DHIS2 End-user Manual



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DHIS2 Documentation Team

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About this guide

The DHIS2 documentation is a collective effort and has been developed by the development team and users. While the guide strives to be complete, there may be certain functionalities which have been omitted or which have yet to be documented. This section explains some of the conventions which are used throughout the document.

DHIS2 is a browser-based application. In many cases, screenshots have been included for enhanced clarity. Shortcuts to various functionalities are displayed such as "Maintenance->Data administration". The "->" character indicates that you should choose "Maintenance" and then click on "Data administration" in the menu which appears through the browser.

Different styles of text have been used to highlight important parts of the text or particular types of text, such as source code. Each of the conventions used in the document are explained below.



Note

A note contains additional information which should be considered or a reference to more information which may be helpful.

Tip

A tip can be a useful piece of advice, such as how to perform a particular task more efficiently.



Important

Important information should not be ignored, and usually indicates something which is required by the application.



Caution

Information contained in these sections should be carefully considered, and if not heeded, could result in unexpected results in analysis, performance, or functionality.



Warning

Information contained in these sections, if not heeded, could result in permanent data loss or affect the overall usability of the system.

```
Program listings usually contain some type of computer code.
They will be displayed with a shaded background and a different font.
```

Commands will be displayed in bold text, and represent a command which would need to be executed on the operating system or database.

Links to external web sites or cross references will be displayed in blue text, and underlined like this..

Bibliographic references will displayed in square brackets like this [Store2007]. A full reference can be found in the bibliography contained at the end of this document.

Chapter 1. Getting started with DHIS2

1.1. Using the DHIS2 demo server

The DHIS2 team maintains a demonstration server at https://play.dhis2.org/demo. This is by far the easiest way to try out DHIS2. Simply open the link in your web browser and login with username = admin and password = district.

Note

All changes on this server are deleted each night, so do not save any important work on this server. It is strictly for demonstration purposes on only!

1.2. Using the DHIS2 live package

1.2.1. Starting the DHIS2 Live package

The DHIS2 Live package is the easiest way to get started with DHIS2 on your local computer. DHIS2 Live is appropriate for a stand-alone installation and demos. Simply download the application from here. Once the file is downloaded, you can simply double-click the downloaded file, and get started using DHIS2.

1.2.1.1. Prerequisites for DHIS2 Live

You must be sure that you have a current version of the Java Runtime installed on your machine. Depending on your operating system, there are different ways of installing Java. The reader is referred to this website for detailed information on getting Java installed.

1.2.1.2. Starting up with a blank database

The live package comes with a demo database just like what you see on the online demo (which is based on the national Sierra Leone HMIS), and if you want to start with a blank system/ database and build up your own system then you need to do the following:

1) Stop DHIS2 live if it is already running. Right click on the tray icon and select Exit. The tray icon is the green symbol on the bottom right of your screen (on Windows) which should say' DHIS2 Server running' when you hover your mouse pointer over the icon.

2) Open the folder where the DHIS2 live package is installed and locate the folder called "conf".

3) In conf/ open the file called 'hibernate.properties' in a text editor (notepad or similar) and do the following modification: locate the string 'jdbc:h2:./database/dhis2' and replace the 'dhis2' part with any name that you want to give to your database (e.g. dhis2_test).

4) Save and close the hibernate.properties file.

5) Start DHIS2 Live by double-clicking on the file dhis2-live.exe in the DHIS2 Live installation folder or by using a desktop shortcut or menu link that you might have set up.

6) Wait for the browser window to open and the login screen to show, and then log in with username: admin and password: district

7) Now you will see a completely empty DHIS2 system and you should start by adding your users, organisational hierarchy, data elements, and datasets etc. Please refer to the other sections of the user manual for instructions on how to do this.

1.2.2. Downloading and installing the server version

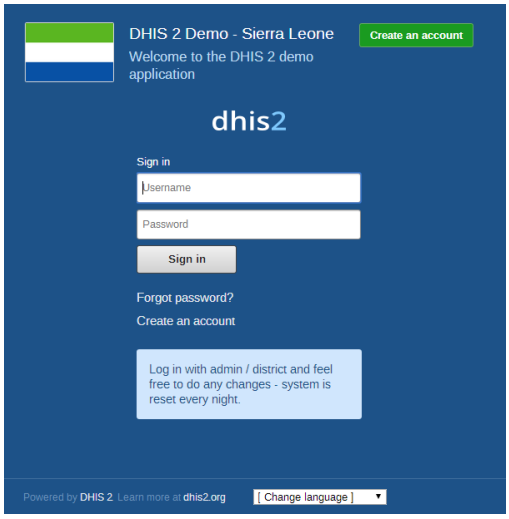
The latest stable server version can be downloaded from this website. For detailed information on how to install it please refer to the installation chapter in the implementation manual.

1.3. Logging on to DHIS2

Regardless of whether you have installed the server version of the desktop Live version, you will use a web-browser to log on to the application. DHIS2 should be compatible with most modern web-browsers, although you will need to ensure that Java Script is enabled.

To log on to the application just enter http://localhost:8080/dhis if you are using the DHIS2 live package, or replace `localhost` with the name or IP address of the server where the server version is installed.

Once you have started DHIS2, either on-line or off-line, the displayed screen will prompt you to enter your registered user-name and password. After entering the required information click on log-in button to log into the application. The default user name and password are 'admin' and 'district'. They should be changed immediately upon logging on the first time.



You can select the language which you wish to display DHIS2 in from the "Change language" dialog box at the bottom of the screen. Not all languages may be available.

Should you have forgotten your password, you can click on the "Forgot password?" link. You must have informed DHIS2 of your email address and the server must be properly configured to send emails.

If you want to create your own account (and the server administrator allows this), simply click "Create an account" and follow the directions provided.

Once you have logged into DHIS2, refer to the specific sections in this manual for the different functionality which is available.

1.4. Logging out of DHIS2

Just click on the Profile and the click "Log out" the top-right corner of the DHIS2 menu.

1.5. Quick intro to designing a DHIS2 database

DHIS2 provides a powerful set of tools for data collection, validation, reporting and analysis, but the contents of the database, e.g. what to collect, who should collect it and on what format will depend on the context of use. However, in order to do anything with DHIS2, you must first create meta-data. Meta-data, or data about the data, describes what should be collected (data elements and categories), where it should be collected (organisation units) and how frequently it should be collected (periods). This meta-data needs to be created in the DHIS2 database before it can be used. This can be done through the user interface and requires no programming or in-depth technical skills of the software, but does require a good understanding of the processes which you are trying to collect data form.

This section will provide a very quick and brief introduction to DHIS2 database design and mainly explain the various steps needed to prepare a new DHIS2 system for use. How to do each step is explained in other chapters, and best practices on design choices will be explained in the implementers manual. Here are the steps to follow:

1. Set up an organisational hierarchy
2. Define data elements
3. Define data sets and data entry forms
4. Define validation rules
5. Define indicators
6. Define report tables and design reports
7. Set up the GIS module
8. Design charts and customise the dashboard

1.5.1. The organisational hierarchy

The organisational hierarchy defines the organisation using the DHIS2, the health facilities, administrative areas and other geographical areas used in data collection and data analysis. This dimension to the data is defined as a hierarchy with one root unit (e.g. Ministry of Health) and any number of levels and nodes below. Each node in this hierarchy is called an organisational unit in DHIS2.

The design of this hierarchy will determine the geographical units of analysis available to the users as data is collected and aggregated in this structure. There can only be one organisational hierarchy at the same time so its structure needs careful consideration. Additional hierarchies (e.g. parallel administrative groupings such as "Facility ownership") can be modelled using organisational groups and group sets, however the organisational hierarchy is the main vehicle for data aggregation on the geographical dimension. Typically national organisational hierarchies in public health have 4-6 levels, but any number of levels is supported. The hierarchy is built up of parent-child relations, e.g. a Country or MoH unit (the root) might have e.g. 8 parent units (provinces), and each province again (at level 2) might have 10-15 districts as their children. Normally the health facilities will be located at the lowest level, but they can also be located at higher levels, e.g. national or provincial hospitals, so skewed organisational trees are supported (e.g. a leaf node can be positioned at level 2 while most other leaf nodes are at level 5).

Typically there is a geographical hierarchy defined by the health system. e.g. where the administrative offices are located (e.g. MoH, province, district), but often there are other administrative boundaries in the country that might or might not be added, depending on how its boundaries will improve data analysis. When designing the hierarchy the number of children for any organisational unit may indicate the usefulness of the structure, e.g. having one or

more 1-1 relationships between two levels is not very useful as the values will be the same for the child and the parent level. On the other extreme a very high number of children in the middle of the hierarchy (e.g. 50 districts in a province) might call for an extra level to be added in between to increase the usefulness of data analysis. The lowest level, the health facilities will often have a large number of children (10-60), but for other levels higher up in the hierarchy approx. 5-20 children is recommended. Too few or too many children might indicate that a level should be removed or added.

Note that it is quite easy to make changes to the upper levels of the hierarchy at a later stage, the only problem is changing organisational units that collect data (the leaf nodes), e.g. splitting or merging health facilities. Aggregation up the hierarchy is done based on the current hierarchy at any time and will always reflect the most recent changes to the organisational structure. Refer to the chapter on Organisation Units to learn how to create organisational units and to build up the hierarchy.

1.5.2. Data Elements

The Data Element is perhaps the most important building block of a DHIS2 database. It represents the "WHAT" dimension, it explains what is being collected or analysed. In some contexts this is referred to an indicator, but in DHIS2 we call this unit of collection and analysis a data element. The data element often represents a count of something, and its name describes what is being counted, e.g. "BCG doses given" or "Malaria cases". When data is collected, validated, analysed, reported or presented it is the data elements or expressions built upon data elements that describes the WHAT of the data. As such the data elements become important for all aspects of the system and they decide not only how data is collected, but more importantly how the data values are represented in the database, which again decides how data can be analysed and presented.

It is possible to add more details to this "WHAT" dimension through the disaggregation dimension called data element categories. Some common categories are Age and Gender, but any category can be added by the user and linked to specific data elements. The combination of a data element's name and its assigned category defines the smallest unit of collection and analysis available in the system, and hence describes the raw data in the database. Aggregations can be done when zooming out of this dimension, but no further drill-down is possible, so designing data elements and categories define the detail of the analysis available to the system (on the WHAT dimension). Changes to data elements and categories at a later stage in the process might be complicated as these will change the meaning of the data values already captured in the database (if any). So this step is one of the more decisive and careful steps in the database design process.

One best practice when designing data elements is to think of data elements as a unit of data analysis and not just as a field in the data collection form. Each data element lives on its own in the database, completely detached from the collection form, and reports and other outputs are based on data elements and expressions/formulas composed of data elements and not the data collection forms. So the data analysis needs should drive the process, and not the look an feel of the data collection forms. A simple rule of thumb is that the name of the data element must be able to stand on its own and describe the data value also outside the context of its collection form. E.g. a data element name like "Total referrals" makes sense when looking at it in either the "RCH" form or the "OPD" form, but on its own it does not uniquely describe the phenomena (who are being referred?), and should in stead be called "Total referrals from Maternity" or "Total referrals from OPD". Two different data elements with different meanings, although the field on the paper form might only say "Total referrals" since the user of the form will always know where these referrals come from. In a database or a repository of data elements this context is no longer valid and therefore the names of the data elements become so important in describing the data.

Common properties of data elements can be modelled through what is called data element groups. The groups are completely flexible in the sense that they are defined by the user,

both their names and their memberships. Groups are useful both for browsing and presenting related data, but can also be used to aggregate data elements together. Groups are loosely coupled to data elements and not tied directly to the data values which means they can be modified and added at any point in time without interfering with the raw data.

1.5.3. Datasets and data entry forms

All data entry in DHIS2 is organised through the use of Datasets. A Dataset is a collection of data elements grouped together for data collection, and in the case of distributed installs they also define chunks of data for export and import between instances of DHIS2 (e.g. from a district office local installation to a national server). Datasets are not linked directly to the data values, only through their data elements and frequencies, and as such a dataset can be modified, deleted or added at any point in time without affecting the raw data already captured in the system, but such changes will of course affect how new data will be collected.

A dataset has a period type which controls the data collection frequency, which can be daily, weekly, monthly, quarterly, six-monthly, or yearly. Both which data elements to include in the dataset and the period type is defined by the user, together with a name, short name, and code.

In order to use a dataset to collect data for a specific orgunit you must assign the orgunit to the dataset, and this mechanism controls which orgunits that can use which datasets, and at the same time defines the target values for data completeness (e.g. how many health facilities in a district expected to submit RCH data every month).

A data element can belong to multiple datasets, but this requires careful thinking as it may lead to overlapping and inconstant data being collected if e.g. the datasets are given different frequencies and are used by the same orgunits.

1.5.3.1. Data entry forms

Once you have assigned a dataset to an orgunit that dataset will be made available in Data Entry (under Services) for the orgunits you have assigned it to and for the valid periods according to the dataset's period type. A default data entry form will then be shown, which is simply a list of the data elements belonging to the dataset together with a column for inputting the values. If your dataset contains data elements with categories such as age groups or gender, then additional columns will be automatically generated in the default form based on the categories. In addition to the default list-based data entry form there are two more alternatives, the section-based form and the custom form.

1.5.3.1.1. Section forms

Section forms allow for a bit more flexibility when it comes to using tabular forms and are quick and simple to design. Often your data entry form will need multiple tables with subheadings, and sometimes you need to disable (grey out) a few fields in the table (e.g. some categories do not apply to all data elements), both of these functions are supported in section forms. After defining a dataset you can define it's sections with subsets of dataelements, a heading and possible grey fields i the section's table. The order of sections in a dataset can also be defined. In Data Entry you can now start using the Section form (should appear automatically when sections are available for the selected dataset). You can switch between default and section forms in the top right corner of the data entry screen. Most tabular data entry forms should be possible to do with sections forms, and the more you can utilise the section forms (or default forms) the easier it is for you. If these two types of forms are not meeting your requirements then the third option is the completely flexible, although more time-consuming, custom data entry forms.

1.5.3.1.2. Custom Forms

When the form you want to design is too complicated for the default or section forms then your last option is to use a custom form. This takes more time, but gives you full flexibility in

term of the design. In DHIS2 there is a built in HTML editor (FcK Editor) for the form designer and you can either design the form in the UI or paste in your HTML directly using the Source window in the editor. In the custom form you can insert static text or data fields (linked to data elements + category) in any position on the form and you have complete freedom to design the layout of the form. Once a custom form has been added to a dataset it will be available in data entry and used automatically. You can switch back to default and section (if exists) forms in the top right corner of the data entry screen.

1.5.4. Validation rules

Once you have set up the data entry part of the system and started to collect data then there is time to define data quality checks that help to improve the quality of the data being collected. You can add as many validation rules as you like and these are composed of left and right side expressions that again are composed of data elements, with an operator between the two sides. Typical rules are comparing subtotals to totals of something. E.g. if you have two data elements "HIV tests taken" and "HIV test result positive" then you know that in the same form (for the same period and organisational unit) the total number of tests must always be equal or higher than the number of positive tests. These rules should be absolute rules meaning that they are mathematically correct and not just assumptions or "most of the time correct". The rules can be run in data entry, after filling each form, or as a more batch like process on multiple forms at the same time, e.g. for all facilities for the previous reporting month. The results of the tests will list all violations and the detailed values for each side of the expression where the violation occurred to make it easy to go back to data entry and correct the values.

1.5.5. Indicators

Indicators represent perhaps the most powerful data analysis feature of the DHIS2. While data elements represent the raw data (counts) being collected the indicators represent formulas providing coverage rates, incidence rates, ratios and other formula-based units of analysis. An indicator is made up of a factor (e.g. 1, 100, 100, 100 000), a numerator and a denominator, the two latter are both expressions based on one or more data elements. E.g. the indicator "BCG coverage <1 year" is defined a formula with a factor 100, a numerator ("BCG doses given to children under 1 year") and a denominator ("Target population under 1 year"). The indicator "DPT1 to DPT3 drop out rate" is a formula of 100 % x ("DPT1 doses given"- "DPT3 doses given") / ("DPT1 doses given").

Most report modules in DHIS2 support both data elements and indicators and you can also combine these in custom reports, but the important difference and strength of indicators versus raw data (data element's data values) is the ability to compare data across different geographical areas (e.g. highly populated vs rural areas) as the target population can be used in the denominator.

Indicators can be added, modified and deleted at any point in time without interfering with the data values in the database.

1.5.6. Report tables and reports

Standard reports in DHIS2 are a very flexible way of presenting the data that has been collected. Data can be aggregated by any organisational unit or orgunit level, by data element, by indicators, as well as over time (e.g. monthly, quarterly, yearly). The report tables are custom data sources for the standard reports and can be flexibly defined in the user interface and later accessed in external report designers such as iReport or through custom HTML reports. These report designs can then be set up as easily accessible one-click reports with parameters so that the users can run the same reports e.g. every month when new data is entered, and also be relevant to users at all levels as the organisational unit can be selected at the time of running the report.

1.5.7. GIS

In the integrated GIS module you can easily display your data on maps, both on polygons (areas) and as points (health facilities), and either as data elements or indicators. By providing the coordinates of your organisational units to the system you can quickly get up to speed with this module. See the GIS section for details on how to get started.

1.5.8. Charts and dashboard

On of the easiest way to display your indicator data is through charts. An easy to use chart dialogue will guide you through the creation of various types of charts with data on indicators, organisational units and periods of your choice. These charts can easily be added to one of the four chart sections on your dashboard and there be made easily available right after log in. Make sure to set the dashboard module as the start module in user settings.

Chapter 2. Using the Data Entry app

2.1. About the Data Entry app

The Data Entry app is where you manually enter aggregated data in DHIS2. You register data for an organisation unit, a period, and a set of data elements (data set) at a time. A data set often corresponds to a paper-based data collection tool. You configure the data sets in the Maintenance app.

