

Interoperability Guide for Indicator Data Reporting

*Automation of indicator data reporting from
IQCare to DHIS 2*

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August 2014

The findings and conclusions in this report are those of the author(s) and do not necessarily represent the official position of the Centers for Disease Control and Prevention/the Agency for Toxic Substances and Disease Registry.

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Introduction

Health Information Systems (HIS) are critical for managing health information at all levels for decision making on individual patients or the population. Different systems are used for patient care, disease surveillance, and monitoring health service delivery. Often it is necessary to combine data from different systems for analysis to get a complete picture of an individuals' health or to conduct monitoring and evaluation. Ensuring that systems managing health information at the patient and/or aggregate level are interoperable (e.g., have the ability to exchange data between disparate health information systems) will facilitate complex, rigorous analyses. Interoperability of health information systems is fundamental to accomplish health care goals using data and information. In addition to ensuring interoperability between systems, is the need for safe guarding meaning of data as it is combined with data from other systems; namely, semantic interoperability¹ which is the ability to exchange data in such a manner as to preserve the meaning of the data across systems.

This document was developed as a guide on how to automate exchange of aggregate data from IQCare², an open-source electronic medical records system (EMR), to the District Health Information System (DHIS 2)³, an aggregate data system. To facilitate this process, this guidance uses, IQTools⁴, an open-source middleware application that enhances IQCare reporting capabilities to transmit indicator data from IQCare to DHIS 2. IQTools comes with a number of pre-configured reports that can be used out-of-box. To develop this guide, we used an existing Kenya Ministry of Health report created in IQTools.

These applications were set up and tested at US Centers for Disease Control and Prevention (CDC), Public Health Informatics Research Laboratory⁵, to demonstrate interoperability for indicator reporting using demo (mock) data. IQCare and IQTools were installed in a Windows 2008 server and DHIS 2 deployed in a CentOS 5.8 server. Futures Group software developers in Kenya provided technical support and installation and configuration manuals for IQCare and IQTools. Some sections and images (for configuring DHIS 2) in this guide are similar to the guide developed on automating indicator data reporting from OpenMRS to DHIS 2⁶. Appendix 2 of this guide is based on a document that was shared from an OpenMRS to DHIS 2 interoperability guide developed for a demonstration project in the Philippines⁷.

Most configurations and instructions in this guide assume that the applications (IQCare, IQTools, and DHIS 2) are already deployed and running.

Before initiating indicator data exchange between these two systems in a production environment, we recommend that you use a test environment that is similar to the production environment to ensure that all issues that may affect normal production operations in your setting or implementation are fixed. We also recommend that you work in collaboration with system administrators and developers of both applications during testing.

1Hammond WE, Bailey C, Bocher P, Sophr M, Whitaker P. Connecting information to improve health. Health Aff 2010;29:284–8

2IQCare website: <http://fgiqcare.codeplex.com>

3DHIS 2 website: <http://www.dhis2.org/>

4IQTools website: <http://iqtool.codeplex.com/>

5 Informatics Research and Development Laboratory: <http://phiresearchlab.org/>

6 Kariuki J, Manders E., Richards J, Oluoch T, Mulonzi J, Kimanga D, Automating indicator data reporting from an EMR to aggregate data system using OpenMRS and DHIS2. Journal of Health Informatics in Africa, 2013. 1(1): p. 49. <http://jhia-online.org/index.php/jhia/article/view/65>

7 DHIS2 Module on CHITS-OpenMRS document

Requirements

Server infrastructure

A running Microsoft Windows with the following applications for IQCare and IQTools

- MSSQL Server 2005 Express and above
- Microsoft Office 2003 and above (for reporting using MS Excel)
- Internet Information Service (IIS)
- .Net Framework 2.0 Service Pack 2 and above

A running Linux machine with the following applications for DHIS 2

- Apache Tomcat Server
- PostgreSQL

Note: DHIS 2 used for this demonstration was installed in a Linux (Centos) server. Additional requirements for deploying the applications can be obtained from [DHIS 2](#)⁸ and [IQCare implementation](#)⁹ guides.

Applications used

- IQCare version 3.5
- IQTools version 3.1.1.7
- DHIS 2 version 2.12

Skills required

- Some knowledge of PostgreSQL and MSSQL databases
- Software installation and configuration
- Indicator reporting

Other requirements

- DHIS 2 Implementation Guide (For new DHIS 2 instance implementation)
- IQCare and IQTools Step-By-Step Implementation Guide for Implementers
- Demo data for testing or demonstration purposes (optional)

⁸ DHIS 2 website: <http://www.dhis2.org/>

⁹ IQCare website: <http://fgiqcare.codeplex.com>

Prerequisites

To configure automation of indicator data reporting from IQCare to DHIS 2, the following must be in place:

- All the applications (DHIS 2, IQCare and IQTools) are installed and running.
- Configurations are in place to connect IQTools to IQCare database.
- You have a username and password with privileges to generate and post reports from IQTools.
- You have a username and password with privileges to update data in DHIS 2 for the facility you are using.

Additional information on how to install and configure these applications is as follows:

DHIS 2

Deploy DHIS 2 using the instructions in the [DHIS 2 implementation guide](#)3]. This guide is available in DHIS 2 website (www.dhis2.org). Select server set-up option during DHIS 2 installation if you plan to use the DHIS 2 instance over time. This option ensures that configurations and changes made in the database are persisted.

IQCare

To install and configure IQCare you can use instructions in the [installation presentation](#) on IQcare website.

Additional information on IQCare is available in the following website:

<http://fgiqcare.codeplex.com/documentation>

IQTools

This is a middleware application that links to IQCare to enhance reporting capabilities.

IQTools come with a number of pre-configured reports that can be used out-of-box. To develop this guide, we used a report that is already in IQTools. Additional information on IQTools is available in the following website:

<http://iqtool.codeplex.com/documentation>

IQCare to DHIS 2 Interoperability Configuration Process

To successfully send indicator data from IQCare to DHIS 2, there are a number of steps to follow. Figure 1 shows a flow diagram for the systematic interoperability configuration process developed after setting up the demonstration for automating of indicator data reporting from IQCare to DHIS 2.

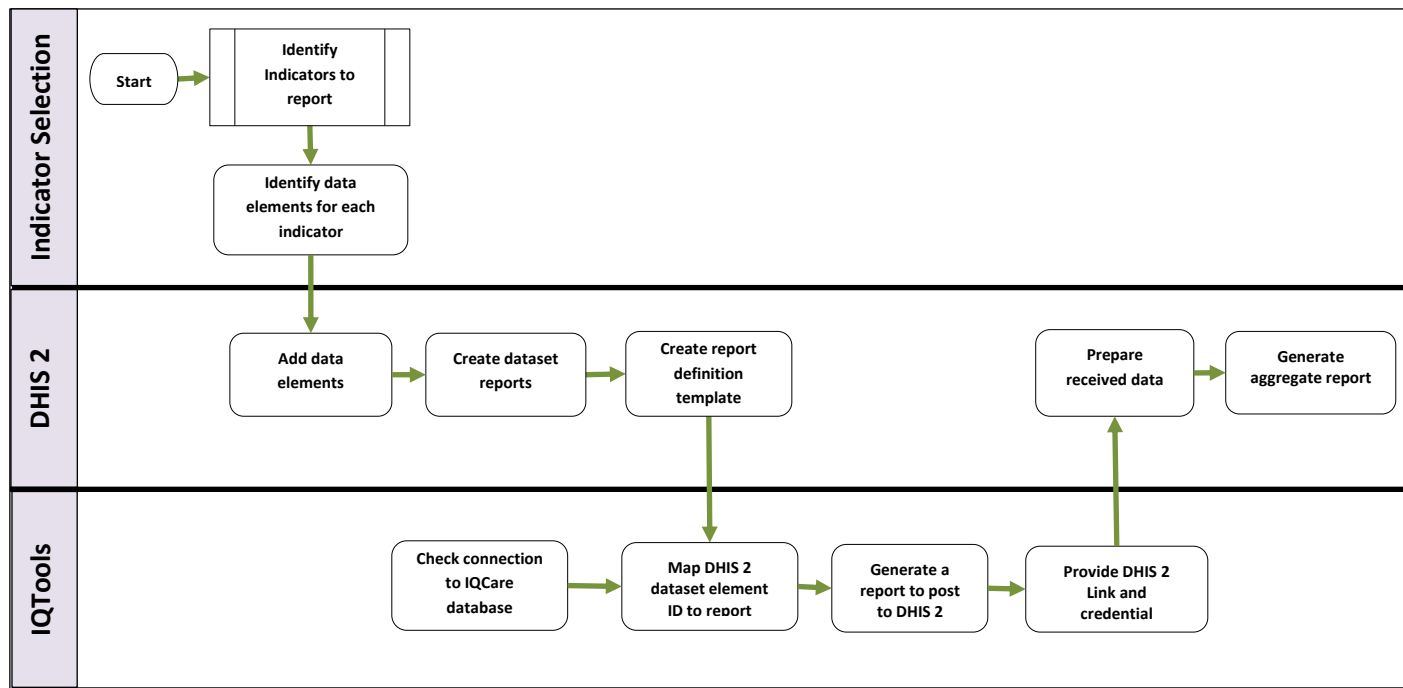


Figure 1: IQcare to DHIS 2 interoperability process flow diagram

Identify indicators to report

Identifying indicators is the first and key step in achieving interoperability between any two systems, as it helps answer the question, “What data are we exchanging?” Later indicators will help to measure success of exchanged data between the two systems.

When developing this guide, we used the Kenya Ministry of Health HIV Care and Treatment indicators in the MOH731 Comprehensive HIV/AIDS Facility Reporting Form, Appendix 1, to demonstrate interoperability for indicator data reporting between IQCare and DHIS 2. Only indicators from the Care and Treatment section of the MOH 731 reporting form were used.

IQCare demo (mock) data¹⁰ was used for the demonstration. Data elements for these indicators were generated from IQCare using IQTools then automatically sent to DHIS 2.

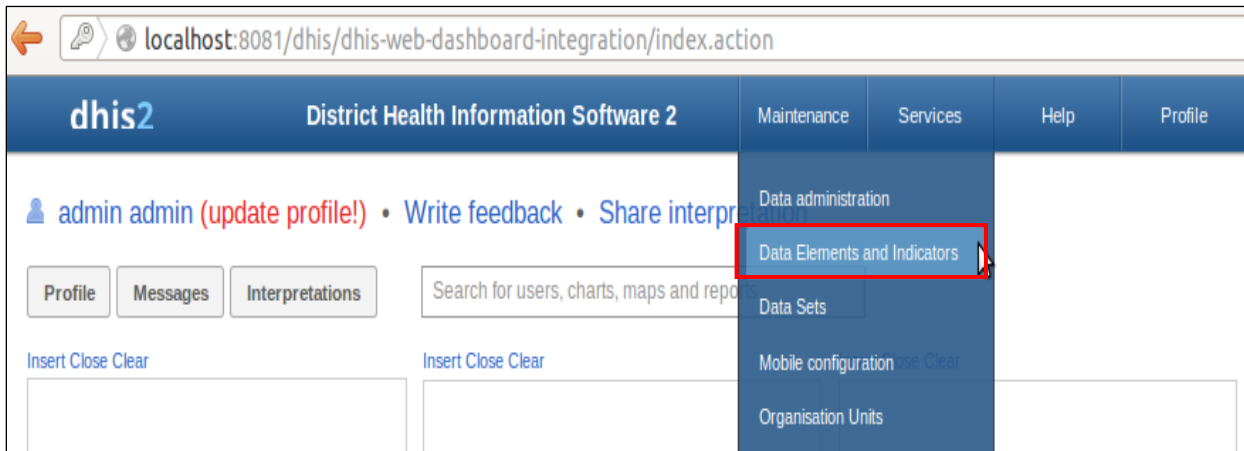
¹⁰ Demo data was provided by futures group Kenya office: <http://futuresgroup.com/>

DHIS 2 Configuration

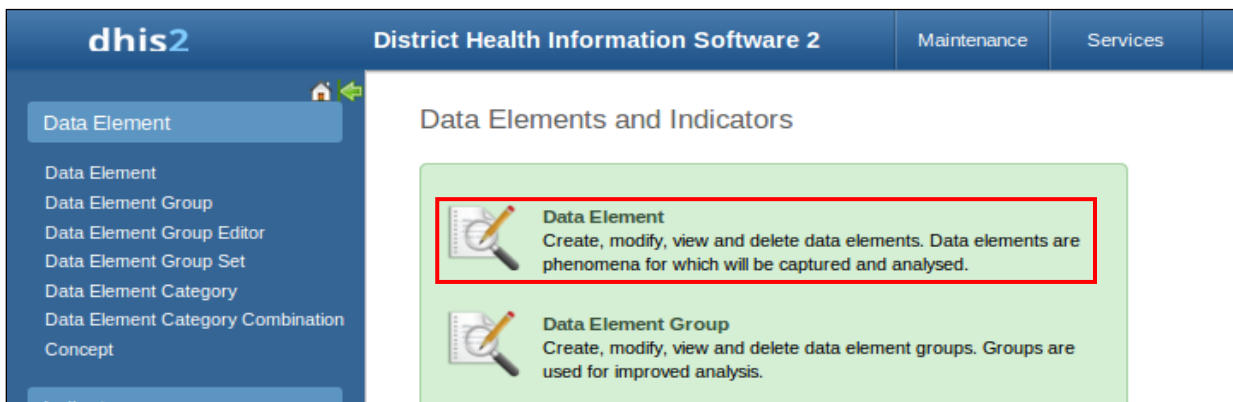
Log in to DHIS 2 and make sure an organization unit exists in DHIS 2 that matches the IQCare location (for this demonstration we used Kericho District hospital).

