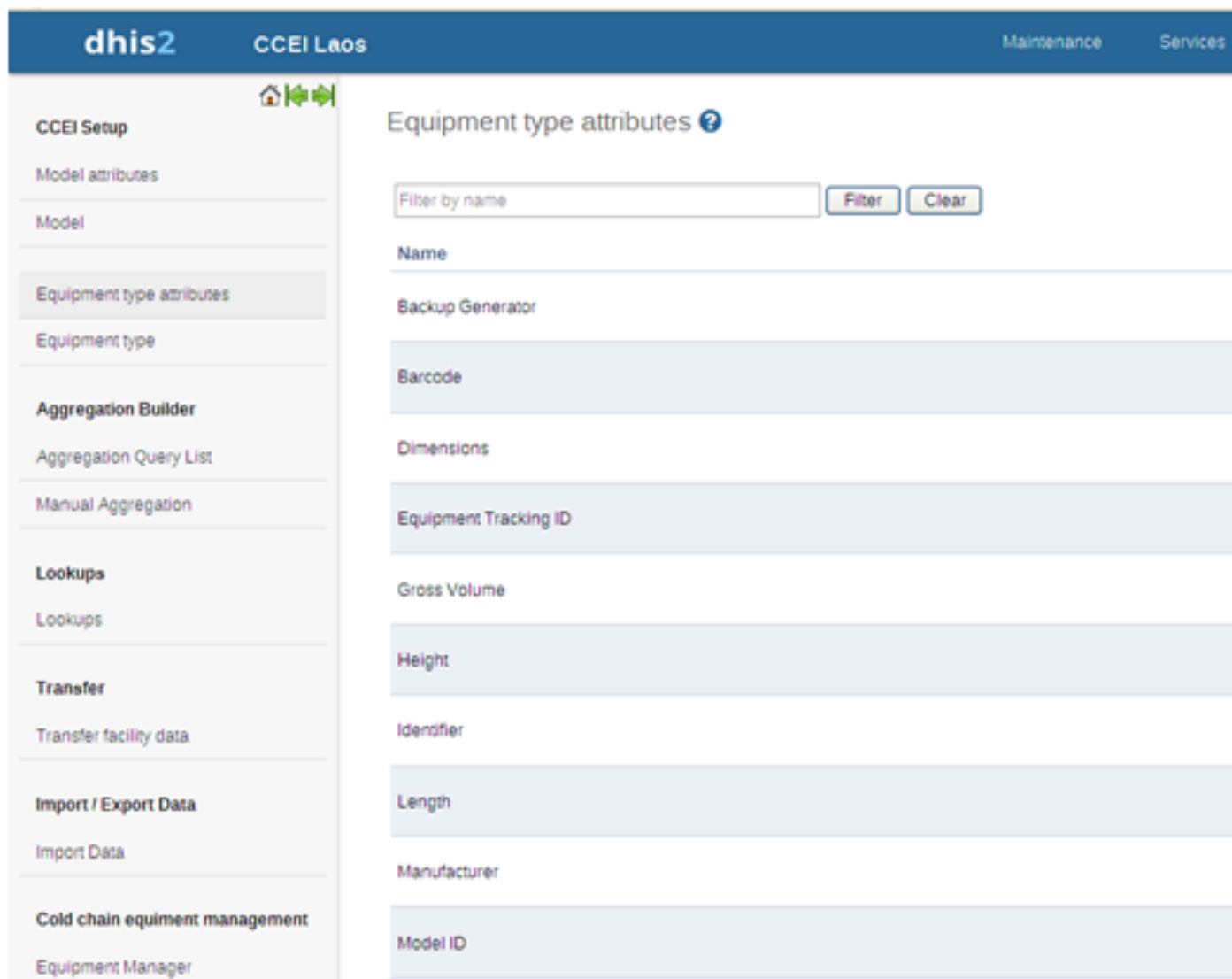
## 1.8. Equipment Type Attribute: Cold Chain Equipment Inventory (CCEI)

### 1.8.1. Equipment Type Attribute>

Equipment type Attributes are the properties of Equipment type, in order to record the equipment specific data, the user has to define attributes for the equipment for say Unique ID, Serial No, manufacturer etc.