A data set can have both section and custom forms

If a data set has both a section form and a custom form, the system displays the custom form during data entry. Users who enter data can't select which form they want to use. In web-based data entry the order of display preference is:

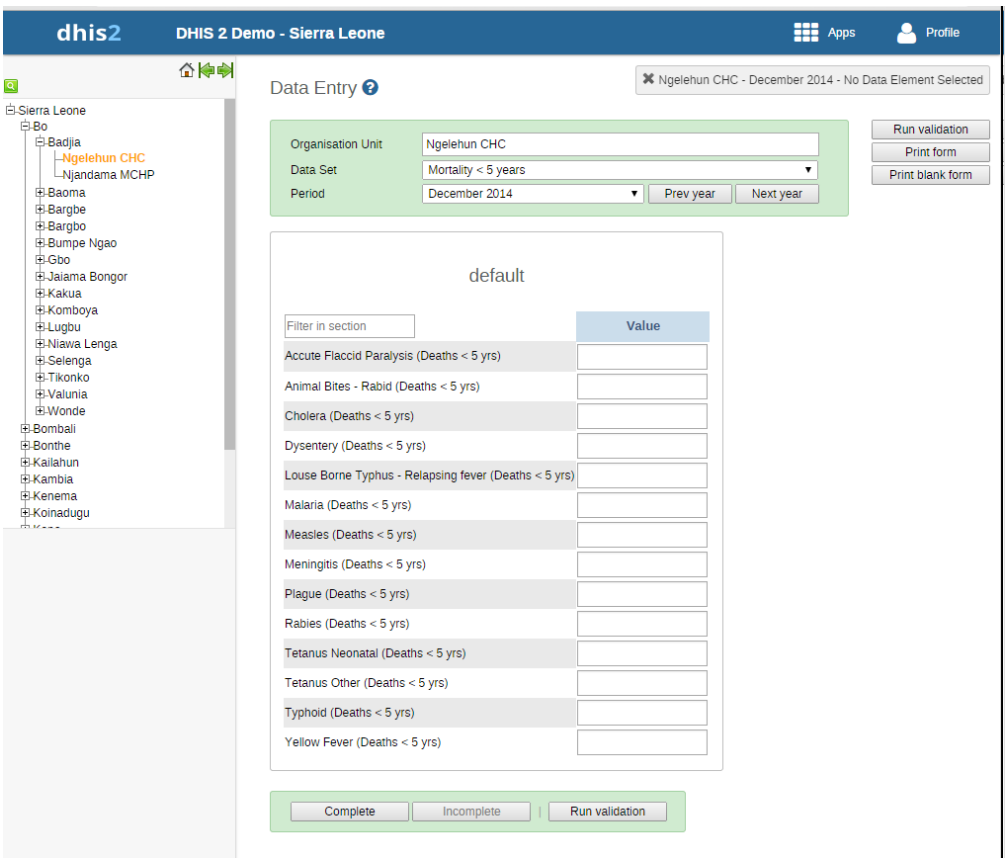
1. Custom form (if it exists)
2. Section form (if it exists)
3. Default form

Mobile devices do not support custom forms. In mobile-based data entry the order of display preference is:

1. Section form (if it exists)
2. Default form

When you close an organisation unit, you can't register or edit data to this organisation unit in the Data Entry app.

2.2. Enter data in a data entry form



1. Open the Data Entry app.
2. In the organisation unit tree to the left, select an organisation unit.
3. Select a Data set.
4. Select a Period.

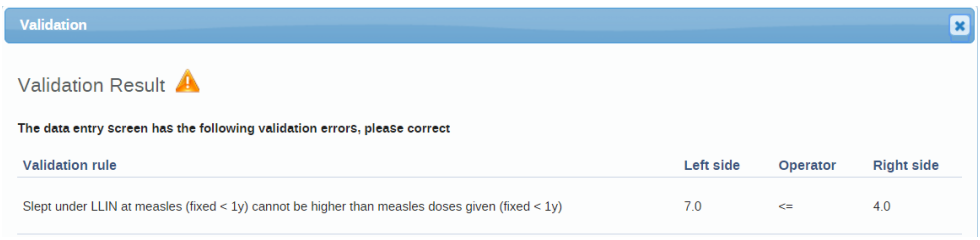
   The available periods are controlled by the period type of the data set (reporting frequency). You can jump a year back or forward by clicking Prev year or Next year.

   ### Note

   Depending on how you've configured the data entry form, you might have to enter additional information before you can open the date entry form. This can for example be a project derived from a category combination.

5. Enter data in the data entry form.
   - A green field means that the system has saved the value.
   - A grey field means that the field is disabled and you can't enter a value. The cursor will automatically jump to the next open field.
   - To move to the next field, press the Tab key or the Down Arrow key.
   - To move back to the previous field, press Shift+Tab or the Up Arrow key.
   - If you type in an invalid value, for example a character in a field that only accepts numeric values, you'll get a pop-up that explains the problem and the field will be coloured yellow (not saved) until you have corrected the value.
   - If you have defined a minimum maximum value range for the field and you enter a value that is outside this range, you'll get a pop-up message that says the value is out of range. The value remains unsaved until you've changed the value or updated the value range and then re-entered the value.
6. When you've filled in the form, click Run validation in the top right corner or below the data entry form.

   All validation rules which involves data elements in the current data entry form (data set) are then run against the new data. If there are no violations of the validation rules, you'll see a message saying The data entry screen successfully passed validation. If there are validation violations, they will be presented in a list.



7. (Optional) Correct validation violations.

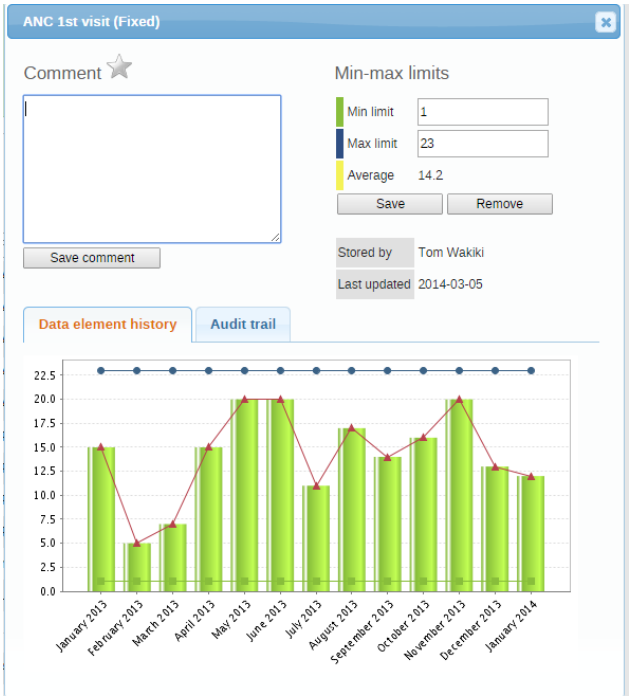
   ### Note

   Zero (0) will delete the value if the data element has been configured to not store zeros.

8. When you've corrected errors and you're done with data entry, click Complete.

   The system uses this information when generating completeness reports for district, county, province or the national level.

2.3. Mark a data value for follow-up



If you for example have a suspicious value that you need to investigate further, you can keep it the system, but mark it for follow-up. In the Data Quality app you can then run a follow-up analysis to view and correct all marked values.

1. Open the Data Entry app.
2. Open an existing data entry form.
3. Double-click the field with the value you want to mark for follow-up.
4. Click the star icon.

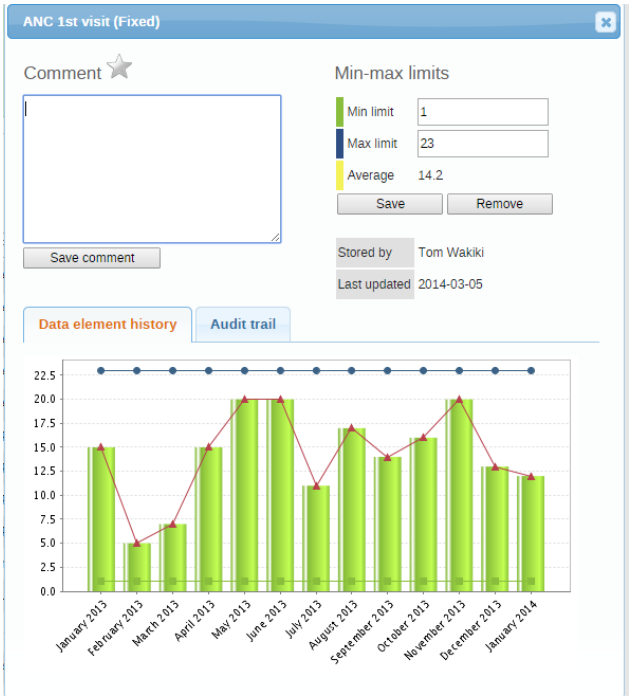
2.4. Edit data values in a completed data entry form

1. Open the Data Entry app.
2. Open an existing data entry form.
3. Click Incomplete.
4. Change the relevant data values.

> **Note**
>
> Zero (0) will delete the value if the data element has been configured to not store zeros,

5. Click Complete.

2.5. Display a data value's history



You can display the last 12 values registered for a field.

1. Open the Data Entry app.
2. Open an existing data entry form.
3. Double-click the field with the value you want to view the history for.
4. Click Data element history.

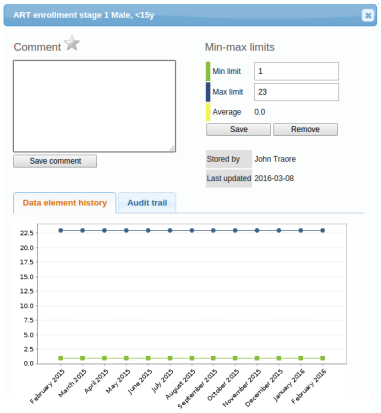
2.6. Display a data value's audit trail



The audit trail allows you to view other data values which have been entered prior to the current value. The audit trail also shows when the data value was altered and which user who made the changes.

1. Open the Data Entry app.
2. Open an existing data entry form.
3. Double-click the field with the value you want to view the audit trail for.
4. Click Audit trail.

2.7. Create minimum maximum value range manually



1. In the Data Entry app, open a data entry form.
2. Double-click the field for which you want to set the minimum maximum value range.
3. Enter Min limit and Max limit.
4. Click Save.

   If values don't fall within the new value range the next time you enter data, the data entry cell will appear with an orange background.
5. (Optional) Type a comment to explain the reason for the discrepancy, for example an event at a facility which may have generated a large number of clients.
6. (Optional) Click Save comment.

Tip

Click the star icon to mark the value for further follow-up.

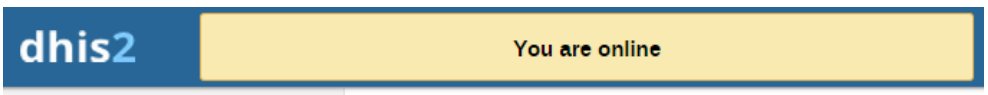
2.8. Enter data offline

The Data Entry app works even if you don't have a stable Internet connection during data entry. When you don't have an internet connection, the data you enter is saved to your local computer. When the Internet connection is back, the app will push the data to the server. The total bandwidth usage is reduced since data entry forms no longer are retrieved from the server for each rendering.

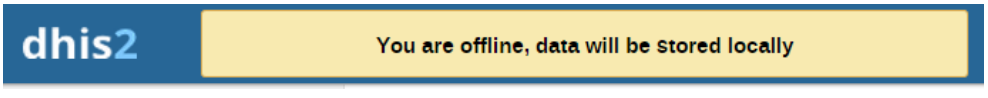
Note

To use this functionality, you must login to the server while you've an Internet connection.

- When you're connected to the Internet, the app displays this message at the top of the data entry form:

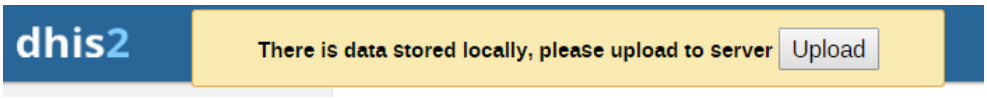


- If your Internet connection breaks during data entry, the app detects it and displays this message:



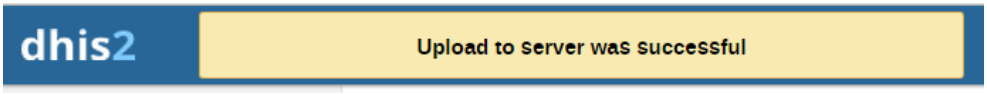
Now your data will be stored locally. You can continue to enter data as normal.

- Once you have entered all necessary data and the app detects that the Internet connection is back, you'll see this message:

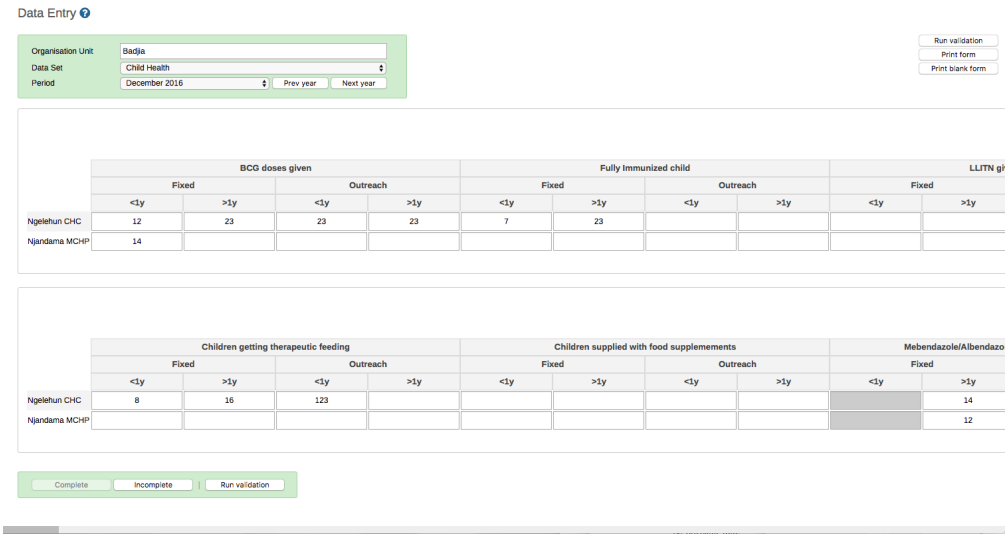


Click Upload to synchronize data with the server.

- When the data has successfully synchronized with the server, you'll see this confirmation message:



2.9. Enable multi-organisation unit data entry



It can be useful to enter data for multiple organisation units in the same data entry form, for instance if there are few data elements in the form and a huge number of organisation units in the hierarchy. In that case, you can enable multi-organisation unit data entry.

Note

Multi-organisation unit data entry only works for section forms.

1. Open the System Settings app.
2. Select Enable multi-organisation unit forms.
3. In the Data Entry app, select the organisation unit immediately above the organisation unit you want to enter data for in the organisation unit hierarchy.

   Data elements will appear as columns and organisation units as rows in the form.

Note

The data entry forms should still be assigned to the facilities that you actually enter data for, that is the organisation units now appearing in the form.

2.10. See also

- Control data quality
- Manage data sets and data entry forms
- Using the Maintenance app

Chapter 3. Control data quality

3.1. About data quality checks

The Data Quality app contains tools to validate the accuracy and reliability of the data in the system. You can verify the data quality with the help of validation rules and various statistical checks. Data quality has different dimensions including:

Dimension	Description
Correctness	Data should be within the normal range for data collected at that facility. There should be no gross discrepancies when compared with data from related data elements.
Completeness	Data for all data elements for all reporting organisation units should have been submitted.
Consistency	Data should be consistent with data entered during earlier months and years while allowing for changes with reorganization, increased work load, etc. and consistent with other similar facilities.
Timeliness	All data from all reporting organisation units should be submitted at the appointed time.

You can verify data quality in different ways, for example:

- At point of data entry, DHIS2 can check the data entered to see if it falls within the minimum maximum value ranges of that data element (based on all previous data registered).
- By defining validation rules, which can be run once the user has finished data entry. The user can also check the entered data for a particular period and organization unit(s) against the validation rules, and display the violations for these validation rules.
- By analysing data sets, that is, examine gaps in the data.
- By data triangulation, that is, comparing the same data or indicator from different sources.

3.2. Validation rule analysis

3.2.1. About validation rule analysis

A validation rule is based on an expression which defines a relationship between data element values. The expression forms a condition which should assert that certain logical criteria are met.

The expression consist of:

- a left side
- a right side
- an operator

Example 3.1.

A validation rule could assert that "Suspected malaria cases tested" >= "Confirmed malaria cases".

The validation rule analysis tests validation rules against the data registered in the system. Validation violations are reported when the condition defined in the validation rule expression is not met, which means when the condition is false.

You can configure a validation rule analysis to automatically send out information about validation violations to selected user groups. These messages are called validation notifications and you create them in the Maintenance app. Validation notifications are sent via the internal DHIS2 messaging system.

3.2.2. Workflow

1. In the Maintenance app, create validation rules and validation rule groups.
2. (Optional) In the Maintenance app, create validation notifications.
3. Run the validation rule analysis, either automatically or manually.
   - In the Data Administration app, you schedule the validation rule analysis to run automatically for all validation rules included in one or several validation notifications. After the system has run the analysis, you'll see the validation violations (if any) in the validation notifications sent via the internal DHIS2 messaging system.
   - In the Data Quality app, you run the validation rule analysis manually for selected validation rules. After the analysis process has finished, you'll see a list of validation violations (if any).

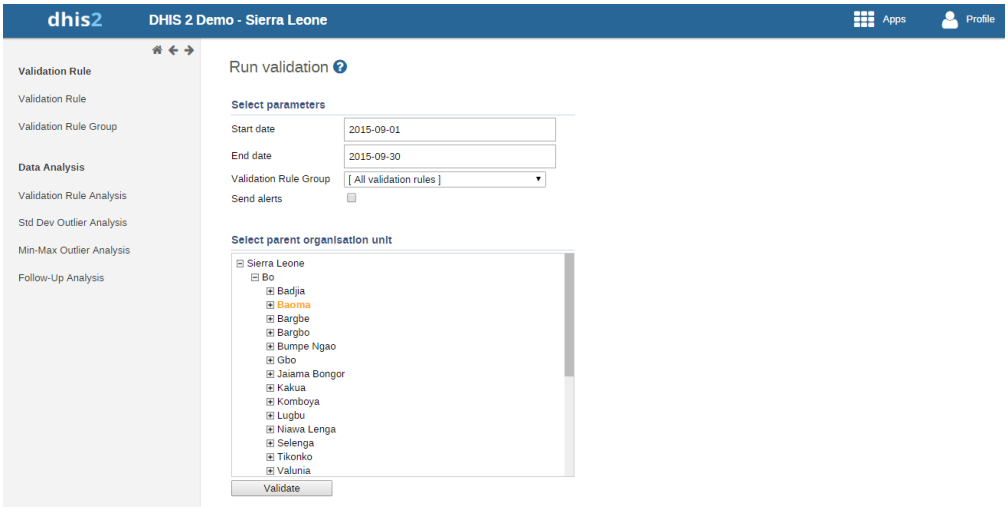
3.2.3. Schedule a validation rule analysis to run automatically

Note

Only validation rules that are included in one or several validation notifications will be a part of the validation rule analysis. If there's no corresponding validation notification for a validation rule, the system has nowhere to send the validation violations.

1. Verify that you have created all the validation rules, validation rule groups and validation notifications you need.
2. Open the Data Administration app and click Scheduling.
3. If scheduling is active, click Stop.
4. In the Data monitoring section, select All daily.
5. Click Start.