Step 1: Add data elements into DHIS 2

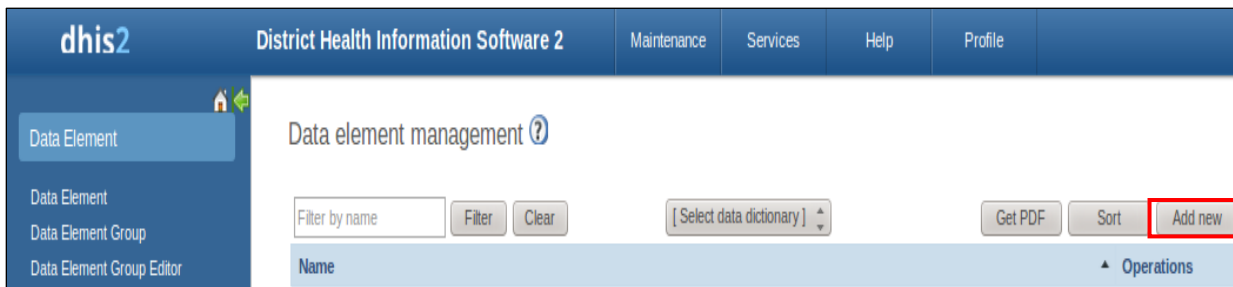
1. On DHIS 2 home page, move the cursor to the **Maintenance** tab and scroll through the dropdown list to select **Data Elements and Indicators** as shown in the figure below.



2. Data Elements and Indicators page will be displayed. Click on **Data Element** to open Data element management page.



3. To add a data element, click Add new button on the Data Element Management page.



- On Create New Data Element page, fill in details on the new data element then click **Add**. This will save the data element in DHIS 2.

dhis2 District Health Information Software 2 Maintenance Services

Create new data element

Details

Name *

Short name *

Code

Description

Form name

Domain Type *

Value Type *

Number type

Aggregation operator *

Store Zero Data Value

URL

Combination of categories *

Aggregation levels

Option set

Legend set

Add **Cancel**

- Data elements created will be displayed in DHIS 2 Data Element Management page.

dhis2 District Health Information Software 2 Maintenance Services Help Profile

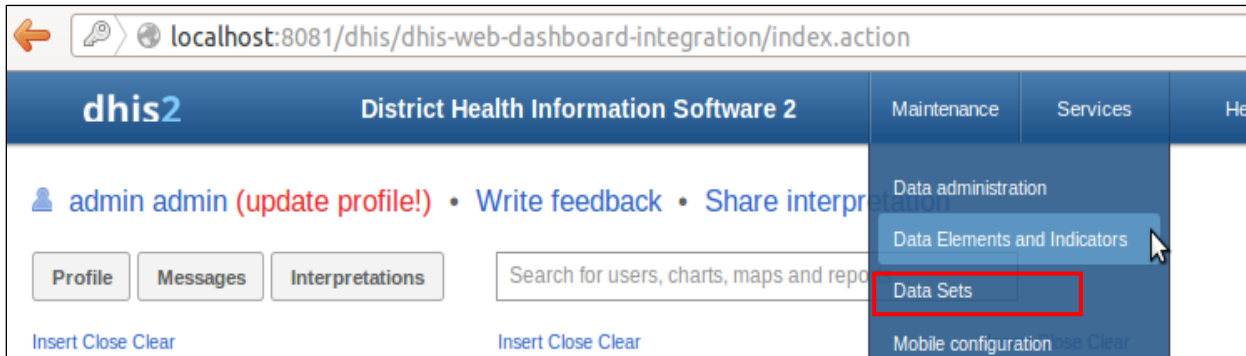
Data element management ?

Filter **Clear** [Select data dictionary] **Get PDF** **Sort** **Add new**

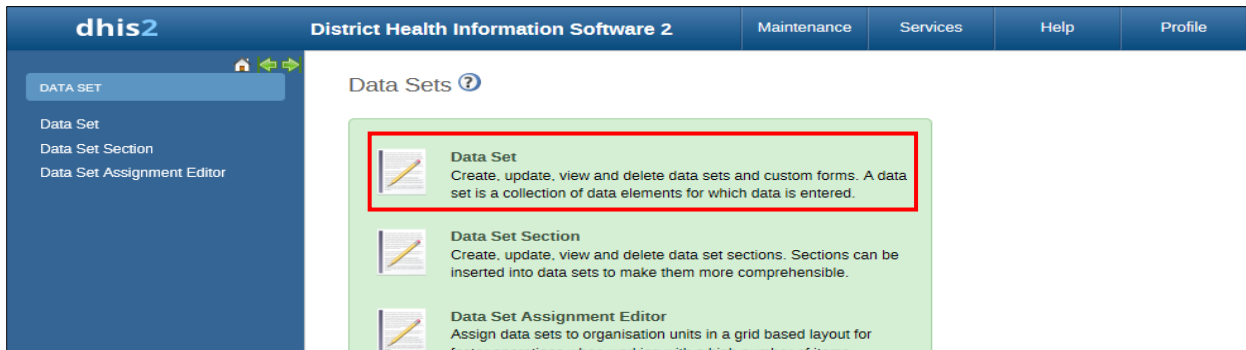
Name	Operations
Infants born to HIV Positive mothers (exposed)	
Number of HIV patients in care who started TB treatment	
Number of HIV patients on therapeutic or supplementary food	
Number of HIV patients receiving clinical services	
Number of HIV patients screened for TB in HIV care	
Number of HIV-positive persons receiving cotrimoxazole prophylaxis	
Number of individuals who received Testing and counseling services for HIV	
Number of male clients circumcised	
Number of patients on ARVs	
Number of patients receiving one care service	

Step 2: Create a report dataset

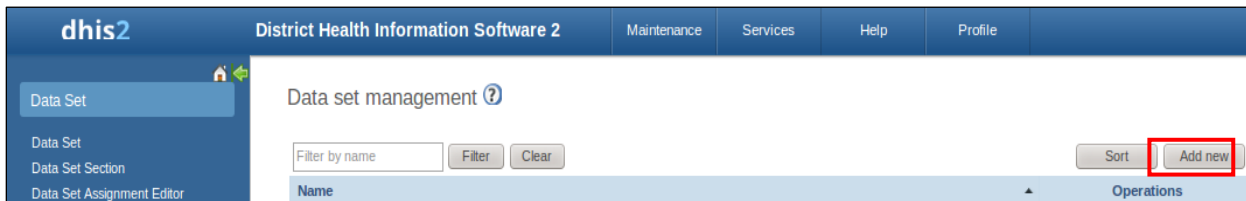
1. On DHIS 2 home page, move the cursor over maintenance tab and scroll down the dropdown list to select **Data Sets**.



2. On the Data Sets page, open Data Set Management page by clicking on **Data Set**.



3. On the Data Set Management page, create a data set by clicking **Add new** button.



4. On the Add data Set page, enter data set details and select data elements or indicators for the data set being created.

The screenshot shows the 'Add data set' page in DHIS2. The page is titled 'Add data set' and is divided into several sections. The top section, 'Data set details', is highlighted with a red border and contains fields for Name, Short name, Code, Description, Expiry Days, Frequency (set to Daily), Complete notification recipients, Send notification to completing user, and Skip aggregation. Below this is the 'Form details' section with fields for Allow future periods, All fields for data elements required, Complete allowed only if validation passes, and Skip Offline. The bottom section, 'Available data elements', contains a list of data elements with a filter and buttons to move them to the 'Selected data elements' section. Below this is the 'Available indicators' section with a similar filter and buttons to move them to the 'Selected indicators' section. At the bottom of the page are 'Save' and 'Cancel' buttons.

To add data elements to the data set created:

- Select the data element under **Available data elements** section.
- Click on the > button. This will move the data element to the **Selected data elements** section and it will be available in the data set.

Repeat step **a)** and **b)** above to add all required data elements to the data set created. Add indicators to the same data set by selecting indicators under **Available** indicators section, then clicking on the > button to move it to **Selected indicators** section.

Once all details are filled and the required data elements and /indicators are selected, click **Save** button to create the data set.

IMPORTANT: Code for each dataset is required.

NOTE: A data set can be created for each section of the indicator document. For example, data sets for HIV prevention, HIV treatment, HIV care, etc....

Create report definition template/file

Report definition XML template

The report definitions XML file/template provides data element codes for mapping data values generated in IQcare to the correct data elements in the data message/file sent to DHIS 2. The DHIS 2 report definition XML template has two parts in the following format:

1. XML version part (first line shown in the template sample below)
2. Report templates

Report definitions XML template sample:

```
<?xml version="1.0"?>
<reportTemplates xmlns:d2="http://dhis2.org/schema/dxf/2.0">
  <dataElements>
    <dataElement uid="<ID>" code="<Code>" name="<name>" type="<Type>"/>
  </dataElements>
  <disaggregations>
    <disaggregation uid="<ID>" code="<code>or <ID>" name="<name>" />
  </disaggregations>
  <reportTemplate>
    <name><name></name>
    <uid><ID></uid>
    <code><code></code>
    <periodType><frequency></periodType>
    <dataValueTemplates>
      <dataValueTemplate dataElement="<code>" disaggregation="<code>">
        </dataValueTemplate>
      </dataValueTemplates>
    </reportTemplate>
  </reportTemplates>
```

The report templates part is divided into three sections:

- Data elements
- Disaggregations
- Report template

Data elements

List all the needed data elements, like “Number of males above 15 years enrolled in care.” There may be several data elements inside the Data Elements section.

Data elements code sample

```
<dataElements>
  <dataElement uid="<ID>" code="<Code>" name="<name>" type="<Type>"/>
</dataElements>
```

Note: The uid code in this section is what we will need to map the value generated in IQCare for the data element name.

Disaggregations

List all the needed category option combos or category combos, like “male_uncategorized_member”; there may be multiple disaggregation tags inside the disaggregations.

Disaggregation sample code

```
<disaggregations>
  <disaggregation uid="<ID>" code="<code>or <ID>" name="<name>" />
</disaggregations>
```

Report template

This section may have multiple entries depending on the number of different types of reports (data sets) that need to be generated.

- name
- uid
- code
- periodType
- dataValueTemplates
 - dataValueTemplate

Report template sample code

```
<reportTemplate>
  <name>PCB Form A2</name>
  <uid>bazOE3Zgw8O</uid>
  <code>A2</code>
  <periodType>Monthly</periodType>
  <dataValueTemplates>
    <dataValueTemplate dataElement="HXHPN" disaggregation="Gb0BGTbfg19">
    </dataValueTemplate>
  </dataValueTemplates>
</reportTemplate>
```

How to create a report definition template

There are two ways that the report definition template can be created from DHIS2.

- Using curl command (Only tested for Linux operating system)
- Manually

Note: Detailed instructions on creating a report definition template using curl command are in Appendix 2. Instructions for creating the report definition template manually are in Appendix 3.