To access the Equipment Type Attribute user has to click Maintenance -> dhish-web-maintenance-ccei -> Equipment type attribute. After clicking on the link the user will be directed to Equipment type attribute management page

## Equipment Tyoe Attribute



The screenshot shows the DHIS2 CCEI Laos interface. The left sidebar contains a menu with the following items: CCEI Setup, Model attributes, Model, Equipment type attributes (highlighted), Equipment type, Aggregation Builder, Aggregation Query List, Manual Aggregation, Lookups, Lookups, Transfer, Transfer facility data, Import / Export Data, Import Data, Cold chain equipment management, and Equipment Manager. The main area is titled 'Equipment type attributes' and features a search filter 'Filter by name' with 'Filter' and 'Clear' buttons. Below the filter, a list of attributes is displayed, including: Name, Backup Generator, Barcode, Dimensions, Equipment Tracking ID, Gross Volume, Height, Identifier, Length, Manufacturer, and Model ID.

### 1.8.2. Operations on Equipment Type Attributes

Filter Clear - Quick search and list the Equipment Type Attributes with edit and show details options

Add new - Add new model attribute

Edit - To edit model attribute

Edit - To edit model attribute



Delete - To remove model attribute

Delete - To remove model attribute



Show details - List shows name, description etc

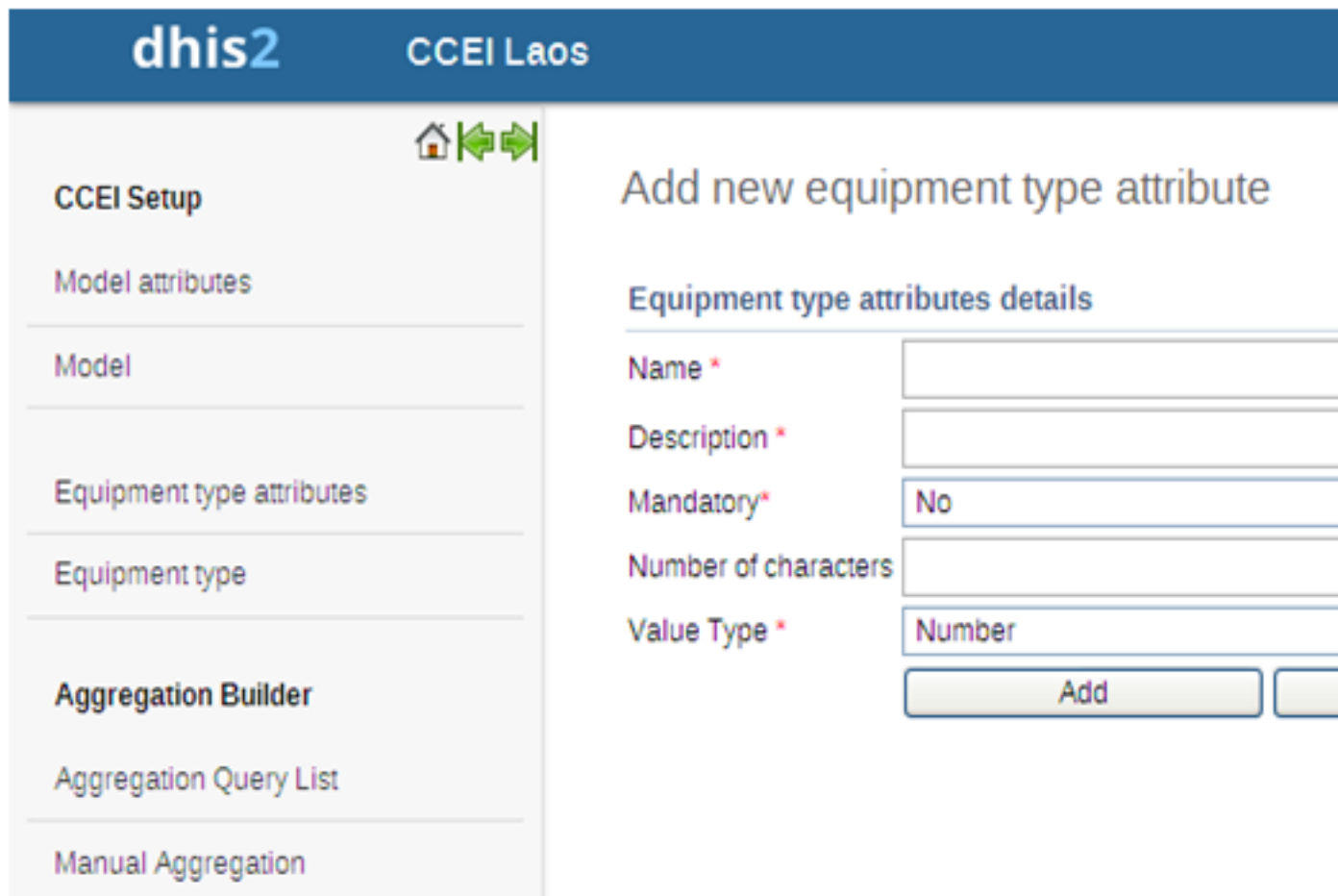
Show details - List shows name, description etc