3.2.4. Run a validation rule analysis manually

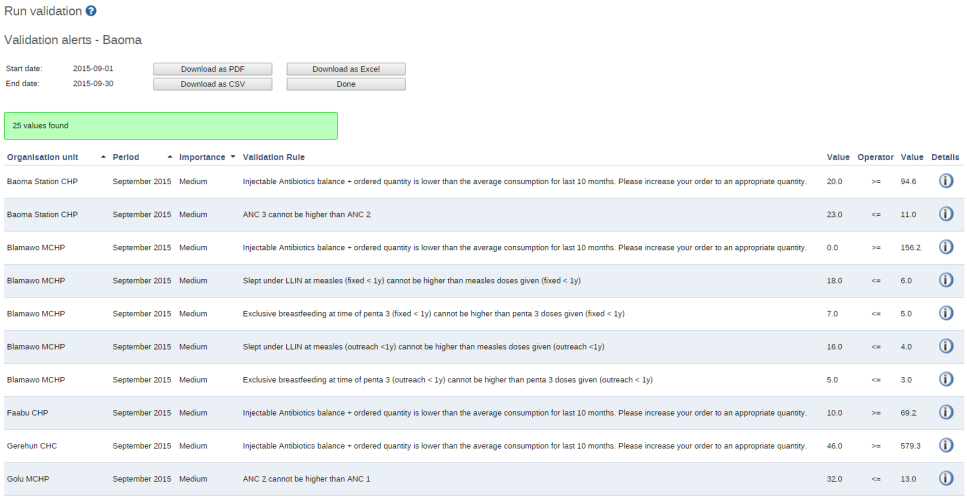


1. Verify that you have created all the validation rules, validation rule groups and validation notifications you need.
2. Open the Data Quality app and click Validation rule analysis.
3. Select Start date and End date.
4. Select which Validation rule group you want to include in the analysis.

   You can select all validation rules or all validation rules from a single validation rule group.
5. (Optional) Select Send notifications to trigger validation notifications.

   > **Note**
   >
   > If you want to send out validation notifications, you must first create them in the Maintenance app.
6. Select a Parent organisation unit.
7. Click Validate.

   The analysis process duration depends on the amount of data that is being analysed. If there are no violations of the validation rules, you'll see a message saying Validation passed successfully. If there are validation violations, they will be presented in a list.


Run validation

Validation alerts - Baoma

Start date: 2015-09-01 Download as PDF Download as Excel
End date: 2015-09-30 Download as CSV Done

25 values found

Organisation unit	Period	Importance	Validation Rule	Value	Operator	Value	Details
Baoma Station CHP	September 2015	Medium	Injectable Antibiotics balance + ordered quantity is lower than the average consumption for last 10 months. Please increase your order to an appropriate quantity.	20.0	>=	94.6	
Baoma Station CHP	September 2015	Medium	ANC 3 cannot be higher than ANC 2	23.0	<=	11.0	
Blamawo MCHP	September 2015	Medium	Injectable Antibiotics balance + ordered quantity is lower than the average consumption for last 10 months. Please increase your order to an appropriate quantity.	0.0	>=	156.2	
Blamawo MCHP	September 2015	Medium	Slept under LLIN at measles (fixed < 1y) cannot be higher than measles doses given (fixed < 1y)	18.0	<=	6.0	
Blamawo MCHP	September 2015	Medium	Exclusive breastfeeding at time of penta 3 (fixed < 1y) cannot be higher than penta 3 doses given (fixed < 1y)	7.0	<=	5.0	
Blamawo MCHP	September 2015	Medium	Slept under LLIN at measles (outreach <1y) cannot be higher than measles doses given (outreach <1y)	16.0	<=	4.0	
Blamawo MCHP	September 2015	Medium	Exclusive breastfeeding at time of penta 3 (outreach < 1y) cannot be higher than penta 3 doses given (outreach < 1y)	5.0	<=	3.0	
Faabu CHP	September 2015	Medium	Injectable Antibiotics balance + ordered quantity is lower than the average consumption for last 10 months. Please increase your order to an appropriate quantity.	10.0	>=	69.2	
Gerehun CHC	September 2015	Medium	Injectable Antibiotics balance + ordered quantity is lower than the average consumption for last 10 months. Please increase your order to an appropriate quantity.	46.0	>=	579.3	
Golu MCHP	September 2015	Medium	ANC 2 cannot be higher than ANC 1	32.0	<=	13.0	

8. (Optional) Click the show details icon to get more information about a validation violation. In the pop-up window you'll find information about the data elements included in the validation rules and their corresponding data values. You can use this information to identify the source of the validation rule violation.
9. (Optional) Click Download as PDF, Download as Excel or Download as CSV to download the validation violations list in PDF, Excel or CSV formats.

3.2.5. See also

- Manage validation rules
- Data Administration app

3.3. Standard deviation outlier analysis

3.3.1. About standard deviation outlier analysis

The standard deviation outlier analysis identifies values that are numerically distant from the rest of the data. The analysis is based on the standard normal distribution. The system

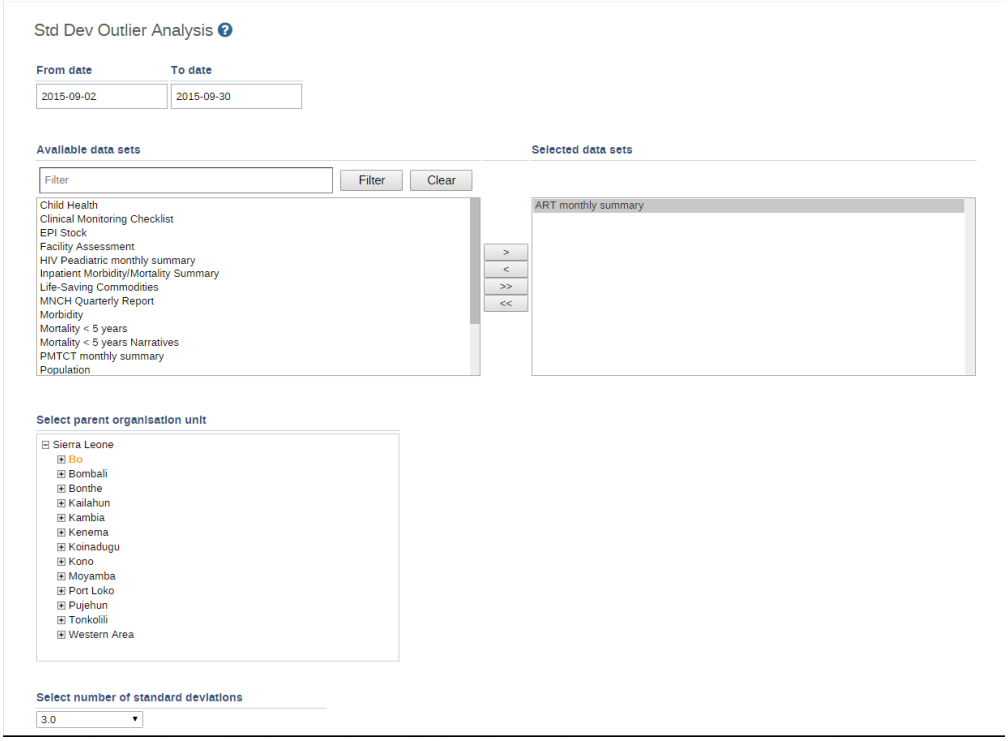
calculates the average, based on values since the beginning of time, for one particular combination of organisation unit, data element, category option combination and attribute option combination. Outliers can occur by chance but often indicate a measurement error or a heavy-tailed distribution which leads to very high numbers. You should investigate measurement errors and try to correct them before you discard them from the analysis.

Warning

It's not recommended to use tools or interpretations that assume a normal distribution for heavy-tailed distributions.

For example: the standard deviation outlier analysis is not an appropriate tool when you expect huge seasonal variations in the data.

3.3.2. Run a standard deviation outlier analysis



1. Open the Data Quality app and click Std dev outlier analysis.
2. Select From date and To date.
3. Select data set(s).
4. Select Parent organisation unit.

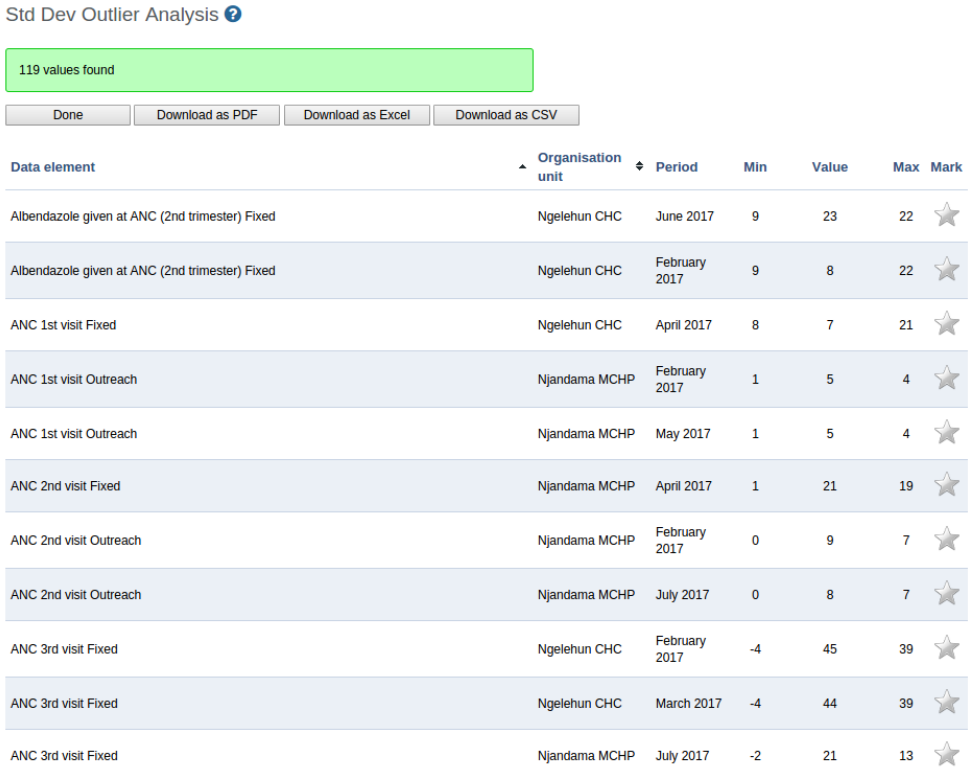
   All children of the organisation unit will be included. The analysis is made on raw data "under" the parent organisation unit, not on aggregated data.

5. Select a number of standard deviations.

   This refers to the number of standard deviations the data is allowed to deviate from the mean before it is classified as an outlier.

6. Click Start.

   The analysis process duration depends on the amount of data that is being analysed. If there are standard deviations outliers, they will be presented in a list.


Std Dev Outlier Analysis

119 values found

Done | Download as PDF | Download as Excel | Download as CSV

Data element	Organisation unit	Period	Min	Value	Max	Mark
Albendazole given at ANC (2nd trimester) Fixed	Ngelehun CHC	June 2017	9	23	22	
Albendazole given at ANC (2nd trimester) Fixed	Ngelehun CHC	February 2017	9	8	22	
ANC 1st visit Fixed	Ngelehun CHC	April 2017	8	7	21	
ANC 1st visit Outreach	Njandama MCHP	February 2017	1	5	4	
ANC 1st visit Outreach	Njandama MCHP	May 2017	1	5	4	
ANC 2nd visit Fixed	Njandama MCHP	April 2017	1	21	19	
ANC 2nd visit Outreach	Njandama MCHP	February 2017	0	9	7	
ANC 2nd visit Outreach	Njandama MCHP	July 2017	0	8	7	
ANC 3rd visit Fixed	Ngelehun CHC	February 2017	-4	45	39	
ANC 3rd visit Fixed	Ngelehun CHC	March 2017	-4	44	39	
ANC 3rd visit Fixed	Njandama MCHP	July 2017	-2	21	13	

For each outlier, you'll see the data element, organisation unit, period, minimum value, actual value and maximum value. The minimum and maximum values refer to the border values derived from the number of standard deviations selected for the analysis.

Tip

Click the star icon to mark an outlier value for further follow-up.

3.3.3. Modify a standard deviation outlier value

You can modify an outlier value directly in the analysis result list:

1. In the value column, click inside the field that contains the value you want to change.
2. Enter a value and then navigate away from that field either by clicking tab or anywhere outside the field.

   The system provides an alert if the value is still outside the defined minimum and maximum values, but the value will be saved in any case. The field will have a red background color if the value is outside the range, and a green if inside.

3.4. Minimum maximum outlier analysis

3.4.1. About minimum maximum value based outlier analysis

You can verify the data quality at the point of data entry by setting a minimum maximum value range for each data element. You create the value ranges manually or generate them automatically.

The auto-generated minimum maximum value range is suitable only for normally distributed data. DHIS2 will determine the arithmetic mean and standard deviation of all values for a given

data element, category option, organisation unit and attribute combination. Then the system will calculate the minimum maximum value range based on the Data analysis std dev factor specified in the System Settings app.

For data which is highly-skewed or zero inflated (as is often the case with aggregate data), the values which DHIS2 auto-generates may not provide an accurate minimum maximum value range. This can lead to excessive false violations, for example if you analyse values related to seasonal diseases.

Note

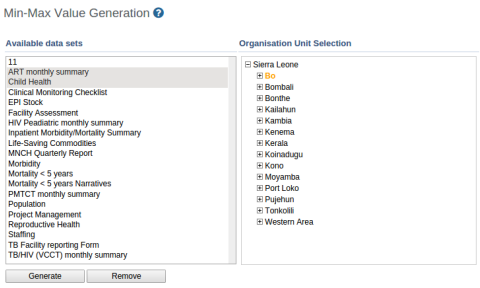
Minimum maximum value ranges are calculated across all attribute combination options for a given data element, category option and organisation unit combination.

3.4.2. Workflow

1. Create a minimum maximum value range, either automatically or manually.
   - In the Data Administration app, you generate value ranges automatically.
   - In the Data Entry app, you set value ranges manually for each field.
2. In the Data Quality app, run the Min-max outlier analysis.

3.4.3. Configure a minimum maximum outlier analysis

3.4.3.1. Create minimum maximum value range automatically



Note

Auto-generated minimum maximum value ranges can be useful for many situations, but it's recommended to verify that the data is actually normally distributed prior to using this function.

You generate minimum maximum value ranges calculated by data set in the Data Administration app. The new value ranges override any value ranges that the system has calculated previously.

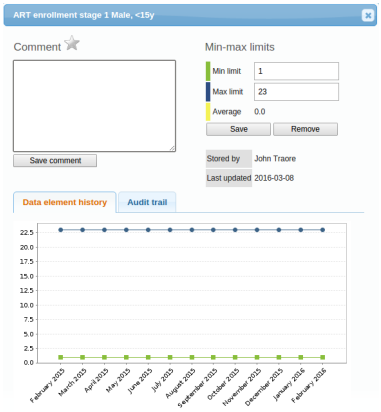
1. Set the Data analysis std dev factor:
   a. Open the System Settings app, and click General.
   b. In the Data analysis std dev factor field, enter a value.

   This sets the number of standard deviations to use in the outlier analysis. The default value is 2. A high value will catch less outlier values than a low value.
2. Open the Data Administration app and click Min-max value generation.
3. Select data set(s).
4. Select an Organisation unit.

5. Click Generate.

   New minimum maximum value ranges for all data elements in the selected data sets for all organisation units (including descendants) of the selected organisation units are generated.

3.4.3.2. Create minimum maximum value range manually



1. In the Data Entry app, open a data entry form.
2. Double-click the field for which you want to set the minimum maximum value range.
3. Enter Min limit and Max limit.
4. Click Save.

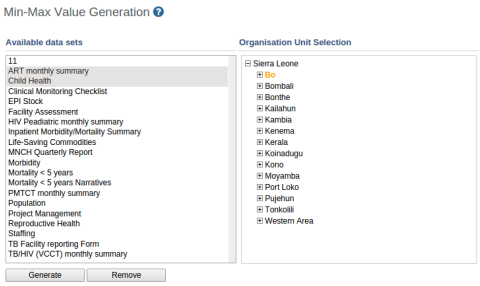
   If values don't fall within the new value range the next time you enter data, the data entry cell will appear with an orange background.

5. (Optional) Type a comment to explain the reason for the discrepancy, for example an event at a facility which may have generated a large number of clients.
6. (Optional) Click Save comment.

Tip

Click the star icon to mark the value for further follow-up.

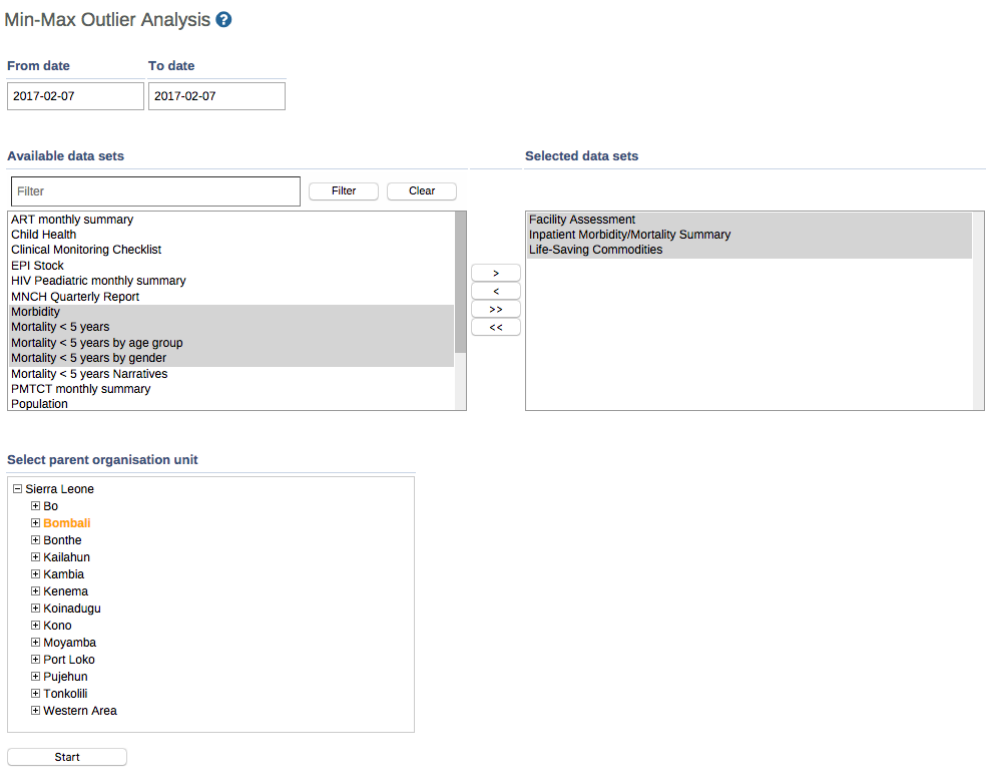
3.4.3.3. Delete minimum maximum value range



You can permanently delete all minimum maximum value ranges for selected data sets and organisation units in the Data Administration app.

1. Open the Data Administration app and click Min-max value generation.
2. Select data set(s).
3. Select an Organisation unit.
4. Click Remove.