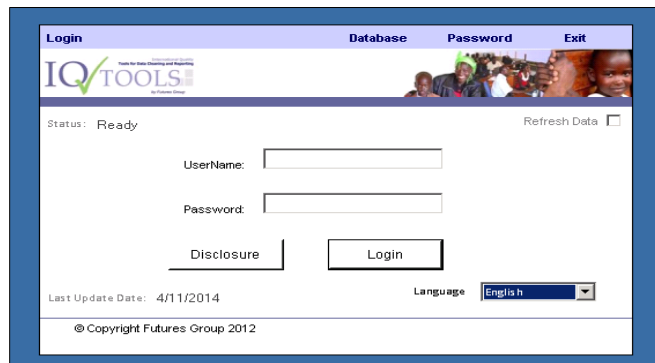
Using IQTools to Post Data to DHIS 2

IQTools is a middleware installed separately to provide interoperability functions. The configuration and electronic data submission process follows the following steps:

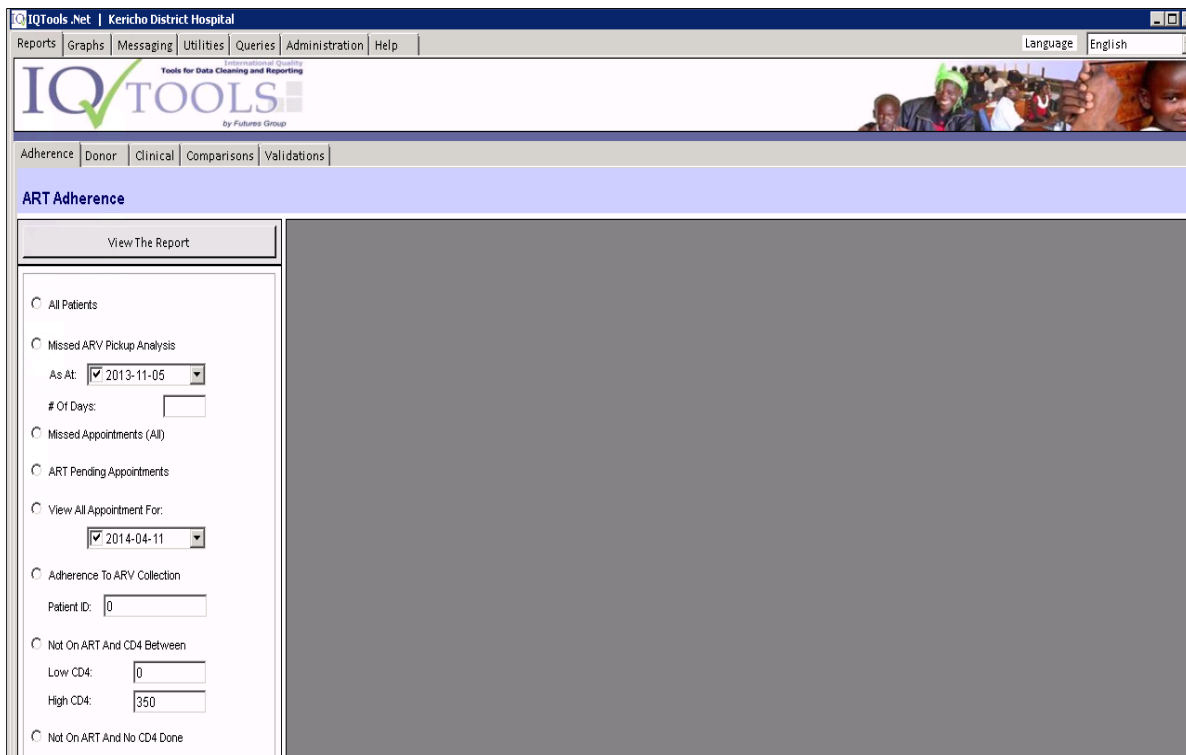
- Check connection to IQCare database
- Map DHIS 2 Data element codes to the report data elements
- Generate and post indicator data report

Check Connection to IQCare database

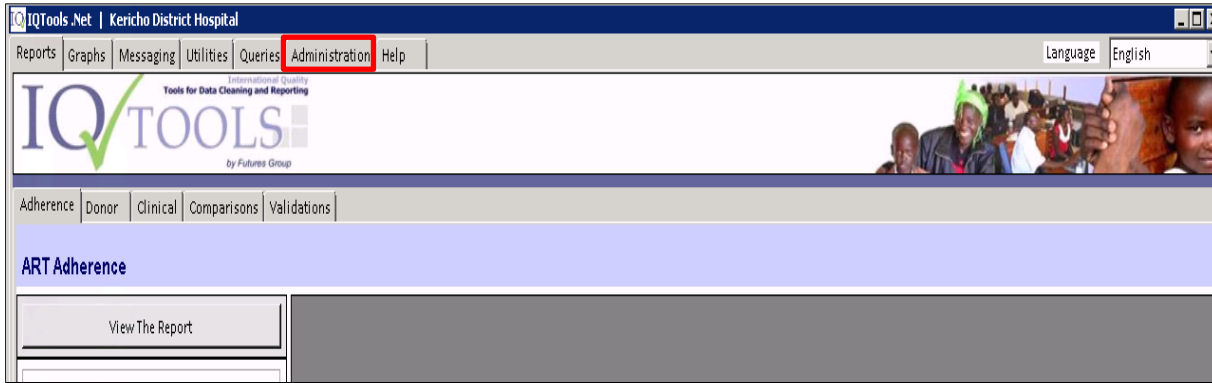
1. Login to IQTools



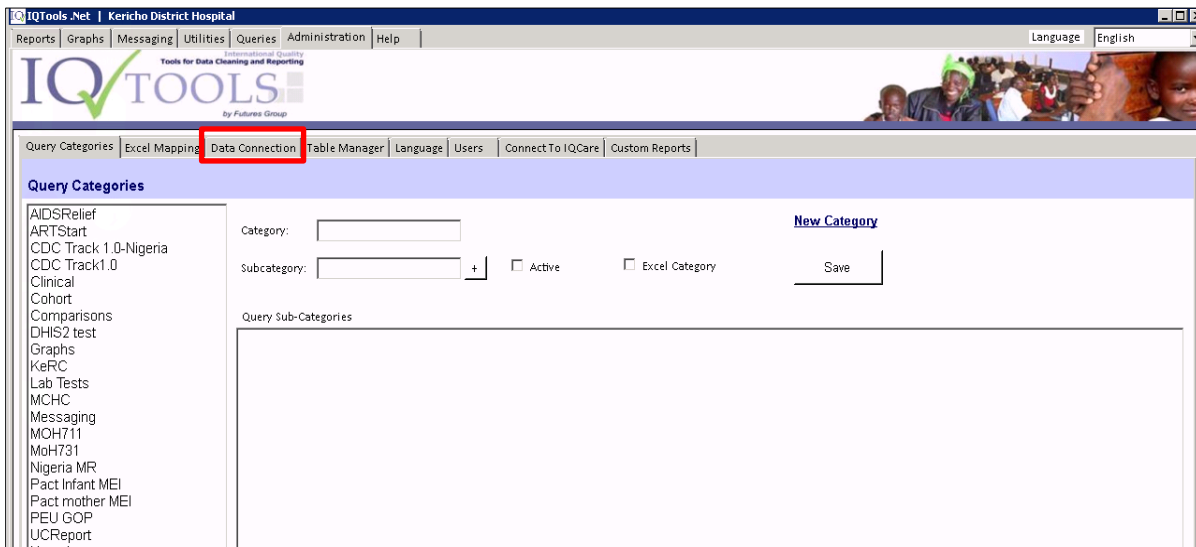
2. When the login is successful, IQTools will load and then display the home screen below.



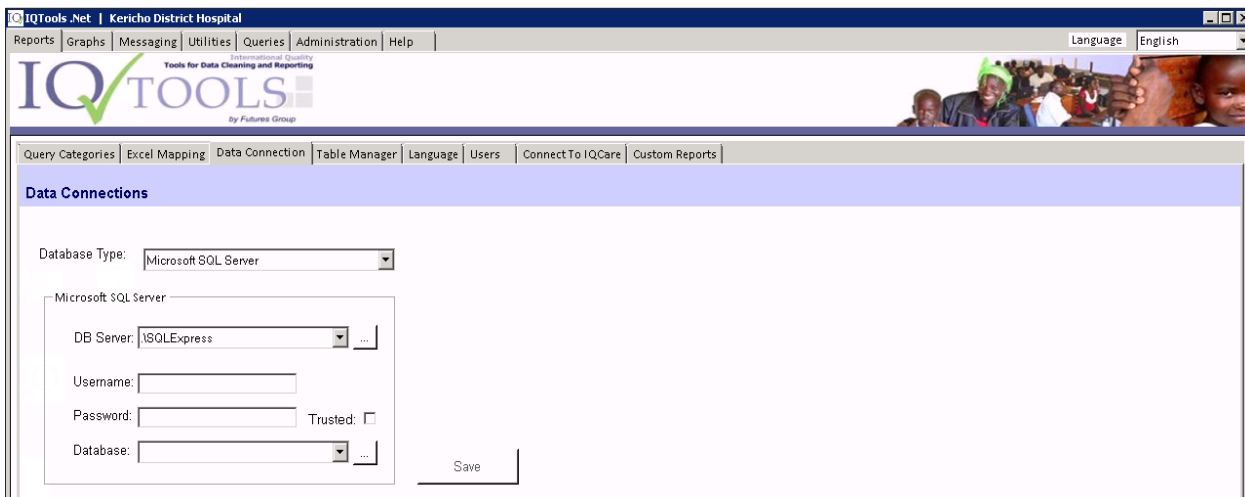
3. On the home screen click the Administration tab



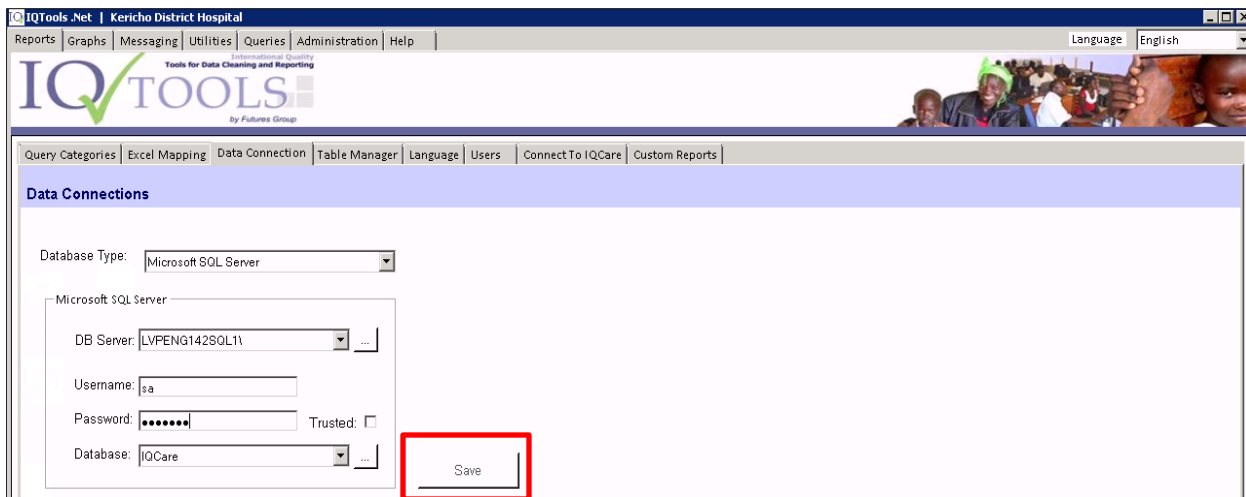
4. On the administration page, click the Data Connection tab.



5. This will open Data connections page where you can view and select different database connections



6. On the Data Connection page, enter the details on the **Database Type**, **DB Server** (database server name), and **Username**, **Password** and **Database** to be used.