### 1.8.3. Add new Equipment Type Attribute

User can add a new Equipment type Attribute by clicking on "Add New" button. After clicking "Add New" button user will get the following screen.

Add Equipment Type Attribute



The screenshot shows the 'Add new equipment type attribute' form in the dhisc2 CCEI Laos system. The left sidebar contains a navigation menu with the following items: CCEI Setup, Model attributes, Model, Equipment type attributes, Equipment type, Aggregation Builder, Aggregation Query List, and Manual Aggregation. The main content area is titled 'Add new equipment type attribute' and contains a section for 'Equipment type attributes details'. This section includes five input fields: 'Name \*', 'Description \*', 'Mandatory\*' (with a dropdown menu showing 'No'), 'Number of characters', and 'Value Type \*' (with a dropdown menu showing 'Number'). At the bottom right of the form, there is an 'Add' button.

To create new equipment type attribute user has to enter following detail:

- Write the name for the attribute
- Write the description for the equipment type attribute
- Select the attribute mandatory as yes/no, based on whether the value to be entered is mandatory or not
- Specify the number of the characters
- Select the value type for the attribute as number, text etc

Please note that the user has to keep in mind the details need to be collected for the equipment type and the attributes should be created accordingly. Once the attributes are created, then the attributes need to be added to its particular equipment.