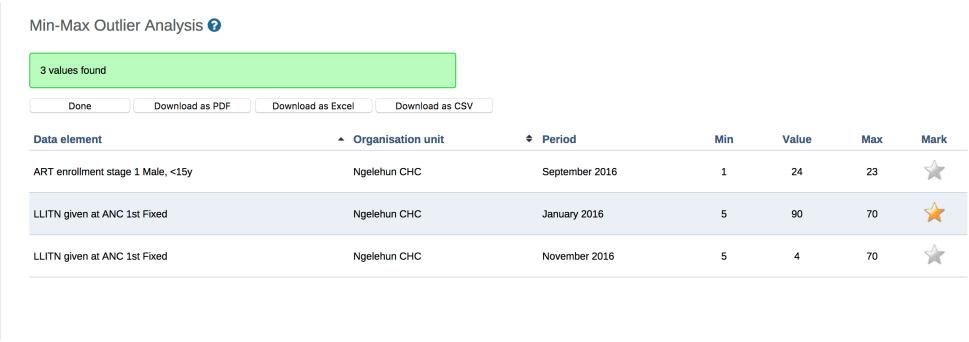
3.4.4. Run a minimum maximum outlier analysis



1. Verify that you've created minimum maximum value ranges.
2. Open the Data Quality app and click Min-max outlier analysis.
3. Select From date and To date.
4. Select which data set(s) you want to include in the analysis.
5. Select Parent organisation unit.

   All children of the organisation unit will be included. The analysis is made on raw data "under" the parent organisation unit, not on aggregated data.
6. Click Start.

   The analysis process duration depends on the amount of data that is being analysed. If there are validation violations, they will be presented in a list.



7. (Optional) Click Download as PDF, Download as Excel or Download as CSV to download the list in PDF, Excel or CSV formats.

Tip

Click the star icon to mark the value for further follow-up.

3.5. Follow-up analysis

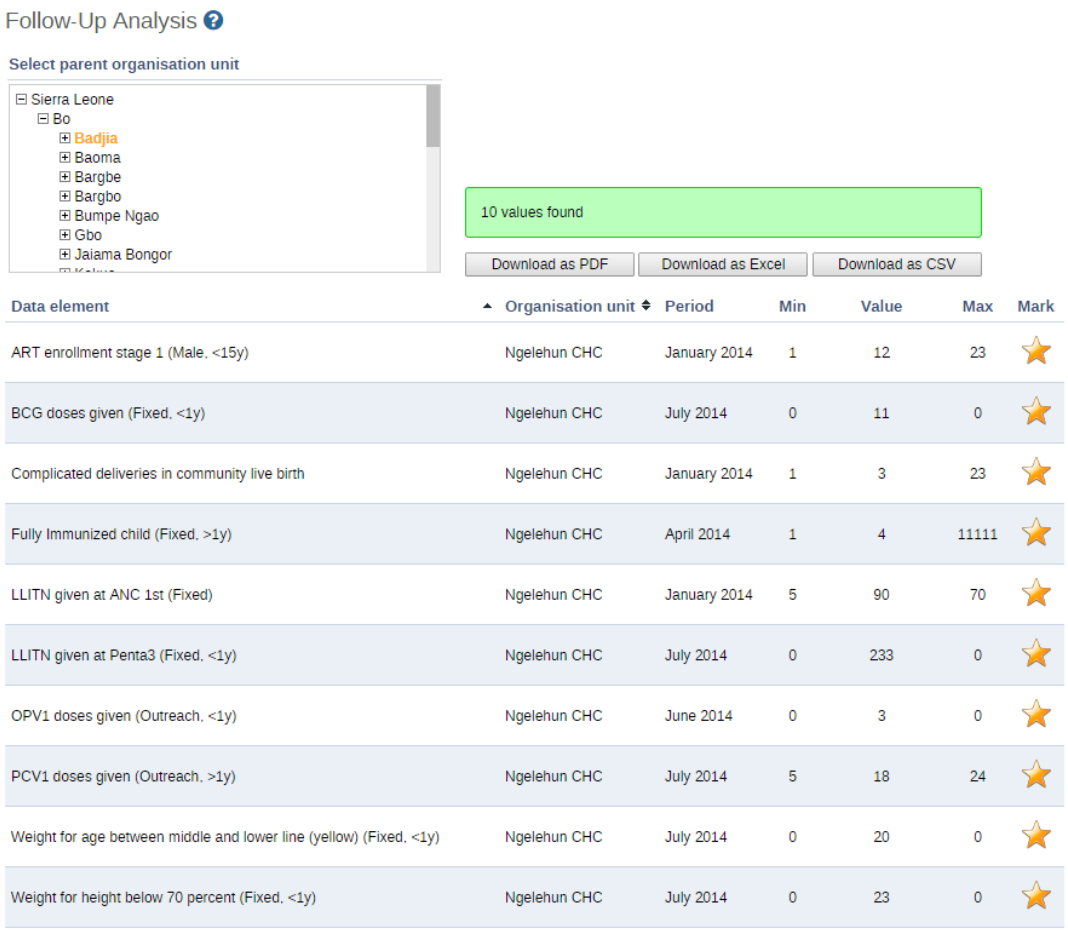
3.5.1. About follow-up analysis

The follow-up analysis creates a list of all data values marked for follow-up. You can mark a data value for follow-up in the Data Entry app and in the result list you get from a standard deviation outlier or minimum maximum outlier analysis.

3.5.2. Create list of data values marked for follow-up

1. Open the Data Quality app and click Follow-up analysis.
2. Select an Organisation unit.

   The analysis process duration depends on the amount of data that is being analysed. If there are data values marked for follow-up, they will be presented in a list.



Data element	Organisation unit	Period	Min	Value	Max	Mark
ART enrollment stage 1 (Male, <15y)	Ngelehun CHC	January 2014	1	12	23	
BCG doses given (Fixed, <1y)	Ngelehun CHC	July 2014	0	11	0	
Complicated deliveries in community live birth	Ngelehun CHC	January 2014	1	3	23	
Fully Immunized child (Fixed, >1y)	Ngelehun CHC	April 2014	1	4	11111	
LLITN given at ANC 1st (Fixed)	Ngelehun CHC	January 2014	5	90	70	
LLITN given at Penta3 (Fixed, <1y)	Ngelehun CHC	July 2014	0	233	0	
OPV1 doses given (Outreach, <1y)	Ngelehun CHC	June 2014	0	3	0	
PCV1 doses given (Outreach, >1y)	Ngelehun CHC	July 2014	5	18	24	
Weight for age between middle and lower line (yellow) (Fixed, <1y)	Ngelehun CHC	July 2014	0	20	0	
Weight for height below 70 percent (Fixed, <1y)	Ngelehun CHC	July 2014	0	23	0	

3. (Optional) Click Download as PDF, Download as Excel or Download as CSV to download the validation violations list in PDF, Excel or CSV formats.

Tip

Click the star icon to remove the follow-up tag from the data value.

Chapter 4. Using reporting functionality

4.1. Reporting functionality in DHIS2

The reporting module in DHIS2 provides a range of reporting alternatives, and this section will explain how to use them to view and analyse data. Another section explains how to configure and set up the various reporting tools.

Standard reports: Standard reports are built on pivot tables, but are more advanced in its design allowing for more cosmetics and styles. These reports can also combine multiple tables and charts in the same report and be made available as one-click reports that are very easy to use. These reports can be downloaded as PDF files which makes them ideal for printing as well as sharing offline.

Dataset reports: Dataset reports are simply a printer friendly way to look at the data entry forms with either raw or aggregated data (over time or place). The design used in data entry will be used also in the data set reports. This will work only for data sets that has a custom data entry form set up.

Dashboard: The fastest way to view your data. The dashboard can display up to four updated charts as well as shortcuts to your favourite reports, report tables, and map views. Each user can configure a personal dashboard.

Data Visualizer: Do flexible visualizations of your data as charts and data tables. Any number of indicators and data elements can be included. Several chart types are available, such as column, stacked column, line, area and pie charts. The charts can be saved in order to be easily retrieved later and can also be put on your personal dashboard. Charts can be downloaded as image and PDF files to your local computer.

Orgunit distribution reports: These reports are generated off the orgunit group set information and can show what types (and how many of each type) of health facilities that are located in a given area (any level in the hierarchy). These reports are automatically generated and display the information in both tables and charts, and downloads in PDF, excel, and CSV are available.

Reporting rate summary: These reports provide a nice overview of how many facilities that have submitted their data for a given dataset and period. Here you can get both the counts and the percentages showing the reporting rate for all or single data sets.

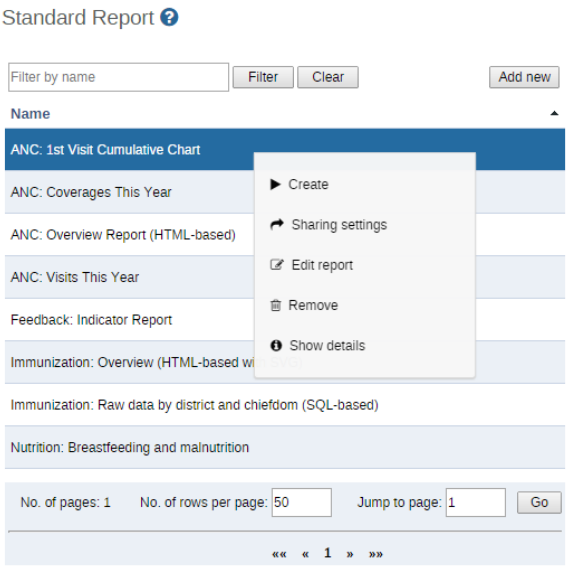
Web-based pivot tables: The built in pivot table tool is a web-based tool to display indicator data by orgunit and period in a typical pivot table view and allows for pivoting manipulations of the tables. It allows for large amounts of data to be downloaded offline for analysis as well.

GIS: Present and analyse your data using thematic maps. You can view both data elements and indicators and given that you have coordinates for all your orgunits you can drill down the hierarchy and view maps for all levels from country polygons to facility points. See the separate chapter on GIS for more details. All the map information is built into DHIS2 and all you need to do is to register coordinates for your organisation units and the maps will be available.

4.2. Using standard reports

You access the available reports by navigating to Apps->Reports. In the report menu in the left bar, click Standard Report. A list of all pre-defined reports will appear in the main window.

Standard reports



You run/view a report by clicking on the name of the report and then selecting "Create" from the contextual menu. If there are any pre-defined paramaters, you will see a report parameter window where you must fill in the values needed for orgunit and/or reporting month, depending on what has been defined in the underlying report table(s). Click on "Get Report" when you are ready. The report will either appear directly in your browser or be available as a PDF file for download, depending on your browser settings for handling PDF files. You can save the file and keep it locally on your computer for later use.

4.3. Using dataset reports

Dataset reports are printer friendly views of the data entry screen filled with either raw or aggregated data. These are only available for data sets that have custom data entry forms and not for default or section forms.

You can access data set reports from Apps->Reports.

A Criteria window will appear where you fill in the details for your report:

Dataset: The data set you want to display.

Reporting period: The actual period you want data for. This can be aggregated as well as raw periods. This means that you can ask for a quarterly or annual report even though the data set is collected monthly. A data set's period type (collection frequency) is defined in data set maintenance. First select the period type (Monthly, Quarterly, Yearly etc.) in the drop down next to Prev and Next buttons, and then select one of the available periods from the dropdown list below. Use Prev and Next to jump one year back or forward.

Use data for selected unit only: Use this option if you want a report for an orgunit that has children, but only want the data collected directly for this unit and not the data collected by its children. If you want a typical aggregated report for an orgunit you do not want to tick this option.

Reporting Organisation unit: Here you select the orgunit you want the report for. This can be at any level in the hierarchy as the data will be aggregated up to this level automatically (if you do not tick the option above).

When you are done filling in the report criteria you click on "Generate". The report will appear as HTML in a printer-friendly format. Use the print and save as functions in the browser to print or save (as HTML) the report.You can also export the data set report in Excel and PDF formats.

4.4. Using resources

The resource tool allows you to upload both files from your local computer to the DHIS server and to add links to other resources on the Internet through URLs. If you want to share a direct link to the DHIS2 resources you can right click on the "view resource" button and copy the link address.

To create a resource click on the "Add new" button. Enter a name for the resource, then choose between uploading a file or external URL. If you chose file upload click "Choose file" and select your file your local computer. If you chose URL enter the link to the resource on the Internet. Then click "Save".

4.5. Using reporting rate summary

Access the reporting rate summary from the Apps->Reports menu. Reporting rate summaries will show how many datasets (forms) that have been submitted by organisation unit and period. There are two methods available to calculate reporting rates (completeness):

- Based on complete data set registrations. A complete data set registration refers to a user marking a data entry form as complete, typically by clicking the complete button in the data entry screen, hereby indicating to the system that she considers the form to be complete. This is i.e. a subjective approach to calculating completeness.
- Based on compulsory data element: You can define any number of data elements in a data set to be compulsory. This implies that data values must be captured for all data elements which have been marked as compulsory in order for the data set to be considered complete. This is i.e. an objective approach to calculating completeness.

The reporting rate summary will for each row show a range of measures:

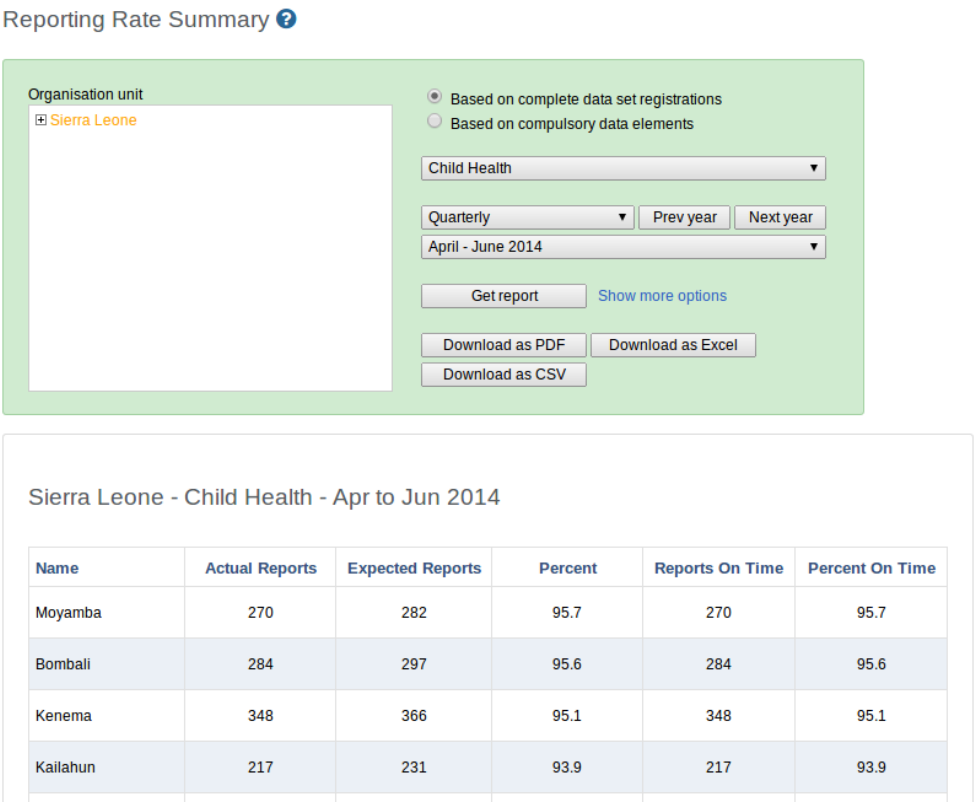
- Actual reports: Indicates the number of data entry complete registrations for the relevant data set.
- Expected reports: Indicates how many data entry complete registrations are expected. This number is based on the number of organisation units the relevant data set has been assigned to (enabled for data entry).
- Percent: The percentage of reports registered as complete based on the number expected.
- Reports on time: Same as actual reports, only reports registered as complete within the maximum number of days after the end of the reporting period. This number of days after reporting period can be defined per data set in the data set management.
- Percent on time: Same as percentage, only reports registered as complete on time used as numerator.

To run the report you can follow these steps:

- Select an orgunit from the tree.
- Select one of the completeness methods to use to calculate the reporting rates.

  Select all or one data set. All will give you a report with all data sets for the selected organisation unit. A single data set will give you a report with completeness for all children of the selected organisation unit.
- Select a period type and a period from the list of available periods for that period type. Move back/forward one year by using the prev/next buttons.
- The report will then be rendered. Change any of the parameters above and the report will be updated automatically.

Reporting rate summary



Name	Actual Reports	Expected Reports	Percent	Reports On Time	Percent On Time
Moyamba	270	282	95.7	270	95.7
Bombali	284	297	95.6	284	95.6
Kenema	348	366	95.1	348	95.1
Kailahun	217	231	93.9	217	93.9

4.6. Using organisation unit distribution reports

You can access the Orgunit Distribution reports from the left side menu in the Apps->Reports.

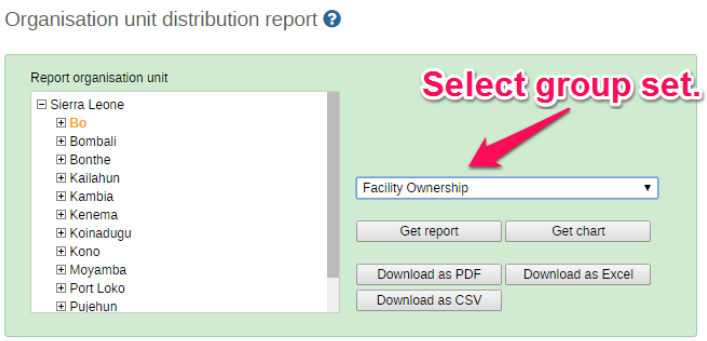
Orgunit distribution reports are reports that show how the orgunits are distributed on various properties like type and ownership, and by geographical areas.

The result can be presented in a table-based report or in a chart.

Running a report:

To run a report first select an orgunit in the upper left side orgunit tree. The report will be based on orgunits located under the selected orgunit. The select the orgunit group set that you want to use, typically these are Type, Ownership, Rural/Urban, but can be any user-defined orgunit group set. The you can click on either Get Report to get the table-based presentation or Get chart to get the same result in a chart. You can also download other format such as PDF, Excel and CSV.

Orgunit distribution report



Chapter 5. Using the Pivot Table app

5.1. About the Pivot table app

With the Pivot Table app, you can create pivot tables based on all available data dimensions in DHIS2. A pivot table is a dynamic tool for data analysis which lets you summarize and arrange data according to its dimensions. Examples of data dimensions in DHIS2 are:

- data dimension itself (for example data elements, indicators and events)
- periods (representing the time period for which the data represents)
- organisation hierarchy (representing the geographical location of the data)

From these dimensions you can freely select dimension items to include in the pivot table. You can create additional dimensions in DHIS2 with the group set functionality. This allows for different aggregation pathways, such as aggregation by "Partner" or facility type.

A pivot table can arrange data dimensions on columns, rows, and as filters. When you place a data dimension on columns, the pivot table will display one column per dimension item. If you place multiple data dimensions on columns, the pivot table displays one column for all combinations of the items in the selected dimensions. When you place a data dimension on rows, the pivot table displays one row per dimension item in a similar fashion. The dimensions you select as filters will not be included in the pivot table, but will aggregate and filter the table data based on the selected filter items.