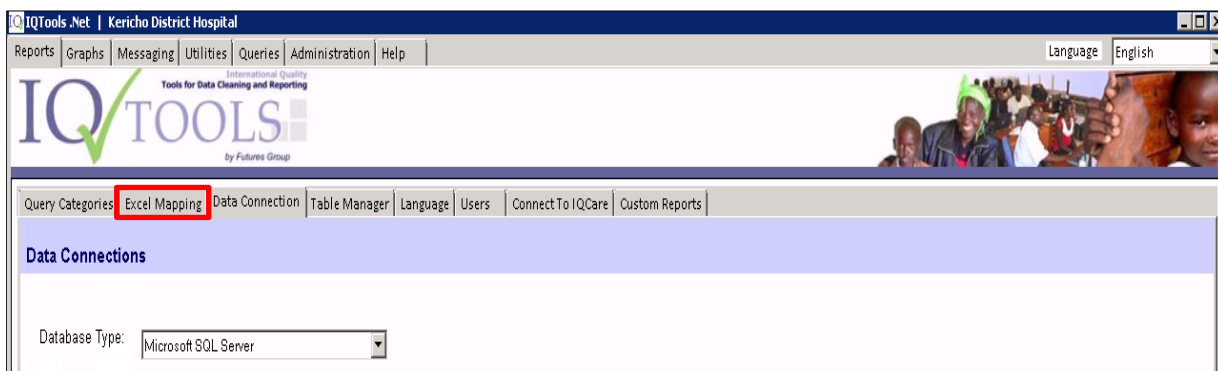


7. Click the **Save** button to save data connection information.

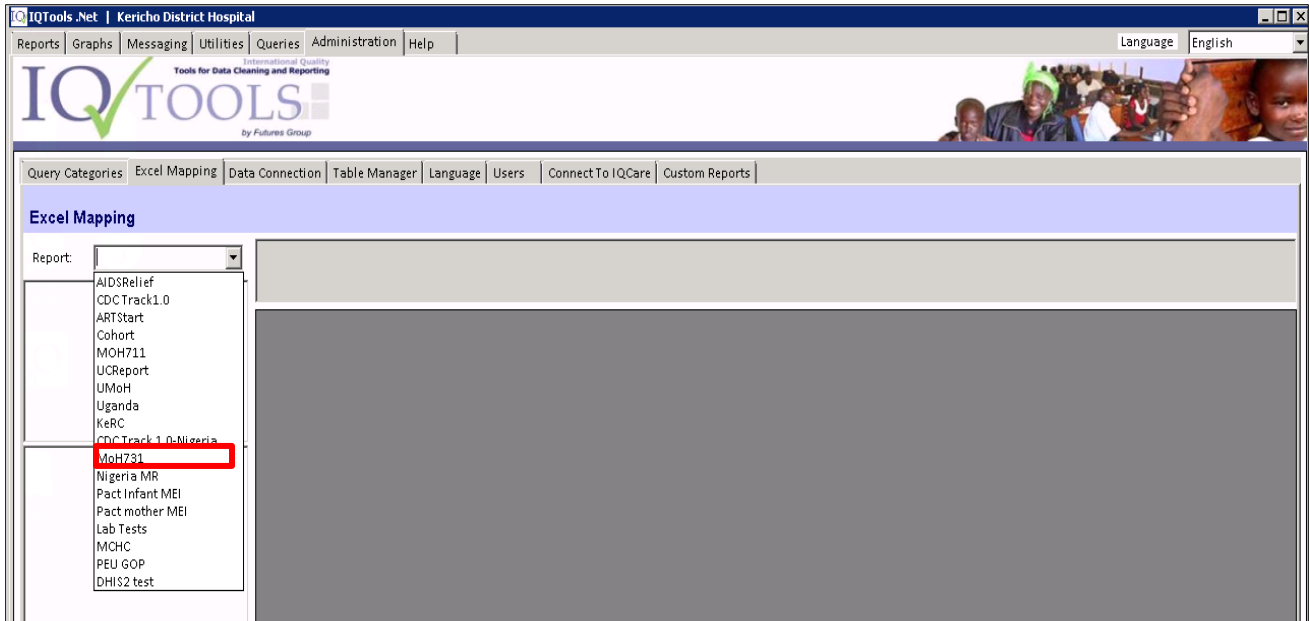
Note: This process can be used to connect to different databases.

Map DHIS 2 Data element codes to report data elements

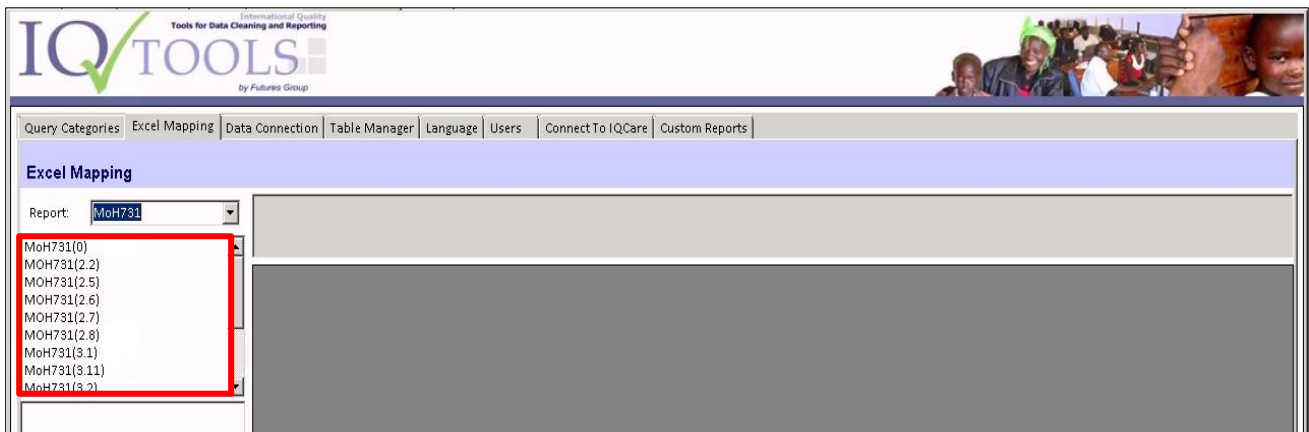
1. Click on the **Excel Mapping** tab to open Excel Mapping page



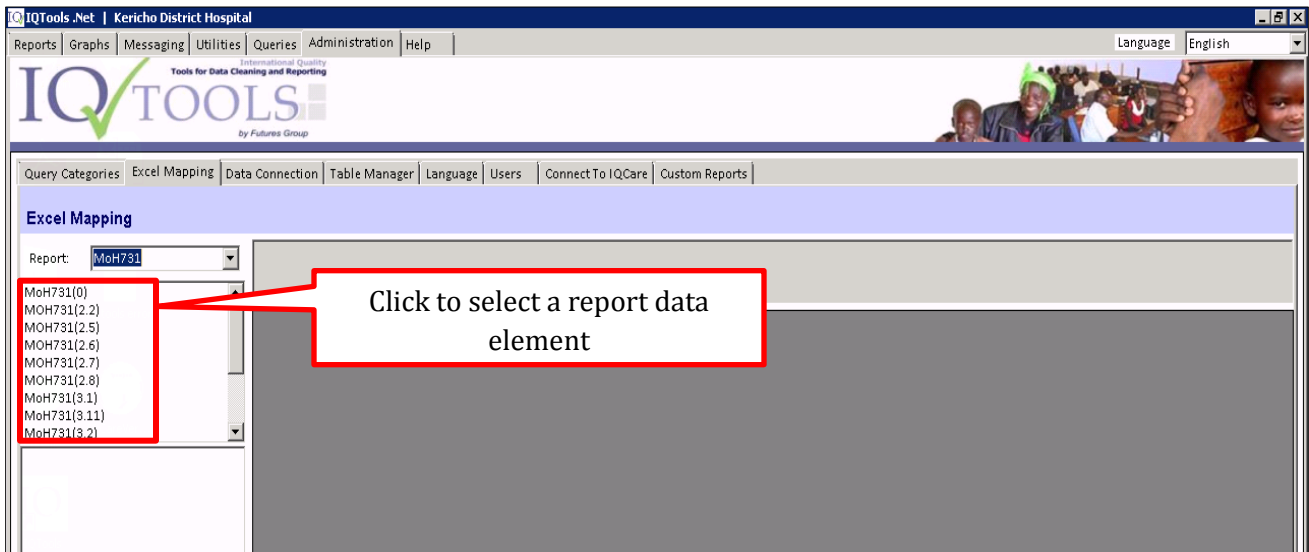
2. On Excel Mapping page, click on Report drop down list, then select the report to be mapped as shown below. (In this case we selected MoH731)



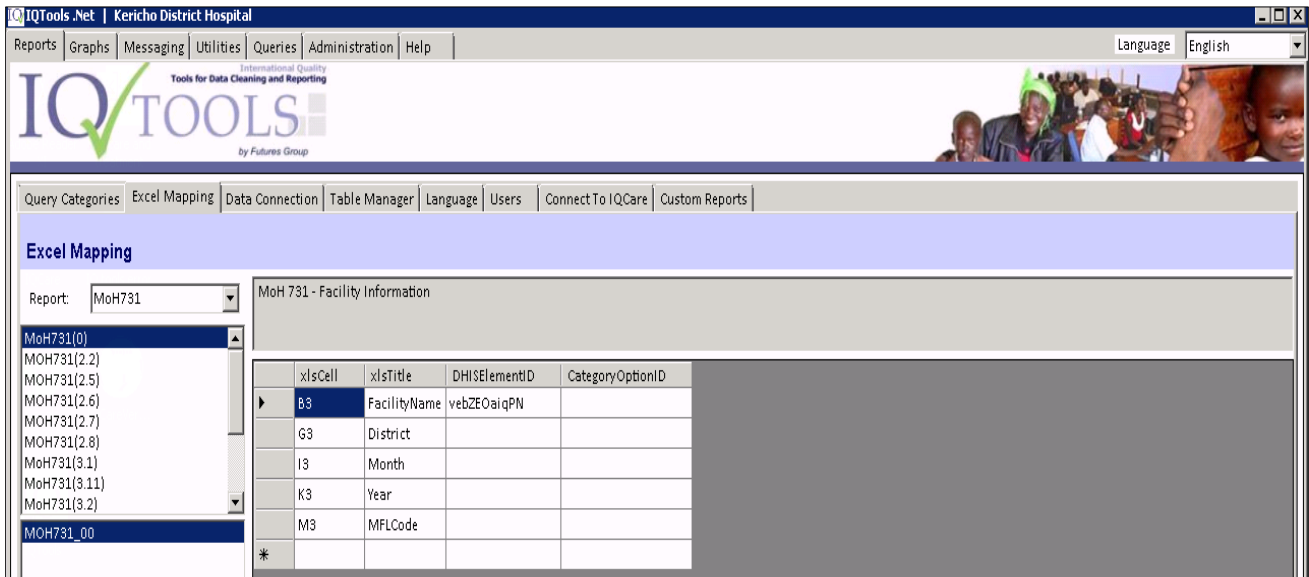
3. The report data elements for generating each indicator value will be displayed as shown in the figure below.



4. Click on the report data element to map report data elements.



5. Details on the selected element will be displayed as shown below.



Note: Each report data element generates indicator data value from IQCare.

6. Open the report definition template downloaded from DHIS 2.

```
<?xml version="1.0" encoding="UTF-8" standalone="true"?>
- <reportTemplates>
  - <dataElements>
    <dataElement code="HV03-09" uid="pX83IFxJtW3" name="Enrolled in Care -Male under 15years"/>
    <dataElement code="HV03-12" uid="gPCvcbsyBvM" name="Enrolled in Care- 15 years and older Female"/>
    <dataElement code="HV03-10" uid="TgWLBqq0KV3" name="Enrolled in care- Female Below 15 years"/>
    <dataElement code="HV03-11" uid="pDYYqCroVlo" name="Enrolled in care-15 years and older Male"/>
  </dataElements>
  - <reportTemplate>
    <name>MOH 731 - 3 care and treatment</name>
    <uid>luTZq2QpyIv</uid>
    <code>MOH 731</code>
    - <dataValueTemplates>
      <dataValueTemplate dataElement="HV03-10" disaggregation="O2rSNQvEwgM"/>
      <dataValueTemplate dataElement="HV03-11" disaggregation="O2rSNQvEwgM"/>
      <dataValueTemplate dataElement="HV03-12" disaggregation="O2rSNQvEwgM"/>
      <dataValueTemplate dataElement="HV03-09" disaggregation="O2rSNQvEwgM"/>
    </dataValueTemplates>
  </reportTemplate>
</reportTemplates>
```

DHIS 2 data element ID

7. Enter DHIS 2 data element ID to the corresponding report data element as shown below.

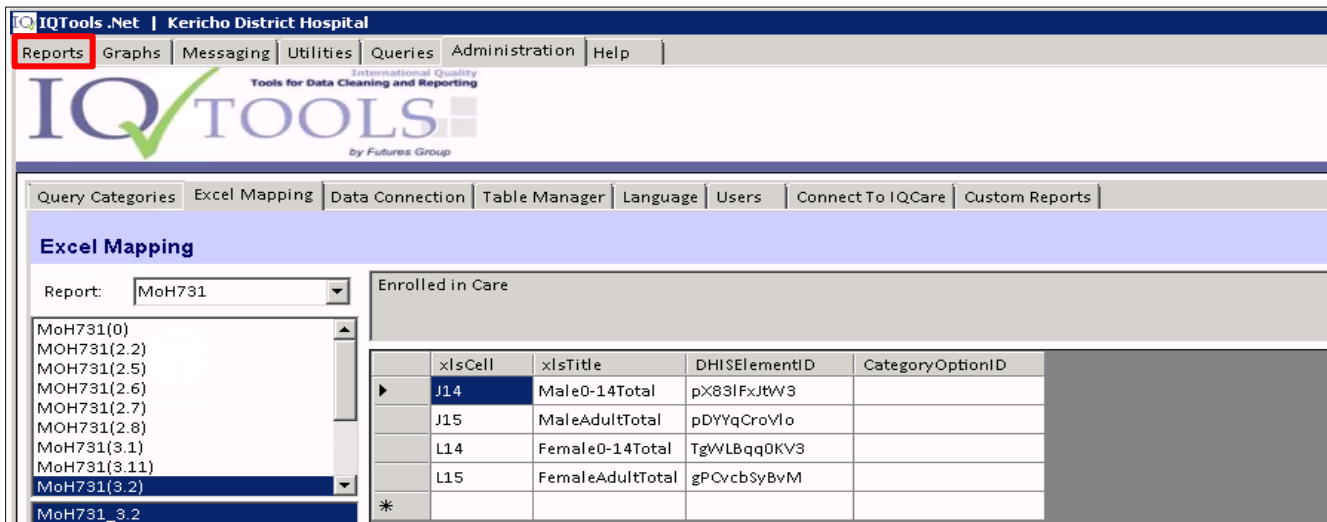
xlsCell	xlsTitle	DHISElementID
J14	Male0-14Total	pX83IFxJtW3
J15	MaleAdultTotal	pDYYqCroVlo
L14	Female0-14Total	TgWLBqq0KV3
L15	FemaleAdultTotal	gPCvcbsyBvM
*		

```
<?xml version="1.0" encoding="UTF-8" standalone="true"?>
<reportTemplates>
  <dataElements>
    <dataElement code="HV03-09" uid="pX83IFxJtW3" name="Enrolled in Care -Male under 15years"/>
    <dataElement code="HV03-12" uid="gPCvcbsyBvM" name="Enrolled in Care- 15 years and older Female"/>
    <dataElement code="HV03-10" uid="TgWLBqq0KV3" name="Enrolled in care- Female Below 15 years"/>
    <dataElement code="HV03-11" uid="pDYYqCroVlo" name="Enrolled in care-15 years and older Male"/>
  </dataElements>
```