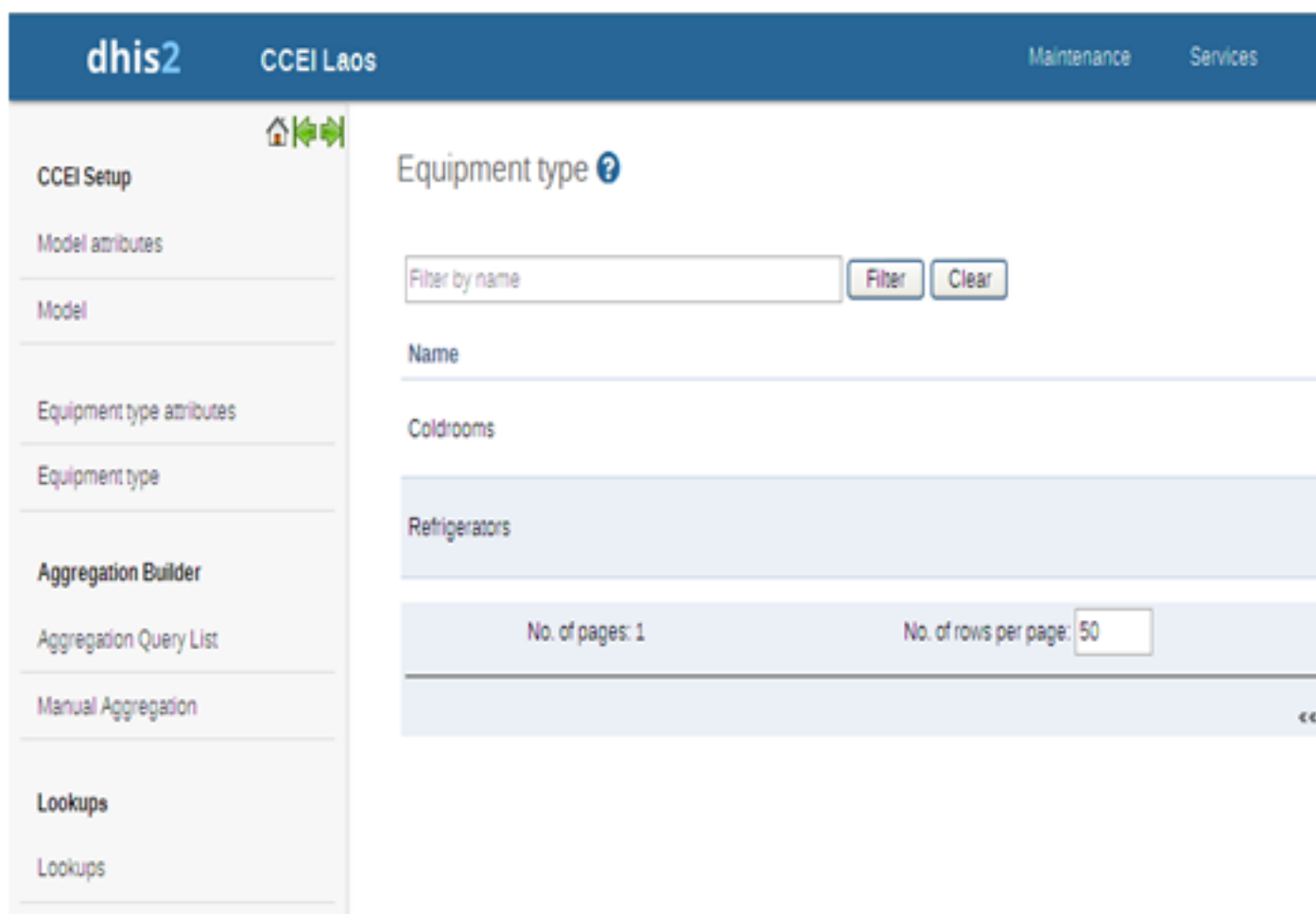
## 1.9. Equipment Type: Cold Chain Equipment Inventory (CCEI)

### 1.9.1. Equipment Type

Equipment Type Indicates the equipment for say Refrigerator, Cold Box, Cold Room etc. Equipment type has a particular model but equipment type have machine specific data with addition to the general data which is common among the models

To access the Equipment Type Attribute user has to click Maintenance -> dhis-web-maintenance-ccei -> Equipment type. After clicking on the link the user will be directed to Equipment type management page

Equipment Type



The screenshot shows the 'Equipment type' management page in the dhis2 CCEI Laos system. The page has a blue header with 'dhis2' and 'CCEI Laos' on the left, and 'Maintenance' and 'Services' on the right. A left sidebar contains a menu with items: 'CCEI Setup', 'Model attributes', 'Model', 'Equipment type attributes', 'Equipment type', 'Aggregation Builder', 'Aggregation Query List', 'Manual Aggregation', 'Lookups', and 'Lookups'. The main content area is titled 'Equipment type ?' and features a search bar labeled 'Filter by name' with 'Filter' and 'Clear' buttons. Below the search bar, there is a table with a header 'Name' and two rows: 'Coldrooms' and 'Refrigerators'. At the bottom of the table, there is a pagination bar showing 'No. of pages: 1' and 'No. of rows per page: 50'.