5.2. Create a pivot table

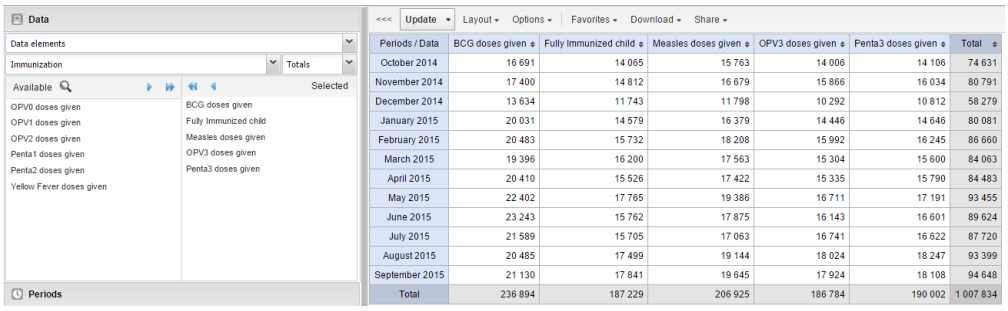
1. In the Apps menu, click Pivot Table.
2. In the menu to the left, select the dimension items you want to analyse, for example data elements or indicators.
3. Click Layout and arrange the data dimensions as columns, rows and filters.

   You can keep the default selection if you want.
4. Click Update.

Example 5.1. Pivot table based on the demo database.

In this example, indicators are listed as columns and periods as rows.

Example pivot table with data elements on columns and periods as rows.



Periods / Data	BCG doses given	Fully Immunized child	Measles doses given	OPV3 doses given	Penta3 doses given	Total
October 2014	16 691	14 065	15 763	14 006	14 106	74 631
November 2014	17 400	14 812	16 679	15 866	16 034	80 791
December 2014	13 634	11 743	11 798	10 292	10 812	58 279
January 2015	20 031	14 579	16 379	14 446	14 646	80 081
February 2015	20 483	15 732	18 208	15 992	16 245	86 660
March 2015	19 396	16 200	17 563	15 304	15 600	84 063
April 2015	20 410	15 526	17 422	15 335	15 790	84 483
May 2015	22 402	17 765	19 386	16 711	17 191	93 455
June 2015	23 243	15 762	17 875	16 143	16 601	89 624
July 2015	21 589	15 705	17 063	16 741	16 622	87 720
August 2015	20 485	17 499	19 144	18 024	18 247	93 399
September 2015	21 130	17 841	19 645	17 924	18 108	94 648
Total	236 894	187 229	206 925	186 784	190 002	1 007 834

5.2.1. Select dimension items

The left menu lists sections for all available data dimensions. From each section you can select any number of dimension items. As an example, you can open the section for data elements and select any number of data elements from the available list. You can select an item by

marking it and clicking on the arrow in the section header or simply double-clicking on the item. Before you can use a data dimension in your pivot table you must at least select one dimension item. If you arrange a dimension as columns or rows but do not select any dimension items, the dimension is ignored.

You must choose at least one data dimension type to create a pivot table. The available types are described in this table:

Table 5.1. Data dimension types

Data dimension type	Definition	Examples
Indicators	An indicator is a calculated formula based on data elements.	Coverage of immunization across a specific district.
Data elements	Represents the phenomenon for which data has been captured.	Number of malaria cases; number of BCG doses given.
Data sets	A collection of data elements grouped for data collection. You can select : • Reporting rates: the percentage of actual reports compared to the expected number of reports • Reporting rates on time: the reporting rates based on timely form submissions. A timely submission must happen within a number of days after the reporting period. • Actual reports: the actual number of reports • Actual reports on time: the actual number of reports based on timely form submissions. A timely submission must happen within a number of days after the reporting period. • Expected reports: the number of expected reports based on organisation units where the data set and the reporting frequency has been assigned.	Reporting rates for immunization and morbidity forms.
Event data items	A data element that is part of a program representing events that have been captured.	Average weight and height for children in a nutrition program.
Program indicators	A calculated formula based on data elements in	Average BMI score for children in a nutrition program.

Data dimension type	Definition	Examples
	a program representing events.	

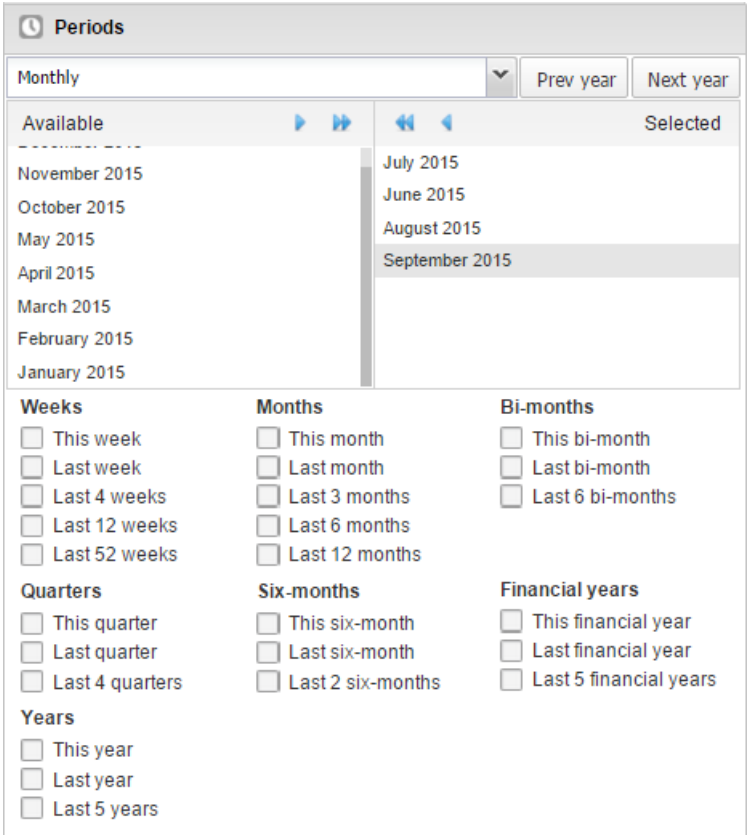
You can combine these dimensions to display for example aggregate data with reporting rates, or event data items together with program indicators, all in the same pivot tables. For the "data element" data dimension, you are also able to select "Totals" and "Details", which will allow you to view different category combination options together on the same pivot table.

For the period dimension you can choose between using fixed periods or relative periods. An example of a fixed period is "January 2012". To select fixed periods start by selecting a period type from the period type list. You can then select periods from the list of available periods.

Relative periods are periods relative to the current date. Examples of relative periods are "Last month", "Last 12 months", "Last 5 years". Relative periods can be selected by ticking the check-boxes next to each period. The main advantage of using relative periods is that when you save a pivot table favorite, it will stay updated with the latest data as time goes by without the need for constantly updating it.

For the organisation unit dimension you can select any number of organisation units from the hierarchy. To select all organisation units below a specific parent organisation unit, right click and click "Select all children". To manually select multiple organisation units, click and hold the Ctrl key while clicking on organisation units. You can tick "User org unit", "User sub-units" or "User sub-x2-units" in order to dynamically insert the organisation unit or units associated with your user account. This is useful when you save a pivot table favorite and want to share it with other users, as the organisation units linked with the other user's account will be used when viewing the favorite.

Selection of fixed and relative periods.



Dynamic dimensions can consist of organisation unit group sets, data element group sets, or category option group sets which have been configured with the type of "Disaggregation". Once the group sets have been configured, they will be come available in the pivot tables, and can be used as additional analysis dimensions, for instance to analyse aggregate data

by Type of organisation unit or Implementing partner. Dynamic dimensions work the same as fixed dimensions.

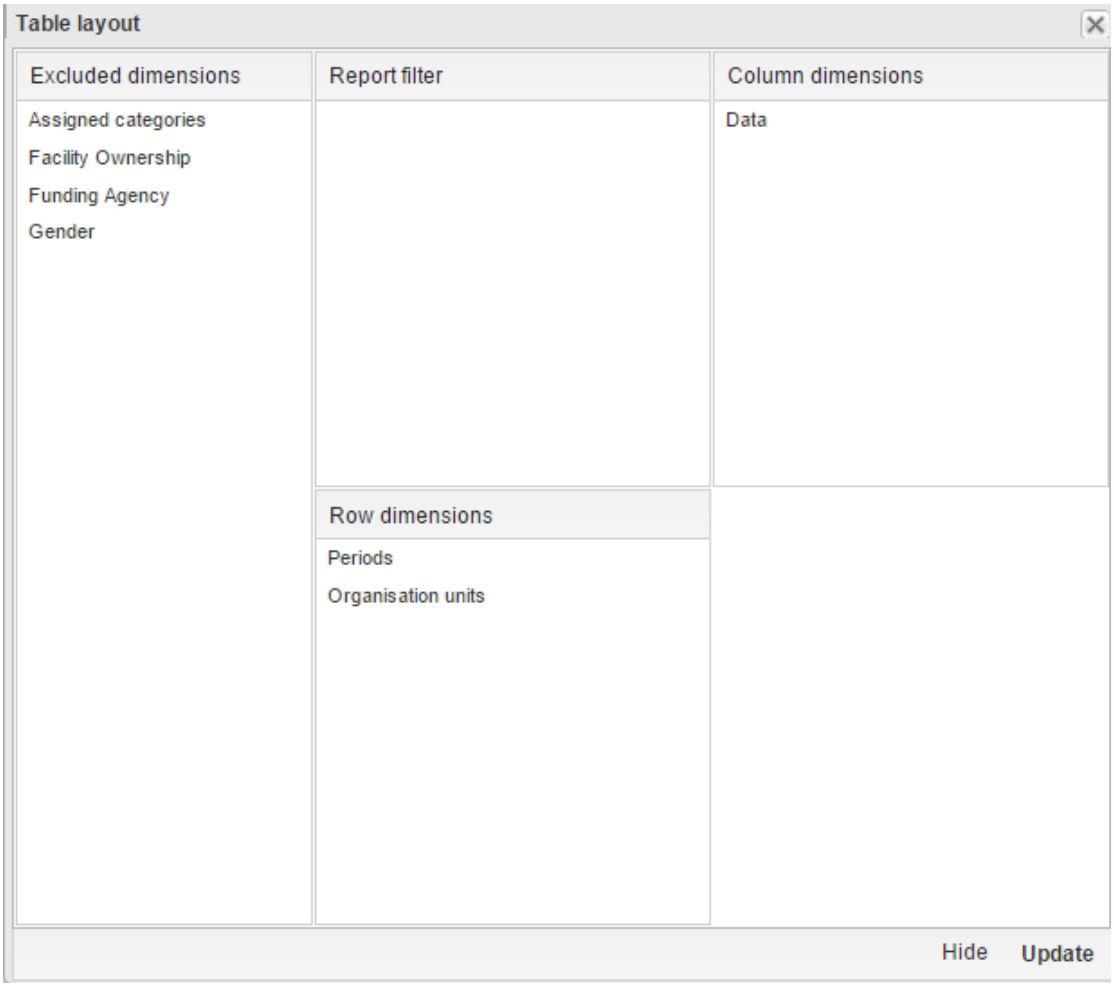
Tip

Some dynamic dimensions may contain many items. This can cause issues with certain browsers due to the length of the URL when many dimension members are selected. A special "All" check box is available for dynamic dimensions, which allows you to include all available dimensions implicitly in your pivot table, without specifying each and every dimension member.

5.2.2. Modify pivot table layout

After selecting data dimensions it is time to arrange your pivot table. Click "Layout" in the top menu to open the layout screen. In this screen you can position your data dimensions as table columns, rows or filters by clicking and dragging the dimensions from the dimensions list to the respective column, row and filter lists. You can set any number of dimensions in any of the lists. For instance, you can click on "Organisation units" and drag it to the row list in order to position the organisation unit dimension as table rows. Note that indicators, data elements and data set reporting rates are part of the common "Data" dimension and will be displayed together in the pivot table. For instance, after selecting indicators and data elements in the left menu, you can drag "Organisation Unit" from the available dimensions list to the row dimension list in order to arrange them as rows in the pivot table.

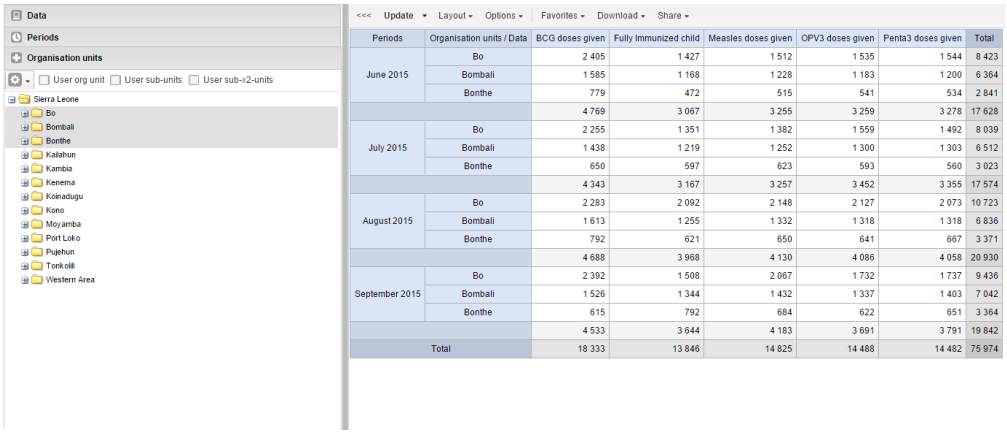
The table layout screen.



After you have set up your pivot table you can click "Update" to render your pivot table, or click "Hide" to hide the layout screen without any changes taking effect. Since we in our example

have selected both the period and organisation unit dimension as rows, the pivot table will generate all combinations of the items in these dimensions and produce a table like this:

Pivot table where organisation units and periods are repeated on rows.



Periods	Organisation units / Data	BCG doses given	Fully immunized child	Measles doses given	OPV3 doses given	Penta3 doses given	Total
June 2015	Bo	2 405	1 427	1 512	1 535	1 544	8 423
	Bombali	1 585	1 168	1 228	1 183	1 200	6 364
	Bonthe	779	472	515	541	534	2 841
		4 769	3 067	3 255	3 259	3 278	17 628
July 2015	Bo	2 255	1 351	1 382	1 559	1 492	8 039
	Bombali	1 438	1 219	1 252	1 300	1 303	6 512
	Bonthe	650	597	623	593	560	3 023
		4 343	3 167	3 257	3 452	3 355	17 574
August 2015	Bo	2 283	2 092	2 148	2 127	2 073	10 723
	Bombali	1 613	1 255	1 332	1 318	1 318	6 836
	Bonthe	792	621	650	641	667	3 371
		4 688	3 968	4 130	4 086	4 058	20 930
September 2015	Bo	2 392	1 508	2 067	1 732	1 737	9 436
	Bombali	1 526	1 344	1 432	1 337	1 403	7 042
	Bonthe	615	792	684	622	651	3 364
		4 533	3 644	4 183	3 691	3 791	19 842
Total		18 333	13 846	14 825	14 488	14 482	75 974

5.3. Change the display of your pivot table

1. Click Options.
2. Set the options as required.

Table 5.2. Table options

Option	Description
Show column totals Show row totals	Displays total values in the table for each row and column, as well as a grand total for all values in the table.
Show column sub-totals Show row sub-totals	Displays subtotals in the table for each dimension. In the screenshot above, notice how subtotals are generated for each of the periods in the period dimension. If you only select one dimension, subtotals will be hidden for those columns or rows. This is because the values will be equal to the subtotals.
Show dimension labels	Shows the dimension names as part of the pivot tables.
Hide empty rows	Hides empty rows from the table, which is useful when looking at large tables where a big part of the dimension items do not have data in order to keep the table more readable.
Skip rounding	Skips the rounding of data values, offering the full precision of data values. Can be useful for finance data where the full dollar amount is required.
Aggregation type	The default aggregation operator can be over-ridden here, by selecting a different aggregation operator. Some of the aggregation types are Count, Min and Max.
Show hierarchy	Shows the name of all ancestors for organisation units, for example "Sierra Leone / Bombali / Tamabaka / Sanya CHP" for Sanya CHP. The organisation units are then sorted alphabetically

Option	Description
	which will order the organisation units perfectly according to the hierarchy.
Include only completed events	Includes only completed events in the aggregation process. This is useful for example to exclude partial events in indicator calculations.
Display density	Controls the size of the cells in the table. You can set it to "comfortable", "normal" and "compact". The "compact" option is handy in order to fit large tables into the browser screen.
Font size	Controls the size of the table text font. Can be set to "large", "normal" and "small".
Digit group separator	Controls which character to separate groups of digits or "thousands". Can be set to "comma", "space" and "none".
Legend set	Shows a colour indicator next to the values. Currently the GIS legend sets are being used.
Legend display style	Color the text or background of cells in pivot tables based on legend sets. You can use this option for scorecards to identify high and low values at a glance.

3. Click Update.

5.4. Manage favorites

Saving your charts as favorites makes it easy to find them later. You can also choose to share them with other users as an interpretation or display them on the dashboard.

You can view the details and interpretations of your favorites when you open the Pivot table or Data Visualization app. You can edit descriptions, share your favorites, or write interpretations directly in this pane, or you can use the Favorites menu.

5.4.1. Open a favorite

1. Click Favorites > Open.
2. Enter the name of a favorite in the search field, or click Prev and Next to display favorites.

5.4.2. Save a favorite

1. Click Favorites > Save as.
2. Enter a name, title and a description for your favorite.
3. Click Save.

5.4.3. Rename a favorite

1. Click Favorites > Rename.
2. Enter the new name for your favorite.
3. Click Update.

5.4.4. Write an interpretation for a favorite

An interpretation is a link to a resource with a description of the data at a given period. This information is visible on the dashboard. To create an interpretation, you first need to create a favorite. If you've shared your favorite with other people, the interpretation you write is visible to those people.

1. Click Favorites > Write interpretation.
2. In the text field, type a comment, question or interpretation. You can see this information on the dashboard.
3. Add a user group that you want to share your favorite with by clicking the + icon.
4. Select:
   a. Allow external access if you want everyone to view this interpretation.
   b. Public access and choose a setting: None, Can view, Can edit and view.
   c. Administrators
5. Click Share.

5.4.5. Create a link to a favorite

1. Click Favorites > Get link.
2. Choose one of the following:
   - Open in this app: You get a URL for the favorite which you can share with other users by email or chat.
   - Open in web api: You get a URL of the API resource. By default this is an HTML resource, but you can change the file extension to ".json" or ".csv".

5.4.6. Delete a favorite

1. Click Favorites > Delete.
2. Click OK.

5.4.7. View interpretations based on relative periods

To view interpretations for relative periods, such as a year ago:

1. Open a favorite with interpretations.
2. Click >>> in the top right of the workspace.
3. Click an interpretation. Your chart displays the data and the date based on when the interpretation was created.To view other interpretations, click them.