8. Repeat step seven until all report data elements have been mapped to DHIS 2 data element ID.

Generate and post indicator data report

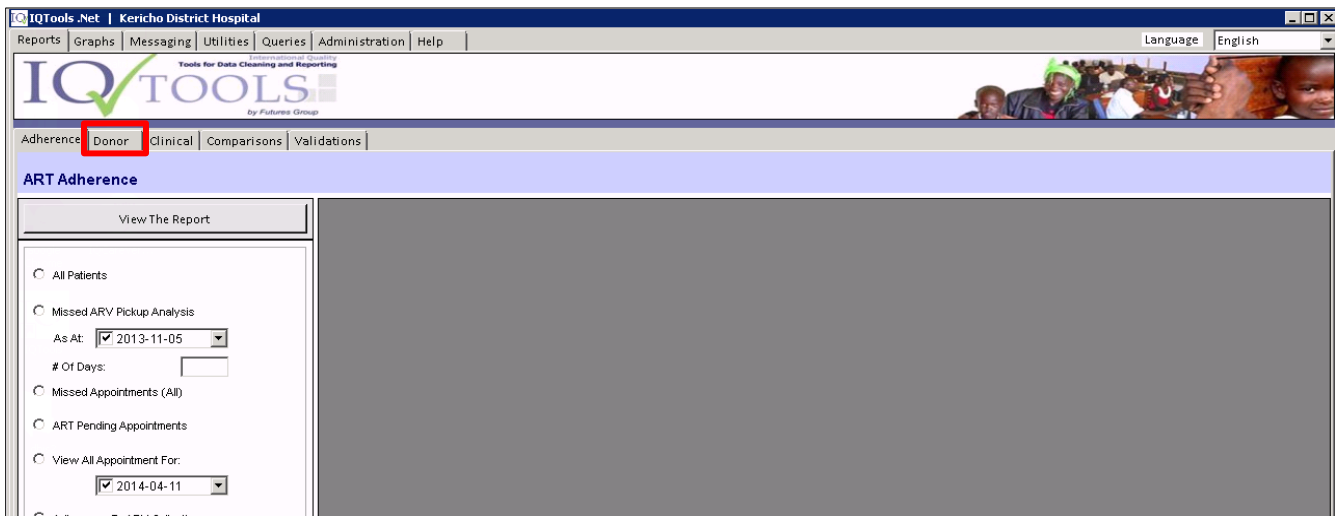
1. From the Excel Mapping page, click the report tab to open the home page.



The screenshot shows the IQTools .Net interface for Kericho District Hospital. The 'Reports' tab is highlighted in red. The 'Excel Mapping' section is active, showing a list of reports on the left and a table of data on the right. The report selected is 'Enrolled in Care'.

	xlsCell	xlsTitle	DHISElementID	CategoryOptionID
▶	J14	Male0-14Total	pX83IFxJtW3	
	J15	MaleAdultTotal	pDYYqCroVlo	
	L14	Female0-14Total	TgWLBqq0KV3	
	L15	FemaleAdultTotal	gPCvcbSyBvM	
	*			

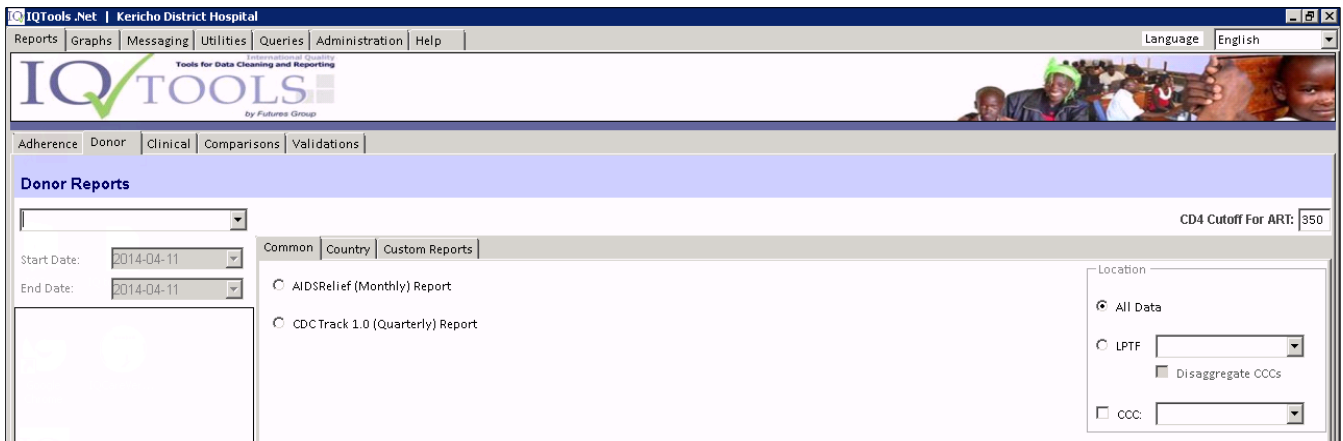
2. On the home page (shown below), click Donor to open Donor Reports page.



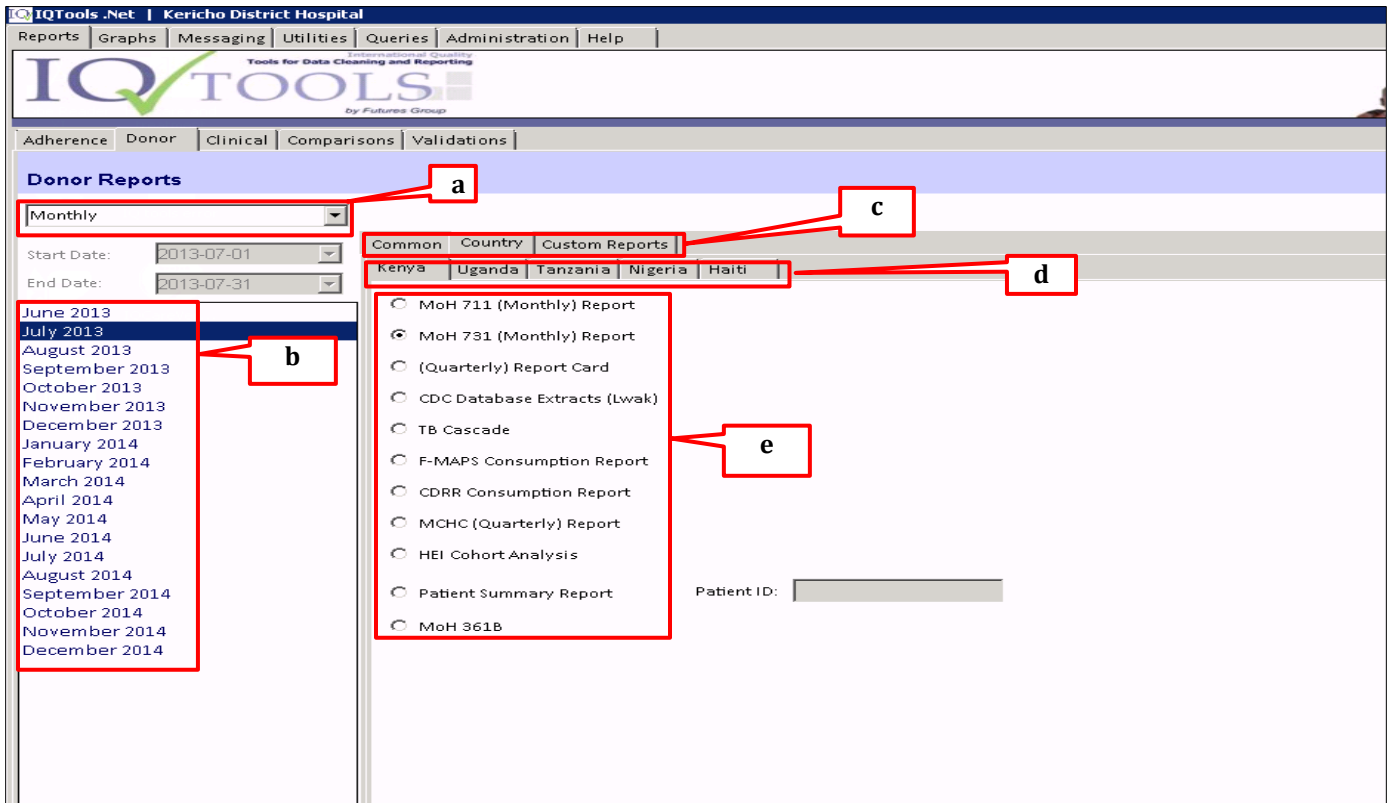
The screenshot shows the IQTools .Net interface for Kericho District Hospital. The 'Donor' tab is highlighted in red. The 'ART Adherence' section is active, showing a list of filters and a 'View The Report' button.

View The Report

- All Patients
- Missed ARV Pickup Analysis
 - As At:
 - # Of Days:
- Missed Appointments (All)
- ART Pending Appointments
- View All Appointment For:
 -
- Adherence To ARV Collection



3. In the donor report, fill in parameters for the mapped report to be sent to DHIS 2.
 - a. Select reporting frequency in the dropdown
 - b. Select the report date
 - c. Select report type (In this demonstration we used country)
 - d. Select country
 - e. Select report name



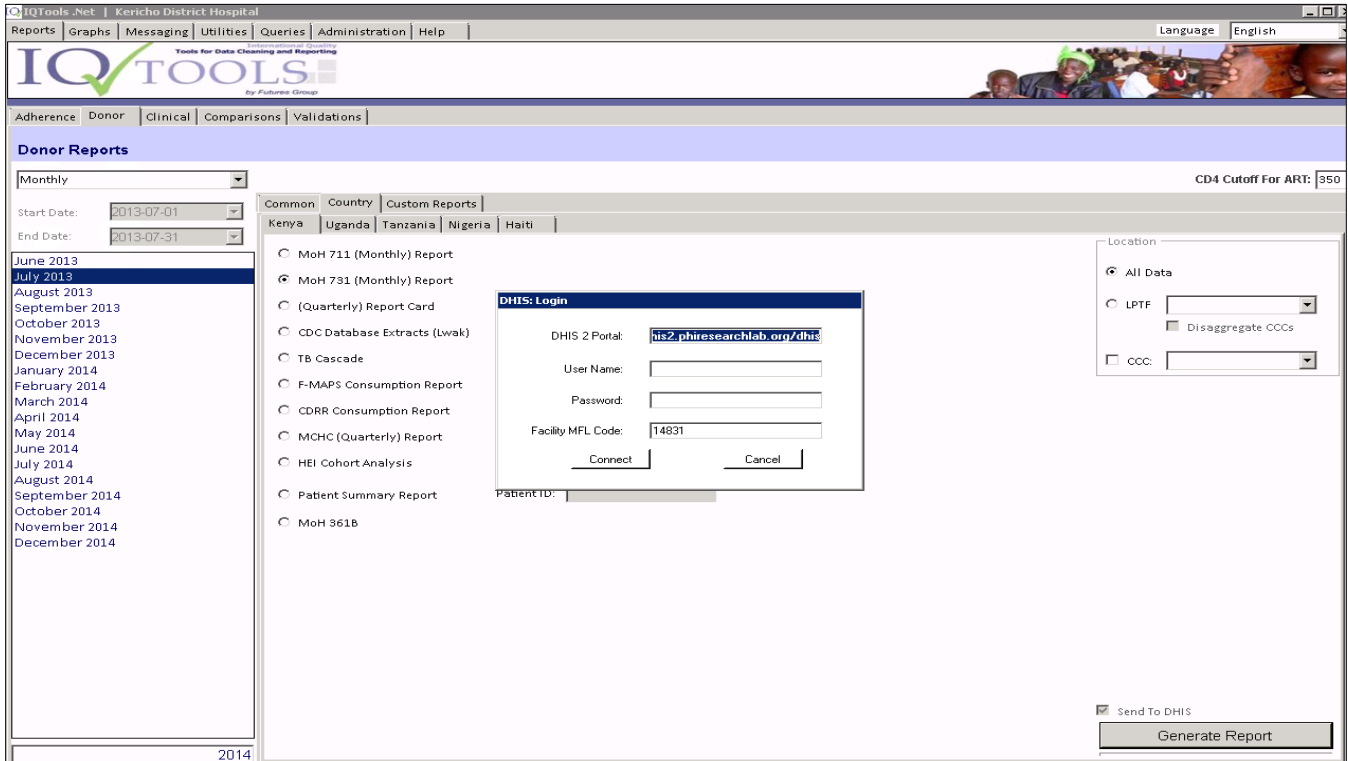
4. Click "Send To DHIS" checkbox

The screenshot shows the 'Donor Reports' interface. On the left, there is a month selection dropdown set to 'Monthly' and a list of months from June 2013 to December 2014, with 'July 2013' selected. The main area has tabs for 'Common', 'Country', and 'Custom Reports', with 'Country' selected and 'Kenya' chosen. A list of report types is shown, with 'MoH 731 (Monthly) Report' selected. A 'Patient ID' field is present. On the right, there is a 'Location' section with 'All Data' selected. At the bottom right, the 'Send To DHIS' checkbox is highlighted with a red box, and the 'Generate Report' button is visible below it.