### 1.9.2. Operations on Equipment Type Attributes

Filter Clear - Quick search and list the Equipment Type Attributes with edit and show details options

Add new - Add new model attribute

Edit - To edit model attribute

Edit - To edit model attribute



Delete - To remove model attribute

Delete - To remove model attribute



Show details - List shows name, description etc

Show details - List shows name, description etc



Equipment Type: Dataset

Periodic dataentry have to be done for Equipment Type, for dataentry user has to assign dataset to individual Equipment Type, this can be done by clicking on following button

Dataset assigned to Equipment Type



Once clicked on above button user will be redirected to following screen

Dataset assignment to Equipment Type

### 1.9.3. Add new Equipment Type

User can add a new Equipment type by clicking on 'Add New' button. After clicking "Add New" button user will get the following screen.

## Add Equipment Type

The screenshot shows the 'Add new equipment type' interface in the dhis2 CCEI Laos system. The left sidebar contains navigation links for CCEI Setup, Aggregation Builder, Lookups, Transfer, and Import / Export Data. The main content area is titled 'Add new equipment type' and contains the following fields:

- Details of equipment type:**
  - Name \* (text input)
  - Description \* (text input)
  - Tracking\* (dropdown menu, currently set to 'No')
  - Model (dropdown menu, currently set to '[Please select model]')
- Available equipment attributes:**
  - A list of attributes: Backup Generator, Barcode, Dimensions, Equipment Tracking ID, Gross Volume, Height, Identifier, Length, Manufacturer, Model ID, Net Volume, Power Use, Reason Not working, Serial Number, Source.
  - A 'Filter' button and a 'Clear' button.
- Selected equipment attributes:**
  - An empty list for selected attributes.
  - Buttons for moving attributes: '>', '<', '>>', and '<<'.
- Buttons:** 'Add' and 'Cancel' at the bottom.

To create new equipment type user has to enter following detail:

- Write the name for Equipment Type
- Write the description for the equipment type
- Select whether the Equipment needs to be track or not
- Select the model from the list of available model list so that the properties of the selected model will be inherited to the Equipment
- Select the Equipment Type Attribute from the list of available attribute, user has to select the attribute which are the members of this Equipment.

Once the Equipment Type Attributes have been selected then user can set the order of the attributes and user can select the attributes which needs to be displayed on user screen by checking particular attribute.

## 1.10. Aggregation Engine: Cold Chain Equipment Inventory (CCEI)

### 1.10.1. Aggregation Engine

Aggregation builder helps user to get quantitative data. It transforms metadata to populate data by aggregation query.

For Example

- In a facility number of refrigerators in use
- In a facility number of refrigerators not in use
- In a facility number of refrigerators unserviceable
- In a facility number of refrigerators awaiting repair etc

To create a query the user has to select aggregation query list where query can be made to transform metadata to populate data and to get aggregate populate data the user has to select manual aggregation.

### 1.10.2. Aggregation Query List

This is the Aggregation Query List page where list of queries can be add, edit, translate, delete and details of a query can be seen.

To access the Aggregation Query List user has to click Maintenance -> CCEI Setup -> Aggregation Builder -> Aggregation Query List

Equipment Type

The screenshot shows the 'CCEI Aggregation Query Builder Management' page. On the left is a sidebar with a navigation menu. The main area displays a list of aggregation queries with a search filter.