5.5. Download data from a pivot table

5.5.1. Download table layout data format

To download the data in the current pivot table:

1. Click Download.
2. Under Table layout, click the format you want to download: Microsoft Excel, CSV or HTML.

   The data table will have one column per dimension and contain names of the dimension items.

Tip

You can create a pivot table in Microsoft Excel from the downloaded Excel file.

5.5.2. Download plain data source format

You can download data in the current pivot table in JSON, XML, Excel, and CSV as plain data formats with different identification schemes (ID, Code, and Name). The data document uses identifiers of the dimension items and opens in a new browser window to display the URL of the request to the Web API in the address bar. This is useful for developers of apps and other client modules based on the DHIS2 Web API or for those who require a plan data source, for instance for import into statistical packages.

To download plain data source formats:

1. Click Download.
2. Under Plain data source, click the format you want to download.

Table 5.3. Available formats

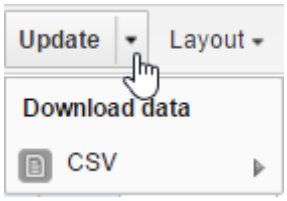
Format	Action	Description
JSON	Click JSON	Downloads JSON format based on ID property. You can also download JSON format based on Code or Name property.
XML	Click XML	Downloads XML format based on ID property. You can also download XML format based on Code or Name property.
Microsoft Excel	Click Microsoft Excel	Downloads XML format based on ID property. You can also download Microsoft Excel format based on Code or Name property.
CSV	Click CSV	Downloads CSV format based on ID property. You can also download CSV format based on Code or Name property.
JRXML	Put the cursor on Advanced and click JRXML	Produces a template of a Jasper Report which can be further customized based on your exact needs and used as the basis for a standard report in DHIS2.
Raw data SQL	Put the cursor on Advanced and click Raw data SQL	Provides the actual SQL statement used to generate the pivot table. You can use it as a data source in a Jasper report, or as the basis for an SQL view.

5.5.3. Download a CSV format without rendering data in the web browser

You can download data in CSV format directly without rendering the data in the web browser. This helps to reduce any constraints in the system settings that has been set with regards to the maximum number of analytic records. This lets you download much larger batches of data that you can use for later offline analysis.

To download data in CSV format without first rendering data in the web browser:

1. Click the arrow beside Update.



2. Click CSV to download the format based on ID property.

   The file downloads to your computer.

> **Tip**
>
> You can also download CSV format based on Code or Name property.

5.6. Embed a pivot table in an external web page

Certain analysis-related resources in DHIS2, like pivot tables, charts and maps, can be embedded in any web page by using a plug-in. You will find more information about the plug-ins in the Web API chapter in the DHIS2 Developer Manual.

To generate a HTML fragment that you can use to display the pivot table in an external web page:

1. Click Embed.
2. Click Select to highlight the HTML fragment.

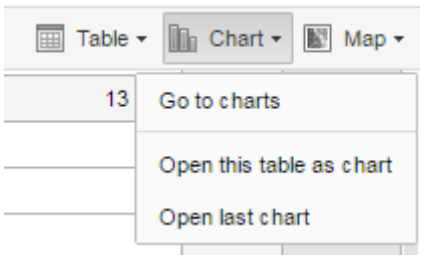
5.7. Visualize a pivot table data as a chart or a map

When you have made a pivot table you can switch between pivot table, chart and map visualization of your data.

5.7.1. Open a pivot table as a chart

1. Click Chart > Open this table as chart.

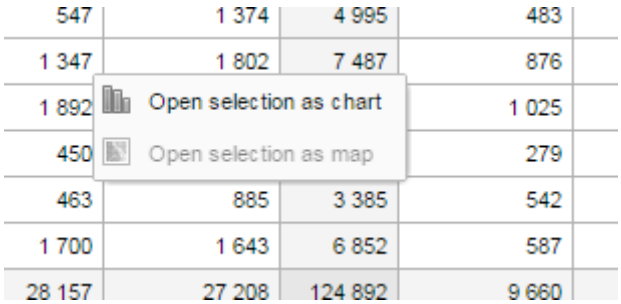
   Your current pivot table opens as a chart.



5.7.2. Open a pivot table selection as a chart

If you want to visualize a small part of your pivot table as a chart you can click directly on a value in the table instead opening the whole table.

1. In the pivot table, click a value.



2. To verify the selection, hold the cursor over Open selection as chart. The highlighted dimension headers in the table indicate what data will be visualized as a chart.
3. Click Open selection as chart.

5.7.3. Open a pivot table as a map

1. Click Chart > Open this table as map

   Your current pivot table opens as a map.

5.7.4. Open a pivot table selection as a map

1. In the pivot table, click a value.

   A menu displays.
2. Click Open selection as map.

   Your selection opens as a map.

5.8. Constraints and tips

When selecting and arranging dimensions there are a few constraints that apply. All of these constraints are validated and the pivot table module will provide feedback if any constraint is violated.

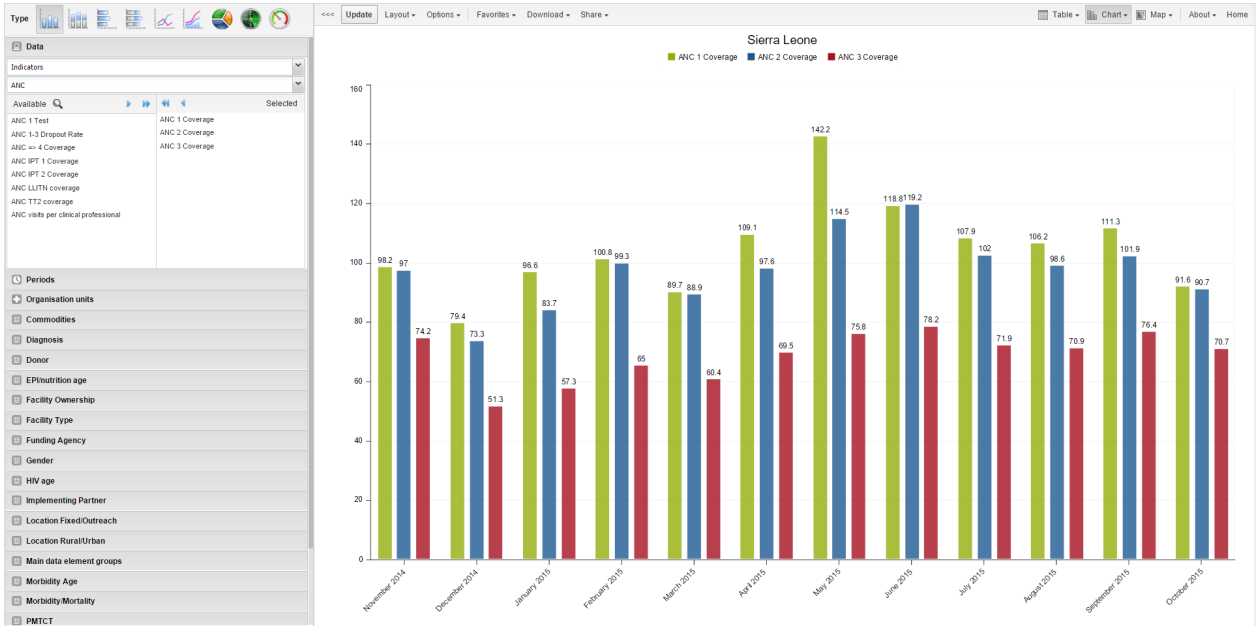
- At least one dimension must be selected on columns or rows.
- At least one period must be included in the pivot table.
- Data element group sets and reporting rates cannot appear in the same pivot table.
- A table cannot contain more than the maximum number of analytic records which have been specified through the system settings. The maximum number of records could also be constrained by the maximum RAM which is available to your browser. Consider making smaller tables instead of one table which displays all of your data elements and indicators together.

Tip

Pivot tables in DHIS2 are limited to a system set parameter, which controls the number of data values which can be returned. The reason for this is two fold. First, it would be easy to overwhelm the server with a very complicated request for a large pivot table. Second, the amount of data which is able to be rendered in a browser is fairly limited. If you are having problems with very large or complex tables, consider to try and reduce the number of items. It is usually more useful to have smaller, concise tables which are easier to understand and which address a particular analysis.

Chapter 6. Using the Data Visualizer app

6.1. Data Visualizer overview



With the Data Visualizer app, you can select content, for example indicators, data elements, periods and organisation units, for an analysis. The app works well over poor Internet connections and generates charts in the web browser.

- You can hide and show individual data series in the chart by clicking directly on the series label in the chart. They appear either at the top or to the right of the chart.
- You can click on the triple left-arrow button on the top centre menu. This collapses the left side menu and gives more space for the chart. You can get the menu back by clicking on the same button again.

6.2. Create a chart

1. In the Apps menu, click Data Visualizer.
2. Select a chart type.
3. In the menu to the left, select the metadata you want to analyse. You must select one or more elements from all of the three dimensions - data (indicators, data elements, reporting rates), periods (relative, fixed) and organisation units (units or groups).

   > **Note**
   >
   > If you've access to the system settings, you can change the default period type under General settings > Default relative period for analysis.

   Last 12 Months from the period dimension and the root organisation unit are selected by default.
4. Click Layout and arrange the dimensions.

   You can keep the default selection if you want.
5. Click Update.

6.3. Select a chart type

The Data Visualizer app has nine different chart types, each with different characteristics. To select a chart type:

1. In Chart type, click the chart type you need.

   Table 6.1. Chart types

Chart type	Description
Column chart	Displays information as vertical rectangular columns with lengths proportional to the values they represent. Useful when you want to, for example, compare performance of different districts.
Stacked column chart	Displays information as vertical rectangular columns, where bars representing multiple categories are stacked on top of each other. Useful when you want to, for example, display trends or sums of related data elements.
Bar chart	Same as column chart, only with horizontal bars.
Stacked bar chart	Same as stacked column chart, only with horizontal bars.
Line chart	Displays information as a series of points connected by straight lines. Also referred to as time series. Useful when you want to, for example, visualize trends in indicator data over multiple time periods.
Area chart	Is based on line chart, with the space between the axis and the line filled with colors and the lines stacked on top of each other. Useful when you want to compare the trends of related indicators.
Pie chart	Circular chart divided into sectors (or slices). Useful when you want to, for example, visualize the proportion of data for individual data elements compared to the total sum of all data elements in the chart.
Radar chart	Displays data on axes starting from the same point. Also known as spider chart.
Speedometer chart	Semi-circle chart which displays values out of 100 %. Also referred to as a gauge chart.

2. Click Update.

6.4. Select dimension items

A dimension refers to the elements which describe the data values in the system. There are three main dimensions in the system:

- Data: Includes data elements, indicators and datasets (reporting rates), describing the phenomena or event of the data.
- Periods: Describes when the event took place.
- Organisation units: Describes where the event took place.

The Data Visualizer app lets you use these dimensions completely flexible in terms of appearing as series, categories and filter.



Note

You can select dimension items in different ways:

- Double-click a dimension item name.
- Highlight one or several dimension items and click the single-arrow.
- To select all dimension items in a list, click the double-arrow.
- To clear dimension items, use the arrows or double-click the names in the Selected list.

6.4.1. Select indicators

The Data Visualizer app can display any number of indicators and data elements in a chart. You can select both indicators and data elements to appear together in the same chart, with their order of appearance the same as the order in which they are selected.

1. Click Data and select Indicators.
2. Select an indicator group.

   The indicators in the selected group appear in the Available list.
3. Select one or several indicators by double-clicking the name.

   The indicator moves to the Selected list.

6.4.2. Select data elements

The Data Visualizer app can display any number of indicators and data elements in a chart. You can select both indicators and data elements to appear together in the same chart, with their order of appearance the same as the order in which they are selected.

1. Click Data and select Data elements.
2. Select a data element group.

   The data elements in the selected group appear in the Available list.
3. Select one or several data elements by double-clicking the name.

   The data element moves to the Selected list.

6.4.3. Select reporting rates

The Data Visualizer app can display reporting rates in a chart, by itself or together with indicators and data elements. Reporting rates are defined by data sets.

1. Click Data and select Reporting rates.

   The reporting rates appear in the Available list.
2. Select one or several reporting rates by double-clicking the name.

   The reporting rate moves to the Selected list.

6.4.4. Select fixed and relative periods

1. Click Periods.
2. Select one or several periods.

   You can combine fixed periods and relative periods in the same chart. Overlapping periods are filtered so that they only appear once.

- Fixed periods: In the Select period type box, select a period type. You can select any number of fixed periods from any period type.
- Relative periods: In the lower part of the Periods section, select as many relative periods as you like. The names are relative to the current date. This means that if the current month is March and you select Last month, the month of February is included in the chart.

6.4.5. Select organisation units

1. Click Organisation units.
2. Click the gearbox icon.
3. Select a Selection mode and an organisation unit.

   There are three different selection modes:

   Table 6.2. Selection modes

Selection mode	Description
Select organisation units	Lets you select the organisation units you want to appear in the chart from the organization tree. Select User org unit to disable the organisation unit tree and only select the organisation unit that is related to your profile. Select User sub-units to disable the organisation unit tree and only select the sub-units of the organisation unit that is related to your profile. Select User sub-x2-units to disable the organisation unit tree and only select organisation units two levels down from the organisation unit that is related to your profile. This functionality is useful for administrators to create a meaningful "system" favorite. With this option checked all users find their respective organisation unit when they open the favorite.
Select levels	Lets you select all organisation units at one or more levels, for example national or district level. You can also select the parent organisation unit in the tree, which makes it easy to select for example, all facilities inside one or more districts.
Select groups	Lets you select all organisation units inside one or several groups and parent organisation units at the same time, for example hospitals or chiefdoms.

4. Click Update.

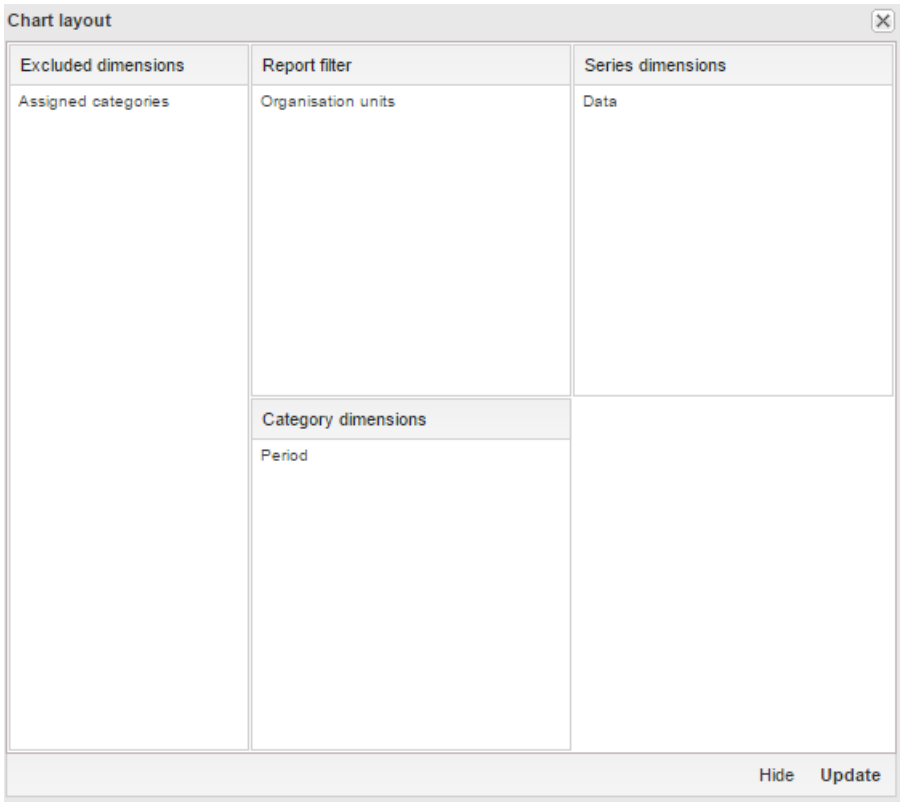
6.4.6. Select additional dimension items

Depending on the settings for your organisation unit group sets and data element group sets, you can select additional dimension items from the left menu.

Here you can add dimension items such as age, sex, etc. without having to add them as detailed data element selections. This is useful when you want to separate these categories in your analysis.

The additional dimension items you select are available in Chart layout as dimensions.

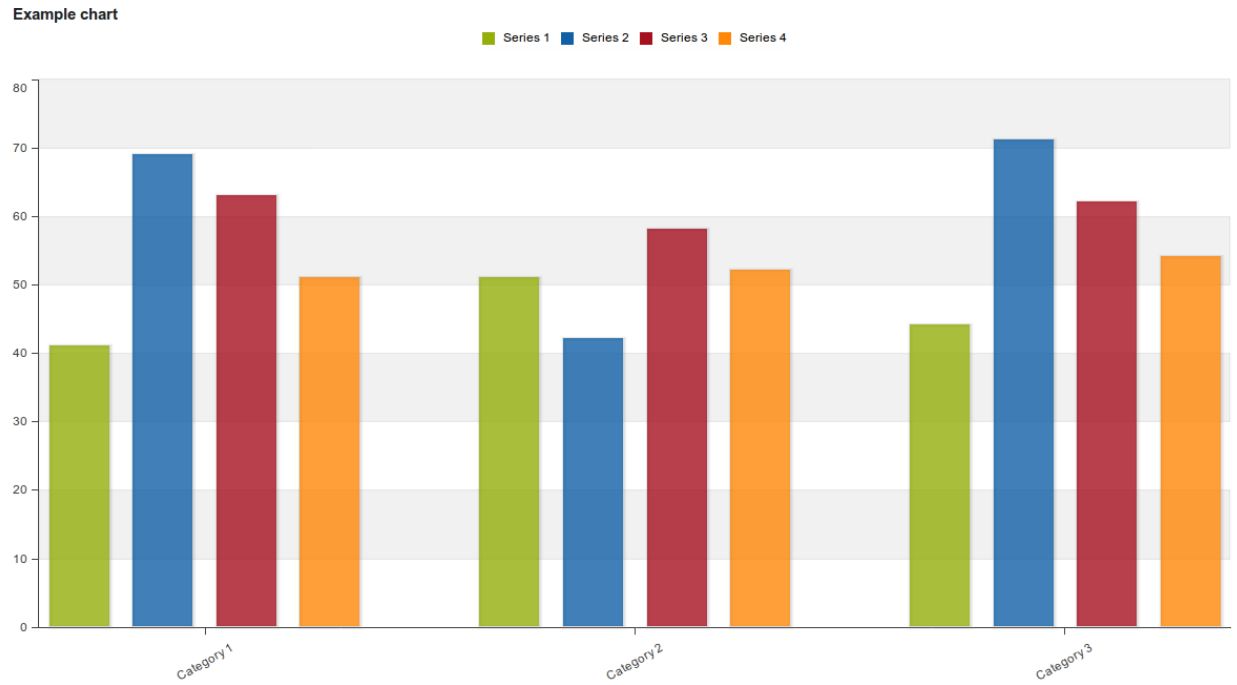
6.5. Select series, category and filter



You can define which dimension of the data you want to appear as series, category and filter.