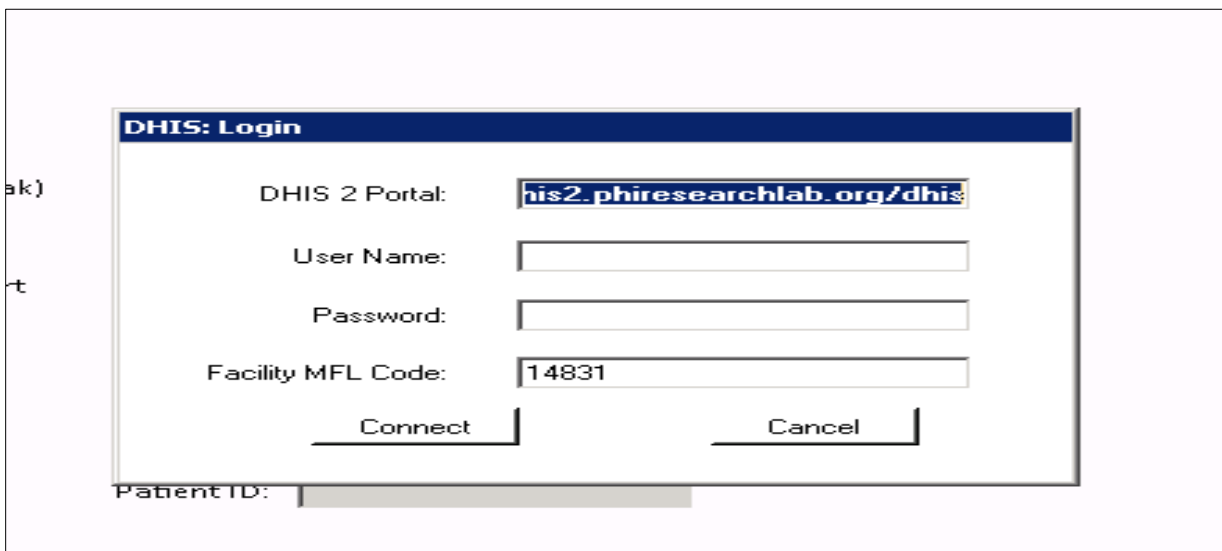
5. Click the **Generate Report** button to generate indicator data report.

This screenshot is identical to the one above, showing the 'Donor Reports' interface. In this step, the 'Send To DHIS' checkbox is checked, and the 'Generate Report' button at the bottom right is highlighted with a red box.

6. After clicking the **Generate Report** button, a dialog box to connect to DHIS 2 will open as shown below.



7. Fill in **DHIS 2 Portal** URL, **User Name** and **Password** then click **Connect** to post report indicator data values to DHIS 2



Note: the user details entered above should have privileges in DHIS 2 to update data records for the facility.

- After the connecting and indicator data values are posted, an Excel report will be generated and a dialog box will display indicating that data has been transmitted to DHIS 2.

National AIDS & STI Control Programme									
MOH 731 - Comprehensive HIV/AIDS Facility Reporting Form - NASCOP									
Facility:	Country:	Kenya	District:	Month:	Year:	MI			
1 HIV Counselling and Testing			3 Care and Treatment						
1.1 Testing			3.1 On Cotrimoxazole Prophylaxis						
First	HV01-01	0	HIV Exposed Infant (within 2 months)	HV03-01	0				
Repeat	HV01-02	0	HIV Exposed Infant (Eligible for CTX at 2 months)	HV03-02	0				
Total Tested (HV01-01 plus HV01-02)	HV01-03	0	On CTX - Below 15 Years	HV03-03(M)	0	HV03-04(F)			
Couples	HV01-05	0	On CTX - 15 years & Older	HV03-05(M)	0	HV03-06(F)			
Static (Facility)	HV01-06	0	Total on CTX (Sum HV03-03 to HV03-06)	HV03-07	0				
Outreach	HV01-07	0							
1.2 Receiving results -(Couples only)			3.2 Enrolled in Care						
Concordant Couples	HV01-08	0	Enrolled in Care - Below 1 year	HV03-08	169				
Discordant Couples	HV01-09	0	Enrolled in Care - Below 15 years	HV03-09 (M)	673	HV03-10 (F)			
			Enrolled in Care - 15 years & older	HV03-11 (M)	4003	HV03-12 (F)			
			Enrolled in Care - Total (Sum HV03-09 to HV03-12)	HV03-13	12099				
1.3 Receiving Positive Results			3.3 Starting ART (from the tally sheet- this month only and from last 2 months)						
Males - Below 15 years	HV01-10	0	Starting ART - Below 1 year	HV03-14	0				
Females - Below 15 years	HV01-11	0	Starting ART - Below 15 years	HV03-15 (M)	2	HV03-16 (F)			
Males - 15 to 24 years	HV01-12	0	Starting ART - 15 years & older	HV03-17 (M)	256	HV03-18 (F)			
Females - 15 to 24 years	HV01-13	0	Starting ART - Total (Sum HV03-15 to HV03-18)	HV03-19	717				
Males - 25 years & older	HV01-14	0	Starting ART - Below 1 year	HV03-20	0				
Females - 25 years & older	HV01-15	0	Starting ART - Below 15 years	HV03-21 (M)	0	HV03-22 (F)			
Total receiving positive results (Sum HV01-10 to 15)	HV01-16	0	Starting ART - 15 years & older	HV03-23 (M)	0	HV03-24 (F)			
2 Prevention of Mother-to-Child transmission			3.4 Starting ART - Total (Sum HV03-21 to HV03-24)						
2.1 Testing for HIV			HV03-25						
Antenatal	HV02-01	0	Starting - Pregnant	HV03-26	0				
Labour and Delivery	HV02-02	0	Starting - TB Patient	HV03-27	0				
Postnatal (within 72hrs)	HV02-03	0							
Total tested (PMTCT) (Sum HV02-01 to HV02-03)	HV02-04	0	3.5 Revisits on ART (from the tally sheet- this month only and from last 2 months)						
2.2 HIV Positive Results			Revisit on ART - Below 1 year						
Known positive status (at entry into ANC)	HV02-05	0	Revisit on ART - Below 15 years	HV03-28	0				
Antenatal	HV02-06	0	Revisit on ART - 15 years & older	HV03-29 (M)	0	HV03-30 (F)			
				HV03-31 (M)	0	HV03-32 (F)			

Generating and Viewing Data Report Sent on DHIS 2

To view the data report sent from IQCare to DHIS 2, log in to DHIS 2 and run a data mart process.

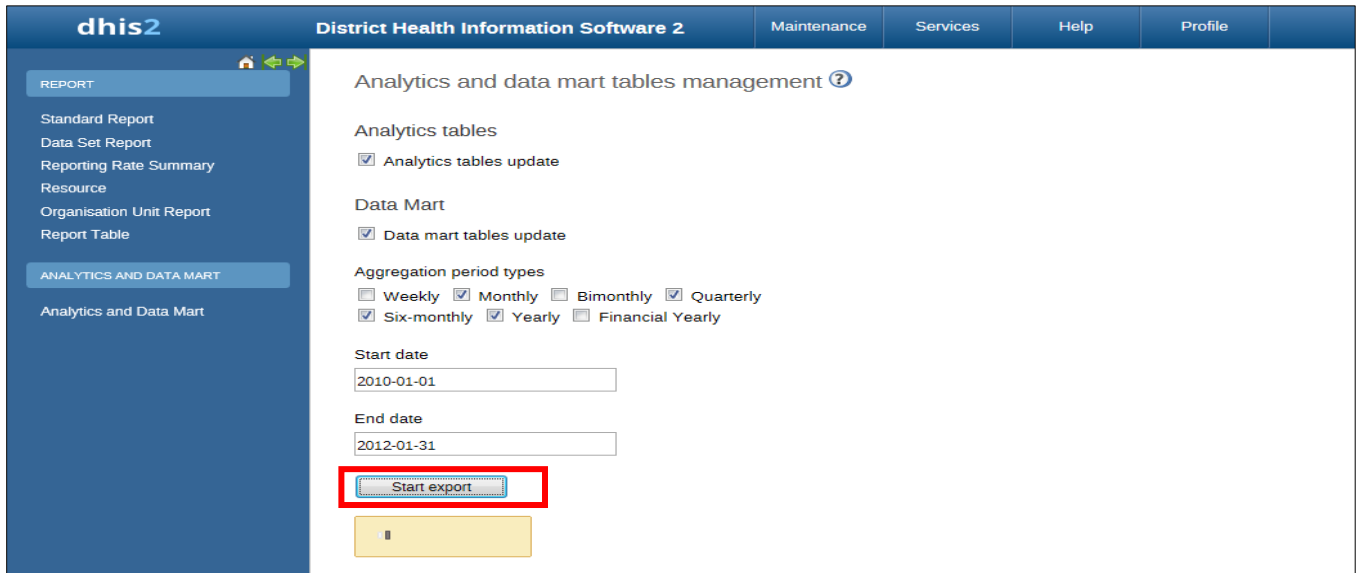
Run DHIS 2 data mart process

- On DHIS 2 home page, go to **Services** on the top menu.
- Select **Reports** on the dropdown list to open reports page.



- Click on the **Analytics and Data Mart** link to open Data Mart Management page.

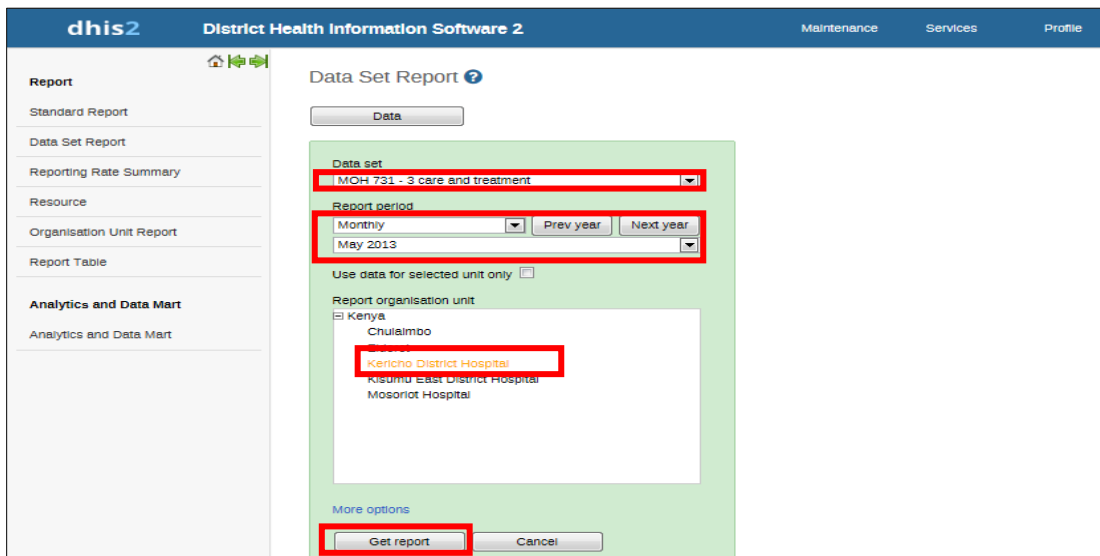
4. Select the period type/frequency, start date, and end date.
5. Click **Start Export** button to begin the process of exporting data from tables to data mart for report generation.



Generating the Report

Once the data mart process is complete:

1. Click on **Data Set Report** to open data set report page.
2. Fill in the details to generate the dataset report:
 - a) Select the data set (in this case, HIV care and treatment).
 - b) Select report period and frequency (In this case, monthly).
 - c) Select the month and year of the report to be generated.
 - d) Specify the organization unit by clicking on the organization unit whose report will be generated. Tick the checkbox if for selected unit only.
 - e) Click the **Get Report** button.