**Navigation Menu (Left Sidebar):**

- CCEI Setup
  - Model attributes
  - Model
  - Equipment type attributes
  - Equipment type
- Aggregation Builder
  - Aggregation Query List**
  - Manual Aggregation
- Lookups
  - Lookups
- Transfer
  - Transfer facility data
- Import / Export Data
  - Import Data
- Cold chain equipment management
  - Equipment Manager

**Main Content Area:**

**CCEI Aggregation Query Builder Management**

Filter by name

Name

Number of Refrigerator Functioning of type - ChestRefrigerator
Number of Refrigerator Functioning of type - IcePackFreezer
Number of Refrigerator Functioning of type - IceLinedRefrigerator
Number of Refrigerator AwaitingRepair of type - ChestFreezer
Number of Refrigerator Functioning of type - ChestFreezer
Number of Refrigerator AwaitingRepair of type - IceLinedRefrigerator
Number of Refrigerator AwaitingRepair of type - ChestRefrigerator
Number of Refrigerator AwaitingRepair of type - IcepackFreezer
Number of Refrigerator Unserviceable of type - IcepackFreezer
Number of Refrigerator Unserviceable of type - ChestFreezer
Number of Refrigerator Unserviceable of type - IceLinedRefrigerator
Number of Refrigerator Unserviceable of model - MK304
Number of Refrigerator Unserviceable of type - ChestRefrigerator
Number of Refrigerator Unserviceable of model - RCW 50 EG

### 1.10.3. Operations on Aggregation Query List

Filter Clear - Quick search and list the Aggregation Query List with edit and show details options

Add new - Add new Aggregation Query List

Edit - To edit Aggregation Query List

Edit - To edit Aggregation Query List



Translate - To translate an aggregation query list, the person has to select translate option by clicking the query

Translate - To translate Aggregation Query List



Remove - To remove Aggregation Query List

Remove - To remove Aggregation Query List



Show details - List shows name, description etc

Show details - List shows name, description etc



#### 1.10.4. Adding Aggregation Query

Please note that before creating the Aggregation Query user has to create a aggregated data element, which will further be used for Aggregation Query

User has to click on Add New button to create a new Aggregation Query and user will be redirected to following page

Add New Aggregation Query

User has to select the aggregated data element for creating Auery, so that the aggregated value generated by the query will be stored against the aggregated data element

Once the data element have been selected then user has to select the type for different Use cases as shown below

Aggregation Query Type



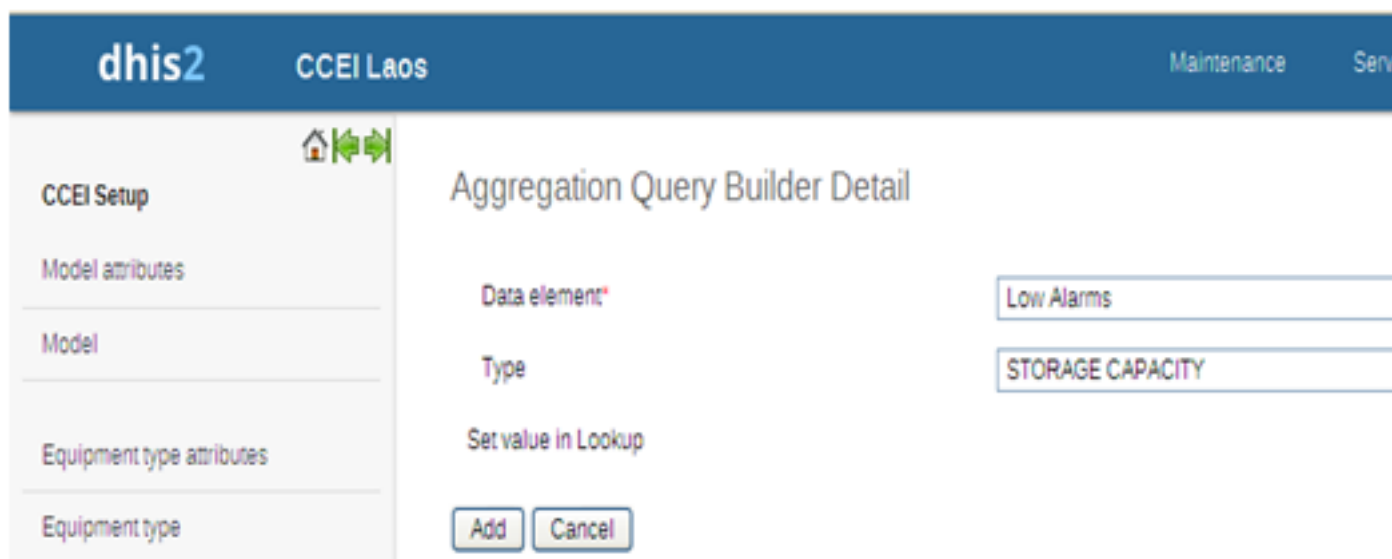
### 1.10.5. Use Cases

Based on the type selected with the data element there will be some use cases for creating Aggregation Queries