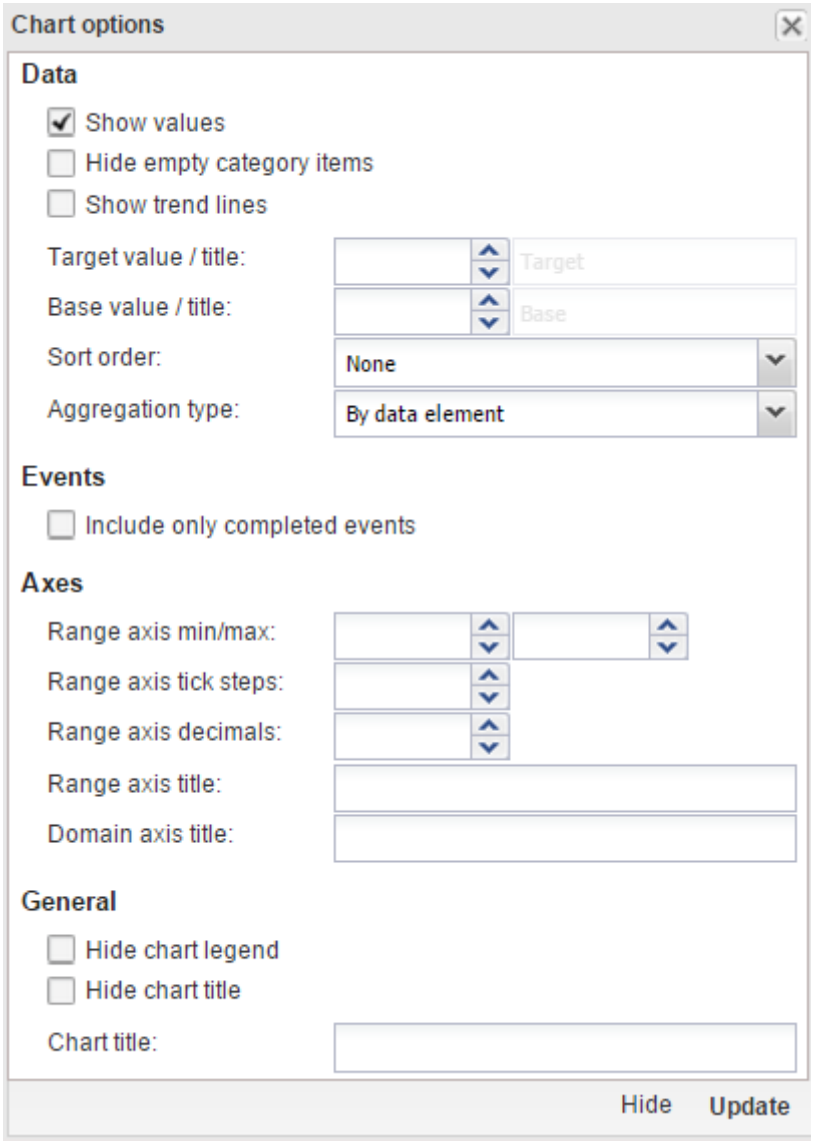
1. Click Layout.
2. Drag and drop the dimensions to the appropriate space. Only one dimension can be in each section.
3. Click Update.

Example 6.1. Chart illustrating the concepts of series, categories and filter



- Series: A series is a set of continuous, related elements (for example periods or data elements) which you want to visualize in order to emphasize trends or relations in its data.
- Categories: A category is a set of elements (for example indicators or organisation units) for which you want to compare its data.
- Filter: The filter selection will filter the data displayed in the chart. Note that if you use the data dimension as filter, you can only specify a single indicator or data set as filter item, whereas with other dimension types you can select any number of items.

6.6. Change the display of your chart



1. Click Options.
2. Set the options as required.

Table 6.3. Chart options

Option	Description
Show values	Shows the values above the series in the chart.
Hide empty category items	Hides the category items with no data from the chart.
Show trend lines	Displays the trend line which visualizes how your data evolves over time. For example if performance is improving or deteriorating. Useful when periods are selected as category.
Target value / title:	Displays a horizontal line at the given domain value. Useful for example when you want to compare your performance to the current target.
Base value / title:	Displays a horizontal line at the given domain value. Useful for example when you want to visualize how your performance has evolved since the beginning of a process.

Option	Description
Sort order:	Allows you to sort the values on your chart from either low to high or high to low.
Aggregation type:	Defines how the data elements or indicators will be aggregated within the chart. Some of the aggregation types are By data element, Count, Min and Max.
Include only completed events	Includes only completed events in the aggregation process. This is useful when you want for example to exclude partial events in indicator calculations.
Range axis min/max:	Defines the maximum and minimum value which will be visible on the range axis.
Range axis tick steps:	Defines the number of ticks which will be visible on the range axis.
Range axis decimals:	Defines the number of decimals which will be used for range axis values.
Range axis title:	Type a title here to display a label next to the range axis (also referred to as the Y axis). Useful when you want to give context information to the chart, for example about the unit of measure.
Domain axis title:	Type a title here to display a label below the domain axis (also referred to as the X axis). Useful when you want to give context information to the chart, for example about the period type.
Hide chart legend	Hides the legend and leaves more room for the chart itself.
Hide chart title	Hides the title of your chart.
Chart title:	Type any title here to display it above the chart.

3. Click Update.

6.7. Manage favorites

Saving your charts as favorites makes it easy to find them later. You can also choose to share them with other users as an interpretation or display them on the dashboard.

You can view the details and interpretations of your favorites when you open the Pivot table or Data Visualization app. You can edit descriptions, share your favorites, or write interpretations directly in this pane, or you can use the Favorites menu.

6.7.1. Open a favorite

1. Click Favorites > Open.
2. Enter the name of a favorite in the search field, or click Prev and Next to display favorites.

6.7.2. Save a favorite

1. Click Favorites > Save as.
2. Enter a name, title and a description for your favorite.
3. Click Save.

6.7.3. Rename a favorite

1. Click Favorites > Rename.
2. Enter the new name for your favorite.
3. Click Update.

6.7.4. Write an interpretation for a favorite

An interpretation is a link to a resource with a description of the data at a given period. This information is visible on the dashboard. To create an interpretation, you first need to create a favorite. If you've shared your favorite with other people, the interpretation you write is visible to those people.

1. Click Favorites > Write interpretation.
2. In the text field, type a comment, question or interpretation. You can see this information on the dashboard.
3. Add a user group that you want to share your favorite with by clicking the + icon.
4. Select:
   a. Allow external access if you want everyone to view this interpretation.
   b. Public access and choose a setting: None, Can view, Can edit and view.
   c. Administrators
5. Click Share.

6.7.5. Create a link to a favorite

1. Click Favorites > Get link.
2. Choose one of the following:
   - Open in this app: You get a URL for the favorite which you can share with other users by email or chat.
   - Open in web api: You get a URL of the API resource. By default this is an HTML resource, but you can change the file extension to ".json" or ".csv".

6.7.6. Delete a favorite

1. Click Favorites > Delete.
2. Click OK.

6.7.7. View interpretations based on relative periods

To view interpretations for relative periods, such as a year ago:

1. Open a favorite with interpretations.
2. Click >>> in the top right of the workspace.
3. Click an interpretation. Your chart displays the data and the date based on when the interpretation was created.To view other interpretations, click them.

6.8. Download a chart as an image or a PDF

After you have created a chart you can download it to your local computer as an image or PDF file.

1. Click Download.
2. Under Graphics, click Image (.png) or PDF (.pdf).

   The file is automatically downloaded to your computer. Now you can for example embed the image file into a text document as part of a report.

6.9. Download chart data source

You can download the data source behind a chart in JSON, XML, Excel, CSV, JXRML or Raw data SQL formats with different identification schemes (ID, Code, and Name). The data document uses identifiers of the dimension items and opens in a new browser window to display the URL of the request to the Web API in the address bar. This is useful for developers of apps and other client modules based on the DHIS2 Web API or for those who require a plan data source, for instance for import into statistical packages.

To download plain data source formats:

1. Click Download.
2. Under Plain data source, click the format you want to download.

   Table 6.4. Available formats

Format	Action	Description
JSON	Click JSON	Downloads JSON format based on ID property. You can also download JSON format based on Code or Name property.
XML	Click XML	Downloads XML format based on ID property. You can also download XML format based on Code or Name property.
Microsoft Excel	Click Microsoft Excel	Downloads Microsoft Excel format based on ID property. You can also download Microsoft Excel format based on Code or Name property.
CSV	Click CSV	Downloads CSV format based on ID property. You can also download CSV format based on Code or Name property.
JRXML	Put the cursor on Advanced and click JRXML	Produces a template of a Jasper Report which can be further customized based on your exact needs and used as the basis for a standard report in DHIS 2.
Raw data SQL	Put the cursor on Advanced and click Raw data SQL	Provides the actual SQL statement used to generate the data visualization. You can use it as a data source in a Jasper report, or as the basis for a SQL view.

6.10. Embed charts in any web page

Certain analysis-related resources in DHIS2, like pivot tables, charts and maps, can be embedded in any web page by using a plug-in. You will find more information about the plug-ins in the Web API chapter in the DHIS2 Developer Manual.

To generate a HTML fragment that you can use to display the chart in an external web page:

1. Click Share > Embed in web page.

   The Embed in web page window opens.
2. Click Select to highlight the HTML fragment.

6.11. Open a chart as a pivot table or as a map

- Open a Chart and click Chart or click Map.

Chapter 7. Using the GIS app

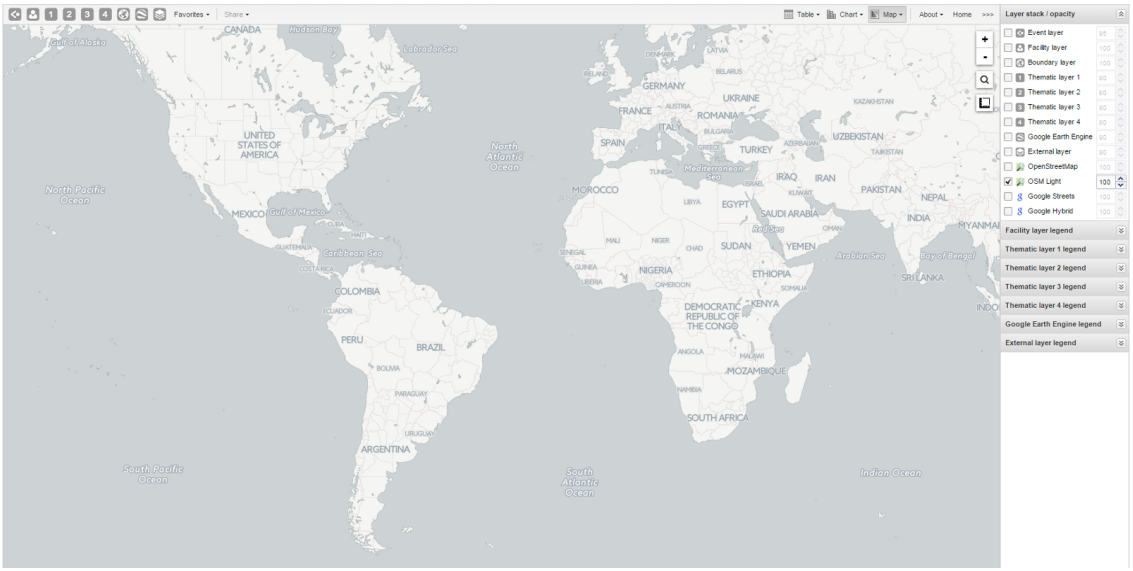
7.1. About the GIS app

With the GIS app you can overlay multiple layers and choose among different base maps. You can create thematic maps of areas and points, view facilities based on classifications, and visualize catchment areas for each facility. You can add labels to areas and points, and search and filter using various criteria. You can move points and set locations on the fly. Maps can be saved as favorites and shared with other people.

Note

To use predefined legends in the GIS app, you need to create them first in the Maintenance app.

Here's an overview of the GIS app workspace



- The icons in the top left of the workspace represent the map layers. They are the starting point of the GIS app.
- The panel on the right side of the workspace shows an overview of the layers:
  - The default base map is OSM Light. It's selected by default. If you're online you'll also see OpenStreetMap, Google Streets and Google Hybrid. You can use these maps as background maps and layers. Switch between them by selecting or clearing the checkbox.
  - If you want to increase or reduce the opacity of a layer, use the up and down arrows for the selected layer.
  - Use the map legends when you create a thematic map. A legend explains the link between values and colors on your map.
- Zoom to content automatically adjusts the zoom level and map center position to put the data on your map in focus.
- To view information for an event, simply click the event.
- Right-click to display the longitude and latitude of the map.

7.2. Create a new thematic map

You use four vector layers to create a thematic map. The workflow for creating a new thematic map is:

1. In the Apps menu, click GIS.

   The DHIS2 GIS window opens.

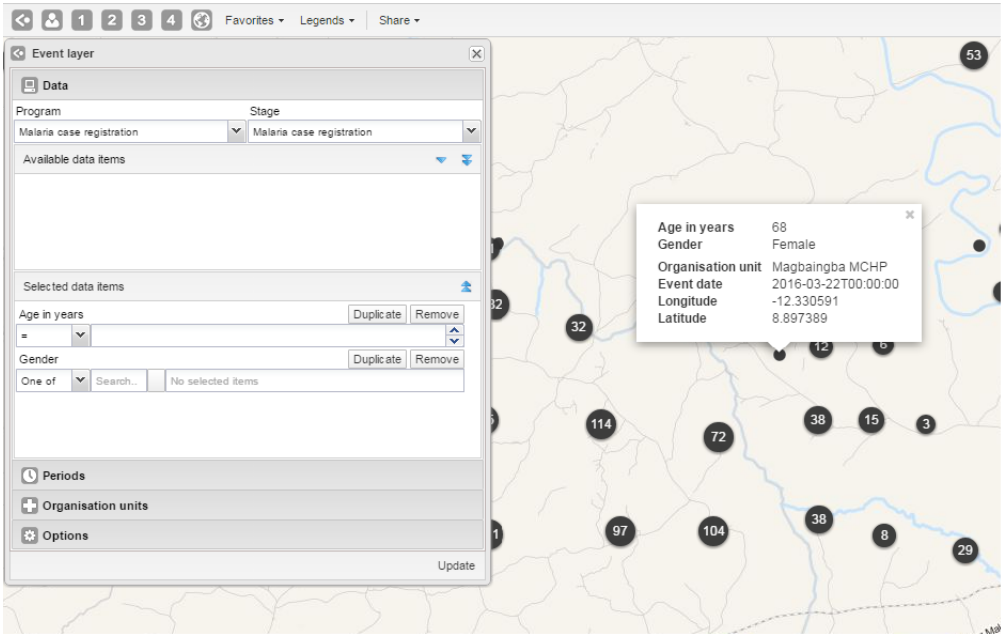
2. In the top menu, click a layer you want to add to the map.
   - Event layer
   - Facility layer
   - Boundary layer
   - Thematic layer 1 - 4
3. Click Edit layer and select the parameters you need..
4. Click Update.

7.3. Manage event layers

The event layer displays the geographical location of events registered in the DHIS2 tracker. Provided that events have associated GPS coordinates, you can use this layer to drill down from the aggregated data displayed in the thematic layers to the underlying individual events or cases.

You can also display aggregated events at the facility or at the boundary level. You do this through a thematic layer using event data items. This is useful when you only have the coordinates for the Org Unit under which the events are recorded.

Event layer



7.3.1. Create or an modify event layer

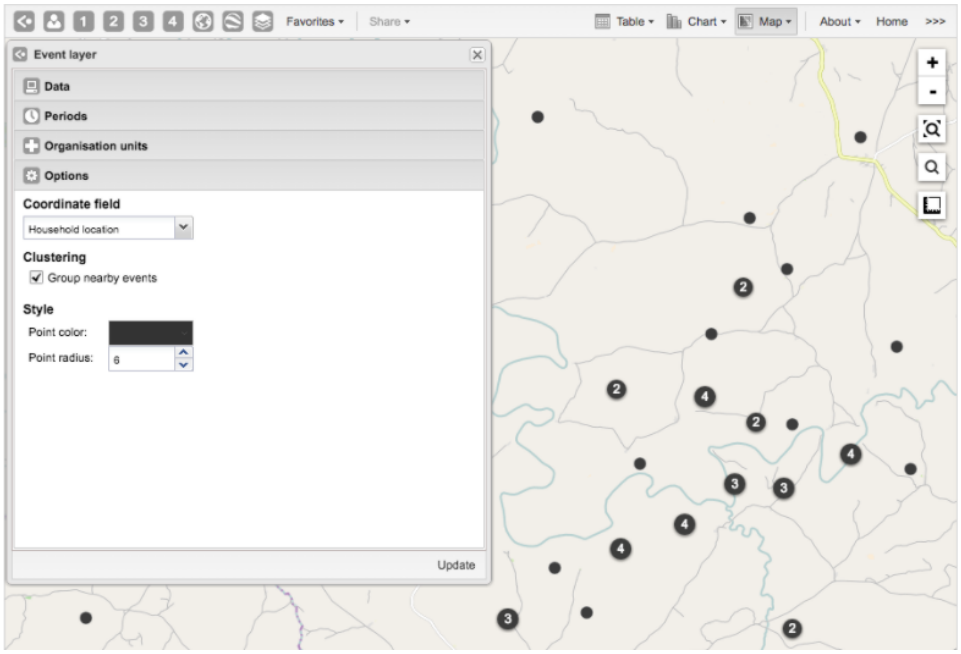
1. In the top menu, click the event layer icon.
2. Click Edit layer.
3. Select a program and then select a program stage.

   If there is only one stage available for the selected program, the stage is automatically selected. A list of data elements and attributes will appear in the Available data items panel.

4. Select any data element or attribute from this list as part of your query.

- To select you can either double-click a data element or (multi) select and use the single-arrow downward button. The double-arrow button will select all data elements in the list. All selected data elements will get their own row in the Selected data items.
- For data elements of type text you will get two choices: Contains implies that the query will match all values which contains your search value, and Is exact implies that only values which is completely identical to your search query will be returned.
- For data elements of type option set, you can select any of the options from the drop down box by using the down-wards arrow or by start typing directly in the box to filter for options.

5. In the Periods section, select the time span for when the events took place. You can select either a fixed period or a relative period.
   - Fixed period: In the Period field, select Start/end dates and fill in a start date and an end date.
   - Relative period: In the Period field, select one of the relative periods, for example This month or Last year.
6. In the Organisation units section, select the organisation units you want to include in the query.
7. In the Options section, you can:
   - Select a value from the Coordinate field for the positions shown on the map. By default, "Event location" is selected. Depending on the data elements or attributes that belong to a program, other coordinates such as "Household position" are available.