View the Generated Report

dhis2 District Health Information Software 2 Maintenance Services Profile

[Download as Excel](#) [Download as CSV](#) [Download as PDF](#) [Download as Report](#) [Download as JRXML](#) [Back](#)

[Share](#)

Kericho Enrolled in care

Kericho District Hospital

Data	May 2013
Enrolled In Care -Male under 15years (default)	673
Enrolled In Care- 15 years and older Female (default)	6722
Enrolled in care- Female Below 15 years (default)	701
Enrolled in care-15 years and older Male (default)	4003

The aggregated data sent from IQCare is available in the DHIS 2 Dataset Report.

Acknowledgements

The authors would like to thank Vincent Yahuma, working with Futures Group- Kenya, for sharing IQCare and IQTools applications, installation, and configuration manuals, and performing a demo on IQCare and IQTools. Thanks also to Bobby Jefferson for organizing and supporting Vincent's travel to give a demo on IQCare and IQTools at CDC Atlanta. We would also like to thank Donna Madeiros for coordinating the review of this document with the Futures Group team in Kenya who provided feedback and comments that greatly improved the content of this guide.

The authors acknowledge CDC Public Health Informatics Research Laboratory (www.phiresearchlab.org) for providing the technology infrastructure environment used in this project and the staff for their technical support with the VM servers.

The authors also acknowledge Jan MacGregor, for reviewing this guide and providing feedback that greatly improved the content and presentation of this document.

The study that led to the development of this guide was supported by the United States President's Emergency Plan for AIDS Relief (PEPFAR) through the U.S. Centers for Disease Control and Prevention (CDC), Atlanta.

Please send your input or feedback to jkariuki@cdc.gov

Appendices

Appendix 1: MOH731- Comprehensive HIV/AIDS Treatment Facility Reporting Form

National AIDS & STI Control Programme				[MOH731]
MOH 731- Comprehensive HIV/AIDS Facility Reporting Form - NASCOP				
District: _____		County: _____		Facility: _____
		Month: _____		Year: _____
				MFL Code: _____
1 HIV Counselling and Testing				
1.1 Testing				
First	HV01-01	Value <input type="text"/>		
Repeat	HV01-02	<input type="text"/>		
Total Tested (HV01-01 plus HV01-02)	HV01-03	<input type="text"/>		
Couples	HV01-05	<input type="text"/>		
Static [Facility]	HV01-06	<input type="text"/>		
Outreach	HV01-07	<input type="text"/>		
1.2 Receiving Results - (Couples only)				
Cocordant Couples	HV01-08	<input type="text"/>		
Discordant Couples	HV01-09	<input type="text"/>		
1.3 Receiving Positive Results				
Males - Below 15 years	HV01-10	<input type="text"/>		
Females - Below 15 years	HV01-11	<input type="text"/>		
Males - 15 to 24 years	HV01-12	<input type="text"/>		
Female - 15 to 24 years	HV01-13	<input type="text"/>		
Males - 25 years & older	HV01-14	<input type="text"/>		
Female - 25 years & older	HV01-15	<input type="text"/>		
Total receiving positive results (Sum HV01-10 to -15)	HV01-16	<input type="text"/>		
2 Prevention of Mother-to-Child Transmission				
2.1 Testing for HIV				
Antenatal	HV02-01	Value <input type="text"/>		
Labour and Delivery	HV02-02	<input type="text"/>		
Postnatal (within 72hrs)	HV02-03	<input type="text"/>		
Total Tested (PMTCT) (Sum HV02-01 to HV02-03)	HV02-04	<input type="text"/>		
2.2 HIV Positive Results				
Known positive status (at entry into ANC)	HV02-05	<input type="text"/>		
Antenatal	HV02-06	<input type="text"/>		
Labour and Delivery	HV02-07	<input type="text"/>		
Postnatal (within 72hrs)	HV02-08	<input type="text"/>		
Total Positive (PMTCT) (Sum HV02-05 to HV02-08)	HV02-09	<input type="text"/>		
Total with known status (HV02-04 plus HV02-05)	HV02-10	<input type="text"/>		
2.3 Partner Involvement				
Male partners tested - (ANC/L&D)	HV02-11	<input type="text"/>		
Discordant Couples	HV02-12	<input type="text"/>		
2.4 Maternal Prophylaxis (at first contact only)				
Prophylaxis - NVP Only	HV02-13	<input type="text"/>		
Prophylaxis - (AZT + SdNVP)	HV02-14	<input type="text"/>		
Prophylaxis - Interrupted HAART	HV02-15	<input type="text"/>		
HAART (ART)	HV02-16	<input type="text"/>		
Total PMTCT prophylaxis (Sum HV02-13 to HV02-16)	HV02-17	<input type="text"/>		
2.5 Assessment for ART Eligibility in MCH (at diagnosis)				
Assessed for eligibility at 1st ANC - WHO Staging done	HV02-18	<input type="text"/>		
Assessed for eligibility at 1st ANC - CD4	HV02-19	<input type="text"/>		
Assessed for Eligibility in ANC (Sum HV02-18 to HV02-19)	HV02-20	<input type="text"/>		
Started on ART during ANC	HV02-21	<input type="text"/>		
2.6 Infant Testing (initial tests only)				
PCR (within 2 months)	HV02-24	<input type="text"/>		
PCR (from 3 to 8 months)	HV02-25	<input type="text"/>		
Serology antibody test (from 9 to 12 months)	HV02-26	<input type="text"/>		
PCR (from 9 to 12 months)	HV02-27	<input type="text"/>		
Total HEI Tested by 12 months (Sum HV02-24 to HV02-26)	HV02-28	<input type="text"/>		
2.7 Confirmed Infant Test Results				
Positive - (within 2 months) - PCR	HV02-29	<input type="text"/>		
Positive - (3 - 8 months) - PCR	HV02-30	<input type="text"/>		
Positive - (9 - 12 months) - PCR	HV02-31	<input type="text"/>		
Total Confirmed Positive (Sum HV02-29 to HV02-31)	HV02-32	<input type="text"/>		
2.8 Infant Feeding				
EBF (at 6 months)	HV02-33	<input type="text"/>		
ERF (at 6 months)	HV02-34	<input type="text"/>		
MF (at 6 months)	HV02-35	<input type="text"/>		
Total Exposed aged 6 months	HV02-36	<input type="text"/>		
BF (12 months)	HV02-37	<input type="text"/>		
Not BF (12 months)	HV02-38	<input type="text"/>		
Not Known	HV02-39	<input type="text"/>		
Total Exposed aged 12 months (Sum HV02-37 to HV02-39)	HV02-40	<input type="text"/>		
2.9 Infant ARV Prophylaxis (at first contact only)				
Issued in ANC	HV02-41	<input type="text"/>		
Labour and Delivery	HV02-42	<input type="text"/>		
PNC (<72hrs)	HV02-43	<input type="text"/>		
Total Infants Issued Prophylaxis (Sum HV02-41 to HV02-43)	HV02-44	<input type="text"/>		
3 Care and Treatment				
3.1 On Cotrimoxazole Prophylaxis				
HIV Exposed Infant (within 2 months)	HV03-01	<input type="text"/>		
HIV Exposed Infant (Eligible for CTX at 2 months)	HV03-02	<input type="text"/>		
On CTX - Below 15 years	HV03-03 (M)	<input type="text"/>		HV03-04 (F) <input type="text"/>
On CTX - 15 years & older	HV03-05 (M)	<input type="text"/>		HV03-06 (F) <input type="text"/>
Total on CTX (Sum HV03-03 to HV03-06)	HV03-07	<input type="text"/>		
3.2 Enrolled in Care				
Enrolled in Care - Below 1 year	HV03-08	<input type="text"/>		
Enrolled in Care - Below 15 years	HV03-09 (M)	<input type="text"/>		HV03-10 (F) <input type="text"/>
Enrolled in Care - 15 years & older	HV03-11 (M)	<input type="text"/>		HV03-12 (F) <input type="text"/>
Enrolled in Care - Total (Sum HV03-09 to HV03-12)	HV03-13	<input type="text"/>		
3.3 Currently in Care - (from the tally sheet- this month only and from last 2 months)				
Currently in Care - Below 1 year	HV03-14	<input type="text"/>		
Currently in Care - Below 15 years	HV03-15 (M)	<input type="text"/>		HV03-16 (F) <input type="text"/>
Currently in Care - 15 years & older	HV03-17 (M)	<input type="text"/>		HV03-18 (F) <input type="text"/>
Currently in Care - Total (Sum HV03-15 to HV03-18)	HV03-19	<input type="text"/>		
3.4 Starting ART				
Starting ART - Below 1 year	HV03-20	<input type="text"/>		
Starting ART - Below 15 years	HV03-21 (M)	<input type="text"/>		HV03-22 (F) <input type="text"/>
Starting ART - 15 years & older	HV03-23 (M)	<input type="text"/>		HV03-24 (F) <input type="text"/>
Starting ART - Total (Sum HV03-21 to HV03-24)	HV03-25	<input type="text"/>		
Starting - Pregnant	HV03-26	<input type="text"/>		
Starting - TB Patient	HV03-27	<input type="text"/>		
3.5 Revisits on ART (from the tally sheet- this month only and from last 2 months)				
Revisit on ART - Below 1 year	HV03-28	<input type="text"/>		
Revisit on ART - Below 15 years	HV03-29 (M)	<input type="text"/>		HV03-30 (F) <input type="text"/>
Revisit on ART - 15 years & older	HV03-31 (M)	<input type="text"/>		HV03-32 (F) <input type="text"/>
Total Revisit on ART (Sum HV03-29 to HV03-32)	HV03-33	<input type="text"/>		
3.6 Currently on ART [All] - (Add 3.4 and 3.5 e.g. HV03-34 = HV03-20 + HV03-28)				
Currently on ART - Below 1 year	HV03-34	<input type="text"/>		
Currently on ART - Below 15 years	HV03-35 (M)	<input type="text"/>		HV03-36 (F) <input type="text"/>
Currently on ART - 15 years & older	HV03-37 (M)	<input type="text"/>		HV03-38 (F) <input type="text"/>
Total Current on ART (Sum HV03-35 to HV03-38)	HV03-39	<input type="text"/>		
3.7 Cumulative Ever on ART				
Ever on ART - Below 15 years	HV03-40 (M)	<input type="text"/>		HV03-41 (F) <input type="text"/>
Ever on ART - 15 years & older	HV03-42 (M)	<input type="text"/>		HV03-43 (F) <input type="text"/>
Total Ever on ART (Sum HV03-40 to HV03-43)	HV03-44	<input type="text"/>		
3.8 Survival and Retention on ART at 12 months				
ART Net Cohort at 12 months	HV03-45	<input type="text"/>		
On Original 1st Line at 12 months	HV03-46	<input type="text"/>		
On alternative 1st Line at 12 months	HV03-47	<input type="text"/>		
On 2nd Line (or higher) at 12 months	HV03-48	<input type="text"/>		
On therapy at 12 months (Sum HV03-46 to HV03-48)	HV03-49	<input type="text"/>		
3.9 Screening				
Screened for TB - Below 15 years	HV03-50 (M)	<input type="text"/>		HV03-51 (F) <input type="text"/>
Screened for TB - 15 years & older	HV03-52 (M)	<input type="text"/>		HV03-53 (F) <input type="text"/>
Total Screened for TB (Sum HV03-50 to -53)	HV03-54	<input type="text"/>		
Screened for cervical cancer (F 18+)	HV03-55	<input type="text"/>		
3.10 Prevention with Positives				
Modern contraceptive methods	HV09-04	<input type="text"/>		
Provided with condoms	HV09-05	<input type="text"/>		
3.11 HIV Care Visits				
Females (18+)	Scheduled	<input type="text"/>		HV03-70 <input type="text"/>
	Unscheduled	<input type="text"/>		HV03-71 <input type="text"/>
Total visits (HV03-71 & -72)		<input type="text"/>		HV03-72 <input type="text"/>
4 Voluntary Medical Male Circumcision				
4.1 Number Circumcised				
0-14	HV04-01	Value <input type="text"/>		
15-24	HV04-02	<input type="text"/>		
25+	HV04-03	<input type="text"/>		
Total (Sum HV04-01 to HV04-03)	HV04-04	<input type="text"/>		
Total (Sum HV04-01 to HV04-02)	HV04-06	<input type="text"/>		
4.2 HIV Status (at circumcision)				
Positive	HV04-07	<input type="text"/>		
Negative	HV04-08	<input type="text"/>		
Unknown	HV04-09	<input type="text"/>		
4.3 Adverse Events (Circumcision)				
During -AE(s)- moderate	HV04-10	<input type="text"/>		
During -AE(s) - severe	HV04-11	<input type="text"/>		
Post-AE(s)- moderate	HV04-12	<input type="text"/>		
Post-AE(s) - severe	HV04-13	<input type="text"/>		
Total AE During (Sum HV04-10 & -11)	HV04-14	<input type="text"/>		
Total AE Post (Sum HV04-12 & -13)	HV04-15	<input type="text"/>		
5 Post-Exposure Prophylaxis				
5.1 Type of Exposure				
Occupational	HV05-01 (M)	<input type="text"/>		HV05-02 (F) <input type="text"/>
Sexual assault	HV05-03 (M)	<input type="text"/>		HV05-04 (F) <input type="text"/>
Other reasons	HV05-05 (M)	<input type="text"/>		HV05-06 (F) <input type="text"/>
Total	HV05-07	<input type="text"/>		
5.2 Provided with Prophylaxis				
Occupational	HV05-08 (M)	<input type="text"/>		HV05-09 (F) <input type="text"/>
Sexual assault	HV05-10 (M)	<input type="text"/>		HV05-11 (F) <input type="text"/>
Other reasons	HV05-12 (M)	<input type="text"/>		HV05-13 (F) <input type="text"/>
Total PEP	HV05-14	<input type="text"/>		
6 Blood Safety				
Donated blood units	HV06-01	<input type="text"/>		
Blood units screened for TTIs	HV06-02	<input type="text"/>		
Blood units reactive to HIV	HV06-05	<input type="text"/>		
Prepared By: (Name).....(Designation).....(Signed)..... Verified By: (Name).....(Designation).....(Signed).....				