#### 1.10.5.1. Storage Capacity

The user can get storage capacity of each facility by selecting the appropriate data element. This gives the user to know whether shortage or surplus or sufficient storage available in a health facilities of a state.

Storage Capacity



#### 1.10.5.2. Refrigerator working status by model

The user can get refrigerator working status by model of aggregate populate data from the facilities of state whether functioning or awaiting repair or unserviceable

## Refrigerator Working Status

The screenshot displays the 'dhis2 CCEI Laos' interface. On the left is a sidebar with a home icon and a list of menu items: CCEI Setup, Model attributes, Model, Equipment type attributes, Equipment type, Aggregation Builder, Aggregation Query List, Manual Aggregation, Lookups, and Lookups. The main content area is titled 'Aggregation Query Builder Detail'. It contains three input fields: 'Data element\*' with the value 'Number of Refrigerator AwaitingRepair of model - M', 'Type' with the value 'REF WORKING STATUS BY MODEL', and a third field with the value 'MODEL\_MODELTYPEATTRIBUTE'. Below these fields is a list of model types: 'TCW 2000 DC', 'HBD-116', 'HBD-286', and 'TFW 800'. Underneath the list is a section for 'WORKING\_STATUS\_OPTIONSET' with three options: 'Functioning', 'AwaitingRepair', and 'Unserviceable'. At the bottom of the main area are two buttons: 'Add' and 'Cancel'.

By selecting refrigerator status by model from type, all models of a refrigerator will be displayed and also working status option too. For each model type attribute three queries can be made like whether functioning or awaiting repair or unserviceable.

For Example

- No of refrigerator MK 304 are functioning
- No of refrigerator MK 304 are awaiting repair
- No of refrigerator MK 304 are unserviceable

### 1.10.5.3. Refrigerator utilization

The user can get utilization of refrigerators in an aggregate populate data of the health facilities of a state whether in use or not in use or in store for allocation. This gives user to evaluate the utilization of refrigerator by model

## Refrigerator Utilization

The screenshot shows the 'dhiss2 CCEI Laos' interface. On the left is a sidebar with 'CCEI Setup' and 'Aggregation Builder' sections. The main area is titled 'Aggregation Query Builder Detail'. It contains three input fields: 'Data element\*' with the value 'Number of Refrigerator Awaiting Repair of model', 'Type' with 'REF UTILIZATION', and a third field with 'UTILIZATION\_OPTIONSET'. Below these is a list of model types: 'TCW 2000 DC', 'HBD-116', 'HBD-286', and 'TRW 800'. At the bottom are 'Add' and 'Cancel' buttons.

By selecting refrigerator utilization, the all models of a refrigerator will be displayed and also utilization option set too. For each model type attribute three queries can be made like whether in use or not in use or in store for allocation.

For Example

- No of refrigerator HBD-116 are in use
- No of refrigerator HBD-116 are not in use
- No of refrigerator HBD-116 are in store for allocation

#### 1.10.5.4. Refrigerator working status by type

The user can get refrigerator working status by type of aggregate populate data from the facilities of state whether functioning or awaiting repair or unserviceable

Refrigerator working status by type

The screenshot shows the 'dhiss2 CCEI Laos' interface. On the left is a sidebar with 'CCEI Setup' and 'Aggregation Builder' sections. The main area is titled 'Aggregation Query Builder Detail'. It contains three input fields: 'Data element\*' with the value 'Number of Refrigerator Awaiting Repair of model - MK 204', 'Type' with 'REF WORKING STATUS BY TYPE', and a third field with 'WORKING\_STATUS\_OPTIONSET'. Below these is a list of equipment types: 'ChestRefrigerator', 'IcepackFreezer', 'SolarThermalRefrigerator', and 'UprightRefrigerator'. At the bottom are 'Add' and 'Cancel' buttons.



By selecting refrigerator status by type, the all model type attributes of a refrigerator will be displayed and also working status option too. For each model type attribute three queries can be made like whether functioning or awaiting repair or unserviceable

For Example

- No of Chest refrigerator are functioning
- No of Chest refrigerator are awaiting repair
- No of Chest refrigerator are unserviceable

#### 1.10.5.5. Refrigerator temperature alarms

The user can get refrigerator temperature alarms whether high temperature alarms or low temperature alarms of the facilities and also number of refrigerators wise. This gives user to evaluate the temperature alarms by refrigerator and facility wise

Refrigerator temperature alarms

The screenshot displays the 'dhis2 CCEI Laos' interface. The left sidebar contains a menu with options: 'CCEI Setup', 'Model attributes', 'Model', 'Equipment type attributes', 'Equipment type', 'Aggregation Builder', and 'Aggregation Query List'. The main content area is titled 'Aggregation Query Builder Detail'. It features a 'Data element\*' field with the value 'REF TEMP ALARMS' and a 'Type' field. Below these fields are 'Add' and 'Cancel' buttons. On the right side, a list of available data elements is shown, including 'Number of Refrigerator Awaiting Repair of mod', 'REF TEMP ALARMS', 'NO\_OF\_REF\_WITH\_HIHTEMP\_ALARM', 'NO\_OF\_REF\_WITH\_LOWTEMP\_ALARM', 'FACILITY\_WITH\_HIHTEMP\_ALARM', and 'FACILITY\_WITH\_LOWTEMP\_ALARM'.

The options for the user to evaluate temperature alarms are

- No of refrigerators with high temperature alarm
- No of refrigerators with low temperature alarm
- Facility with high temperature alarm
- Facility with low temperature alarm
- Facility with temperature alarms

## 1.11. Aggregation of Data

Once Aggregation Queries are ready then its time to convert equipment data to aggregated data for the particular period

To get aggregate values of the health facilities, the user has to select Manual Aggregation under aggregation builder. The user will get the aggregated data of the equipments which can further be used for Other Analysis modules like GIS, Pivot tables and Data Visulizer

## Manual Aggregation

The screenshot shows the 'Manual Aggregation' page in the Dhis2 CCEI Laos system. The left sidebar contains a navigation menu with the following items: CCEI Setup, Model attributes, Model, Equipment type attributes, Equipment type, Aggregation Builder, Aggregation Query List, Manual Aggregation (highlighted), Lookups, Lookups, Transfer, and Transfer facility data. The main content area is titled 'Manual Aggregation' and includes a 'Period' dropdown menu set to '[select]', with 'Prev year' and 'Next year' buttons. Below this is the 'Organisation Unit Selection' section, which has buttons for 'Select at level', 'Level 1' (dropdown), 'Un-select at level', 'Un-select all', 'Select in group', 'District Vaccine S' (dropdown), 'Un-select in group', and 'Select children'. A tree view of Organisation Units is displayed, starting with 'Lao PDR' and listing various provinces and districts, including Attopeu, Phouvong, Xaldaen, Samakkhixay, Sanamxay, Sanxay, Xaysetha, Bokeo, Bolikhamxay, Champasak, Huaphanh, Khammuane, Luangnamtha, Luangprabang, Oudomxay, and Phongsavath. At the bottom of the tree view is an 'Aggregate Values' button.

To get data aggregated user has to follow:

- Select the period from period list for which aggregation needs to be performed
- Select the facility or the parent facility from OrgUnit tree for which aggregation needs to be done, (In case if parent facility is selected then aggregation will run for whole child tree)
- Click Aggregate Values button to aggregate data