Appendix 2: Creating report definitions template using curl command

Using a computer with Linux OS (client side), the report definition XML template can be downloaded using the curl command. This process has been tested using Linux operating system. The command does not have to be run on the server as long as the DHIS 2 server URL, username, and password are known. If using Windows (client side), the curl command will be more complex because xmllint is not well supported on Windows operating systems.

Curl command for DHIS 2 version 2.9 and below

Open the computer terminal and then enter the command below.

```
curl http://DHIS2username:DHIS2password@DHIS2url/api/metaData.xml?assumeTrue=false&categoryOptionCombos=true&dataElements=true&dataSets=true" | xsltproc dxf2template.xslt - |xmllint --format -> ReportTemplates.xml
```

This command will download report definition xml file and would require the file dxf2template.xslt on your local computer. The report template is transformed to the required format.

Note: Computer administrator privilege is required to download the file.

Curl command for DHIS 2 version 2.10 and above

Open the computer terminal and then enter the command below.

```
curl -u user:password -H "Accept: application/dsd+xml" http:// dhis2 URL/dev/api/dataSets >templatename.xml  
(Substitute user:password and the DHIS server URL with your own.)
```

Example

```
user@user-PC:~$ curl -u user:userpassword -H "Accept: application/dsd+xml" http://localhost:8080/dhis/api/dataSets >Report definition template.xml
```

This should download the report definition XML file in a format that does not require client side XSLT transformation.

During report definition download, progress report as shown below will be generated.

% Total	% Received	% Xferd	Average	Speed	Time	Time	Time	Current
	Dload	Upload	Total	Spent	Left	Speed		
100	6093	0	6093	0	0	819	0	--:--:-- 0:00:07 --:--:-- 1784

Once the report template is downloaded, open it in a text editor.

Sample report definition template downloaded using curl command.

```
<?xml version="1.0" encoding="UTF-8"?>
```

```

<reportTemplates xmlns:d2="http://dhis2.org/schema/dxf/2.0">
  <dataElements>
    <dataElement uid="vsYsrqWNYLr" code="PTS_IN" name="Number of patients in care" type="int"/>
    <dataElement uid="PNgDUAQCOqt" code="PTS_ARV" name="Number of patients on ARVs" type="int"/>
  </dataElements>
  <disaggregations>
    <disaggregation uid="hpfLXpfSCEE" code="hpfLXpfSCEE" name="(default)"/>
  </disaggregations>
  <reportTemplate>
    <name>Test Report</name>
    <uid>jmJbDaBUNV6</uid>
    <code>A1</code>
    <periodType>Monthly</periodType>
    <dataValueTemplates>
      <dataValueTemplate dataElement="PTS_ARV" disaggregation="hpfLXpfSCEE"/>
      <dataValueTemplate dataElement="PTS_IN" disaggregation="hpfLXpfSCEE"/>
    </dataValueTemplates>
  </reportTemplate>
</reportTemplates>

```

The report definition template has UID, codes, and names already in place. Save the report definition file to use later for mapping.

Appendix 3: Creating Report Definition Template Manually

Step 1: Adding data elements to the report definition template

1. Log into DHIS 2 then:
2. Go to :< dhis2site URL>/api/dataElements
i.e. Localhost: 8080/phic/api/dataElements
3. Search for the data element you need from the displayed list.
4. Click the **html** link for the data element you need to use.

A screenshot of a web browser showing the URL 106.187.93.155:8080/phic/api/dataElements. The page displays a list of data elements under the heading 'DataElements'. The list includes:

Data Element Name	html	xml	json	jsonp
Adult with BP >= 140/90 but less than 180/120 mmHg	html	xml	json	jsonp
Adult with BP < 140/90 mmHg	html	xml	json	jsonp
Adult with BP > 180/120 mmHg	html	xml	json	jsonp
Age 0 - 1 years	html	xml	json	jsonp

5. Assign the value of the ID, code, name, and type of that data element (based on the HTML shown) to the respective XML attributes.

A screenshot of a web browser showing the URL 106.187.93.155:8080/phic/api/dataElement. The page displays details for a specific data element under the heading 'History Of Diagnosis Of Hypertension'. The details are as follows:

ID	nkOlqRCq8J9
Last Updated	2012-10-11T15:54:45.120+0000
Code	HXHPN
Short Name	Hx of Dx of HPN
Type	int
Zero is Significant	true
Active	true
Aggregation Operator	sum
Domain Type	aggregate

In this example, history of hypertension ID is “nkOlqRCq8J9”, the code is “HXHPN”, the name is “*history of diagnosis of hypertension*” (you may shorten the name), and the type is “*int*”.

6. Using the sample code of the existing DHIS 2 report definition XML above, change the values in red color on the code below.

```
<dataElements>
  <dataElement uid="<ID>" code="<Code>" name="<name>" type="<Type>"/>
</dataElements>
```

The updated XML code for data element would be:

```
<dataElements>
  <dataElement uid="nkOlqRCq8J9" code="HXHPN" name="hx_hypertension" type="int" />
</dataElements>
```

7. If you would like to add more data elements in the template, simply add another data element tag inside the data elements section.

```
<dataElements>
  <dataElement uid="nkOlqRCq8J9" code="HXHPN" name="hx_hypertension" type="int"/>
  <dataElement uid="<ID>" code="<Code>" name="<name>" type="<Type>"/>
</dataElements>
```

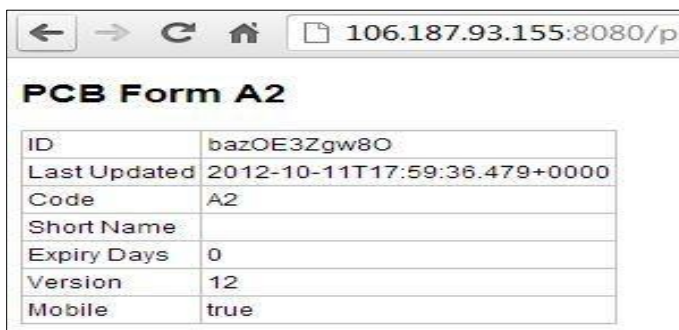
Step 2: Adding report data sets

1. Go to: <dhis2site URL>/api/dataSets
i.e. **localhost:8080/phic/api/dataSets**
2. Search for the data set that you need.
3. Click the **html** link opposite the preferred data element.



DataSets				
Immunizaton dataset	html	xml	json	jsonp
PCB Form A2	html	xml	json	jsonp
PCB Form A4	html	xml	json	jsonp
PCB Provider Clientele Profile	html	xml	json	jsonp
PHIC OPB Reporting	html	xml	json	jsonp

4. Assign the value of the ID, code, and name (based on the HTML shown) of the data set selected to the XML file.

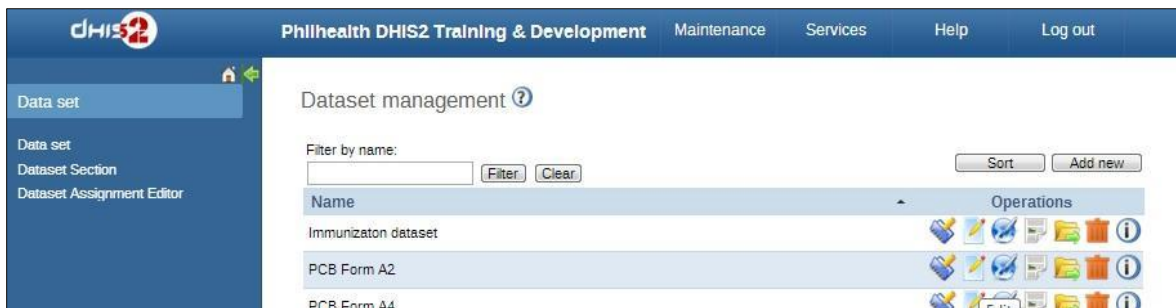


PCB Form A2	
ID	bazOE3Zgw8O
Last Updated	2012-10-11T17:59:36.479+0000
Code	A2
Short Name	
Expiry Days	0
Version	12
Mobile	true

5. To add Period Type:
 - a) Navigate to the DHIS 2 site.
 - b) Select **Maintenance** on the main menu, then scroll down to select **Datasets** on the dropdown list.
 - c) Select **Data set** on the data sets page.

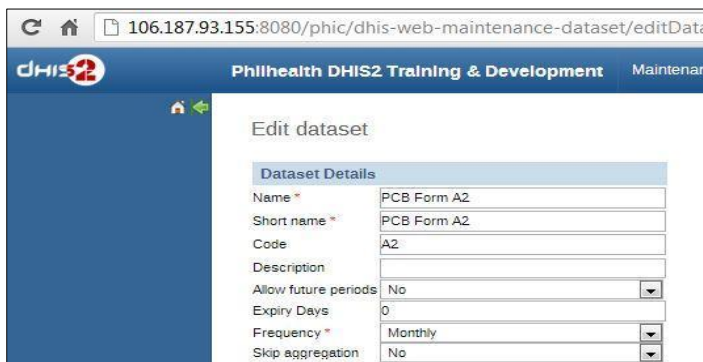


d) Click the **Edit** icon for the preferred dataset (i.e., edit for PCB Form A2) on the dataset management page.



e) Assign the value for the Frequency to the <periodType> (e.g., weekly, monthly, quarterly).

The dataset name and the code will also be in this page. However, on Edit dataset page, the UID is not available.



In this example, the report template for “PCB Form A2” is as follows:

- **Name** is “PCB Form A2”,
- **UID** is “bazOE3Zgw80” (from step 4 above),
- the **Code** is “A2”, and the
- **Period Type (Frequency)** is “Monthly”.

6. Using the sample code of the existing DHIS 2 report definition XML above, change the values in red color. The XML code for data element would be as shown below:

```
<reportTemplate>
  <name>PCB Form A2</name>
  <uid>bazOE3Zgw80</uid>
  <code>A2</code>
  <periodType>Monthly</periodType>
  <dataValueTemplates>
  </dataValueTemplates>
</reportTemplate>
```


7. If you would like to add more data sets in the template, simply add another report template tag inside the report templates section.

```
<reportTemplate>
  <name>PCB Form A2</name>
  <uid>bazOE3Zgw80</uid>
  <code>A2</code>
  <periodType>Monthly</periodType>
  <dataValueTemplates>
  </dataValueTemplates>
</reportTemplate>
<reportTemplate>
  <name><name></name>
  <uid><ID></uid>
  <code><code></code>
  <periodType><frequency></periodType>
  <dataValueTemplates>
  </dataValueTemplates>
</reportTemplate>
```

Final report definitions XML file

When all sections are put together, the report definitions XML file will be complete, as shown below.

```
<?xml version="1.0"?>
<reportTemplates xmlns:d2="http://dhis2.org/schema/dxf/2.0">
  <dataElements>
    <dataElement uid="nk01qRCq8J9" code="HXHPN" name="hx_hypertension" type="int"/>
  </dataElements>

  <disaggregations>
    <disaggregation uid="Gb0BGTbfg19" code="Gb0BGTbfg19" name="male_uncategorized_member"/>
  </disaggregations>

  <reportTemplate>
    <name>PCB Form A2</name>
    <uid>bazOE3Zgw80</uid>
    <code>A2</code>
    <periodType>Monthly</periodType>
    <dataValueTemplates>
      <dataValueTemplate dataElement="HXHPN" disaggregation="Gb0BGTbfg19">
        </dataValueTemplate>
    </dataValueTemplates>
  </reportTemplate>
</reportTemplates>
```

Save the complete report definition XML file in a folder that is accessible when mapping uid codes in IQTools.