   - Select or clear Clustering to group nearby events.
   - Go to Style to select a color for the cluster points or change the radius of clusters (between 1 and 20).

   Clustering if you want to group nearby events and change the style of the cluster points.
8. Click Update.

7.3.2. Turn off cluster

By default events are clustered in a map. You can turn off this function to display all events separately.

1. In the top menu, click the event layer icon.
2. Click Edit layer.
3. Click Options.

4. Clear Group nearby events check box.
5. Click Update.

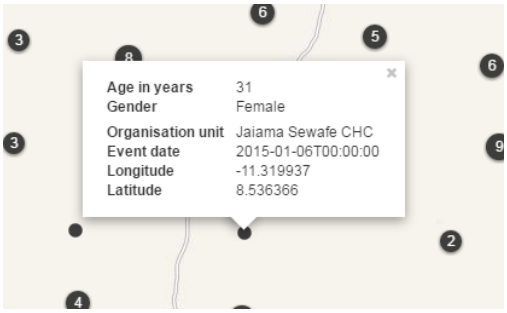
7.3.3. Modify cluster style

1. In the top menu, click the event layer icon.
2. Click Edit layer.
3. In the Options section, change the Point color and Point radius.
4. Click Update.

7.3.4. Modify information in event pop-up windows

For events in a cluster map, you can modify the information displayed in the event pop-up window.

Pop-up window with event information



1. Open the Programs / Attributes app.
2. Click Program.
3. Click the program you want to modify and select View program stages.
4. Click the program stage name and select Edit.
5. Scroll down to the Selected data elements section.
6. For every data element you want to display in the pop-up window, select corresponding Display in reports.
7. Click Update.

7.3.5. Clear event layer

To clear all data in a map:

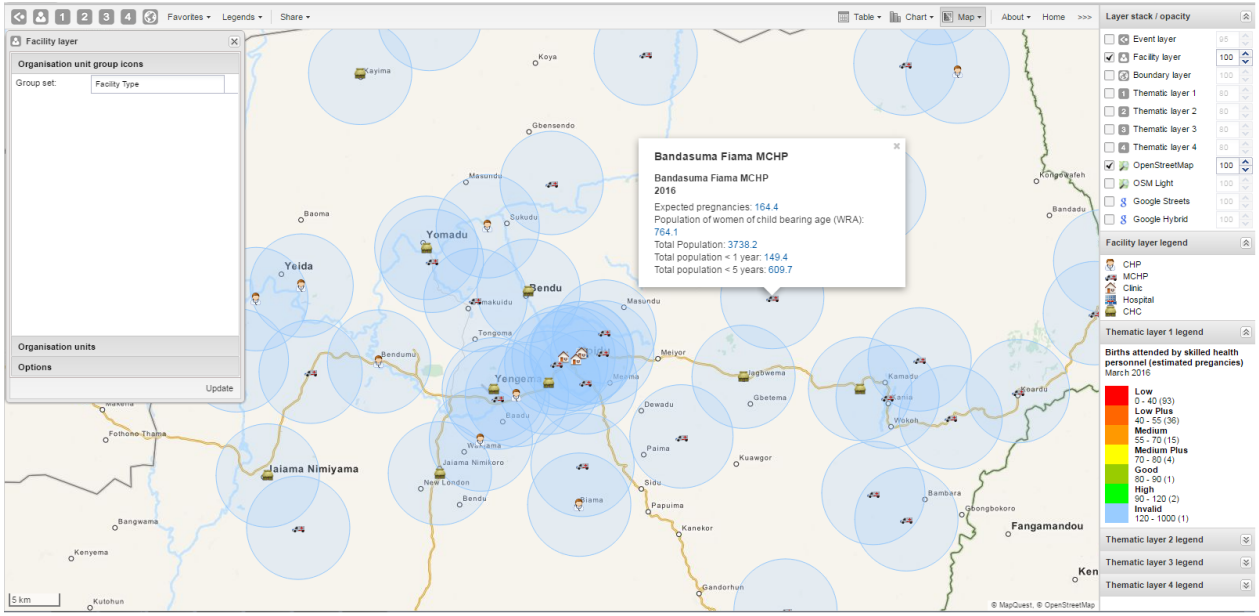
1. In the top menu, click the event layer icon.
2. Click Clear.

7.4. Manage facility layers

The facility layer displays icons that represent types of facilities. Polygons do not show up on the map, so make sure that you select an organisation unit level that has facilities.

A polygon is an enclosed area on a map representing a country, a district or a park. In GIS, a polygon is a shape defined by one or more rings, where a ring is a path that starts and ends at the same point.

Facility layer



7.4.1. Create or modify a facility layer

1. In the top menu, click the facility layer icon.
2. Click Edit layer.
3. In the Organisation unit group icons section, select a Group set.
4. In the Organisation units section, select one or several organisation units.
5. In the Options section, select if you want to show labels and if so, how they look.
6. In the Options section, select if you want to display a circle with a certain radius around each facility.
7. Click Update.

7.4.2. Search for an organisation unit

To locate an organisation unit in the map:

1. In the top menu, click the facility layer icon.
2. Click Search.

   The Organisation unit search dialog box opens.
3. In the text field, type the name of the organisation unit you are looking for or click a name in the list.

   The organisation unit is highlighted in the map.

7.4.3. Clear facility layer

To clear all data in a facility layer:

1. In the top menu, click the facility layer icon.
2. Click Clear.

7.5. Manage facilities in a layer

You can have facilities in Facility, Boundary and Thematic layers.

7.5.1. Relocate a facility

1. Right-click a facility and click Relocate.
2. Put the cursor in the new location.

   The new coordinate is stored permanently. This cannot be undone.

7.5.2. Swap longitude and latitude of a facility

1. Right-click a facility and click Swap long/lat.

   This is useful if a user inverted latitude and longitude coordinates when creating the organisation unit.

7.5.3. Display facility information

You can view organisation unit information set by the administrator as follows:

Table 7.1. View organisation unit information

Function	Action
View information for the current period	1. Click a facility.
View information for a selected period	1. Right-click a facility and click Show information. 2. In the Infrastructural data section, select a period.

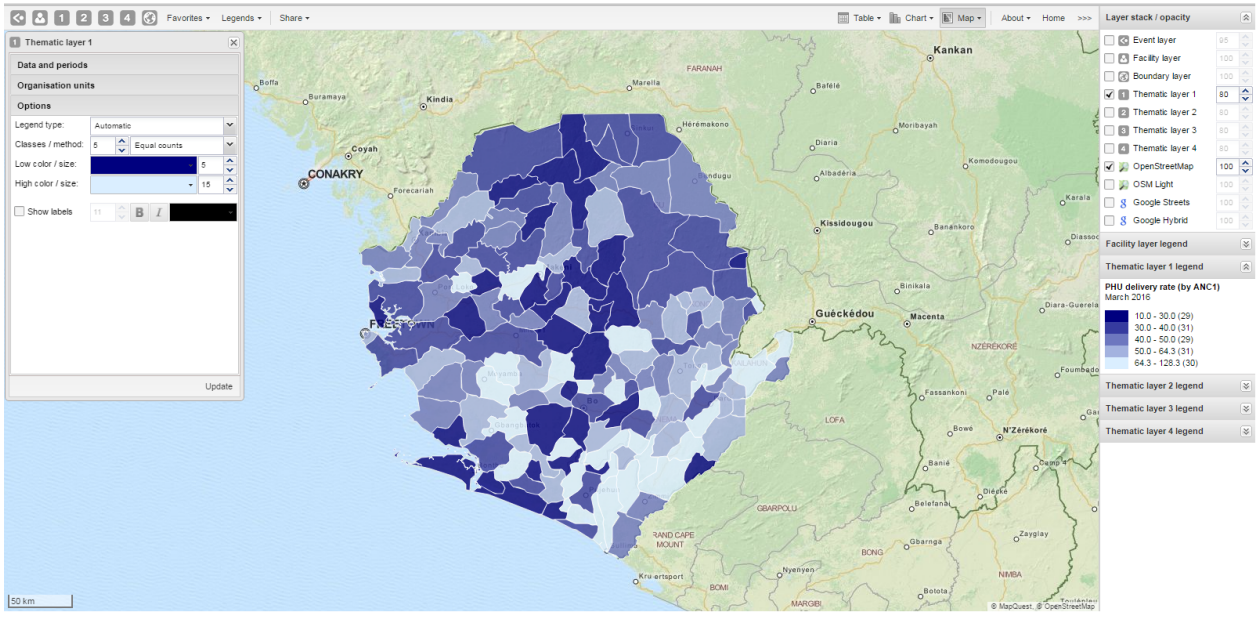
7.6. Manage thematic layers 1- 4

There are four thematic layers in the GIS app. With these layers panels you can use your data for thematic mapping. Select your desired combination of indicator/data element, and period. then the organisation unit level. If your database has coordinates and aggregated data values for these organisation units, they will appear on the map.

Note

You must refresh the DHIS2 analytics tables to have aggregated data values available.

Example of a thematic map



7.6.1. Create or modify a thematic layer

1. In the top menu, click the icon of the thematic layer you want to create or modify.
2. Click Edit layer.
3. In the Data and periods section, select the data and periods you want to display.
4. In the Organisation units section, select one or several organisation units.
5. In the Options section, go to Legend type and select Automatic or Predefined.

   - Automatic legend types means that the application will create a legend set for you based on your what method, number of classes, low color and high color you select. Method alludes to the size of the legend classes.

     Set to Equal intervals they will be “highest map value – lowest map value / number of classes”.

     Set to Equal counts the legend creator will try to distribute the organisation units evenly.

     The legend appears as an even gradation from the start color to the end color.
   - If you have facilities in your thematic layer, you can set the radius for maximum and minimum values by changing the values in the Low color / size and High color size boxes.
6. In the Options section, select if you want to show labels and if so, how they look.
7. In the Options panel, select an aggregation type. See also Aggregation operators.
8. Click Update.

7.6.2. Filter values in a thematic layer

Thematic layer 1-4 menu have a Filter option in addition to the boundary layer menu options. It lets you apply value filters to the organisation units on the map. The filter is removed when you close the filter window.

To filter values in a thematic layer:

1. In the top menu, click the icon of thematic layer you want to create or modify.
2. Click Filter....
3. Modify the Greater than and And/or lower than values.
4. Click Update.

7.6.3. Search for an organisation unit

To locate an organisation unit in a thematic layer:

1. In the top menu, click the relevant thematic layer icon.
2. Click Search.

   The Organisation unit search dialog box opens.
3. In the text field, type the name of the organisation unit you are looking for or click a name in the list.

   The organisation unit is highlighted in the map.

7.6.4. Navigate between organisation hierarchies

When there are visible organisation units on the map, you can easily navigate up and down in the hierarchy without using the level/parent user interface.

1. Right-click one of the organisation units.
2. Select Drill up or Drill down.

   The drill down option is disabled if you are on the lowest level or if there are no coordinates available on the level below. Vice versa goes for drilling up.

7.6.5. Clear thematic layer

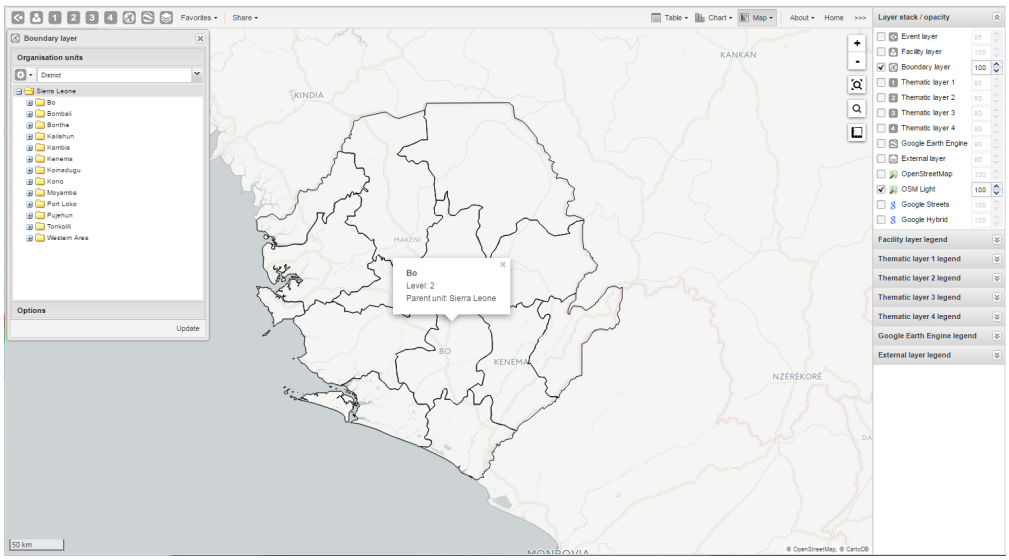
To clear all data in a thematic layer:

1. In the top menu, click the relevant thematic layer icon.
2. Click Clear.

7.7. Manage boundary layers

The boundary layer displays the borders and locations of your organisation units. This layer is useful if you are offline and don't have access to background maps.

Boundary layer



7.7.1. Create or modify boundary layers

1. In the top left menu, click the boundary layer icon.
2. Click Edit layer.
3. In the Organisation units section, select one or several organisation units.

   You can select the organisation units you want to show on the map by selecting a level and a parent. That means "show all organisations units at this level that are children of this parent".
4. In the Options section, select if you want to show labels and if so, how they look.
5. Click Update.

7.7.2. Search for organisation units

To locate an organisation unit on the map:

1. In the top menu, click the boundary layer icon.
2. Click Search.

The Organisation unit search dialog box opens.

3. In the text field, type the name of the organisation unit you are looking for or click a name in the list.

   The organisation unit is highlighted in the map.

7.7.3. Navigate between organisation hierarchies

When there are visible organisation units on the map, you can easily navigate up and down in the hierarchy without using the level/parent user interface.

1. Right-click one of the organisation units.
2. Select Drill up or Drill down.

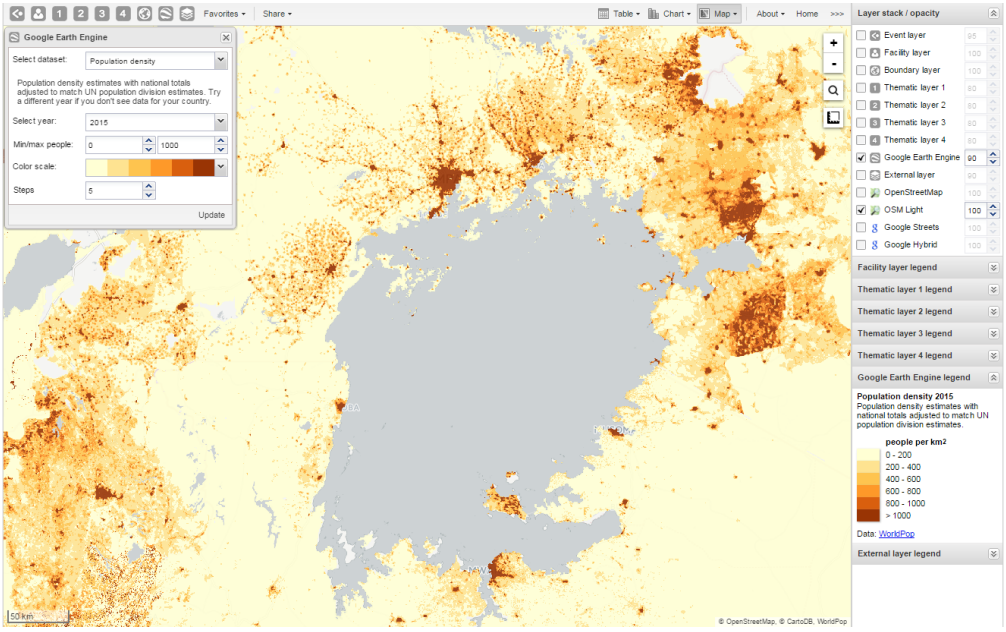
   The drill down option is disabled if you are on the lowest level or if there are no coordinates available on the level below. The same applies when you are drilling up.

7.7.4. Clear boundary layer

To clear data in a boundary layer:

1. In the top menu, click the boundary layer icon.
2. Click Clear.

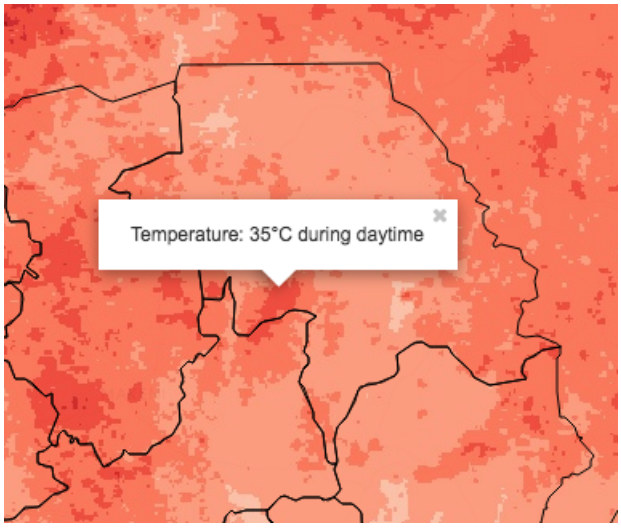
7.8. Manage Earth Engine layer



The Google Earth Engine layer lets you display satellite imagery and geospatial datasets from Google's vast catalog. This layer is useful in combination with thematic and event layers to enhance analysis. The following layers are supported:

- Elevation: Metres above sea level
- Nighttime lights: Lights from cities, towns, and other sites with persistent lighting, including gas flares (from 2013)
- Population density: Population in 100 x 100 m grid cells (from 2010)
- Temperature, population and land cover at any location.

Right-click on the layers to view more information, for example temperature and elevation.



7.8.1. Create or modify an Earth Engine layer

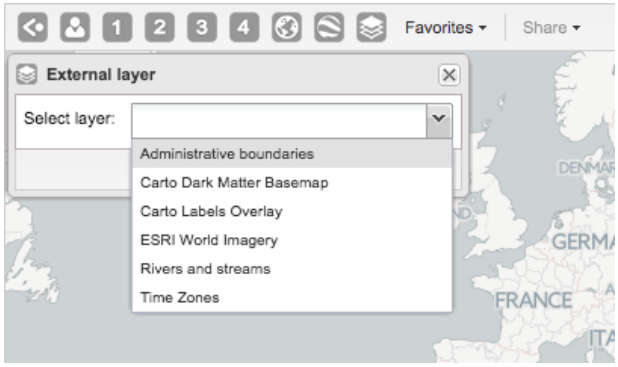
1. In the top menu, click the Google Earth Engine layer icon.
2. Select a data set, for example "Elevation".
3. Select Min / max value.

   The meaning of these values depend on which data set you've selected.
4. Select a Color scale.
5. Select the number of Steps.

   The number of steps means the number of distinct colors in the color scale.
6. Click Update.

7.9. Add external map layers

1. In the top menu, click the External layer icon.
2. Click Edit to add a new layer.
3. Select a layer from the list.



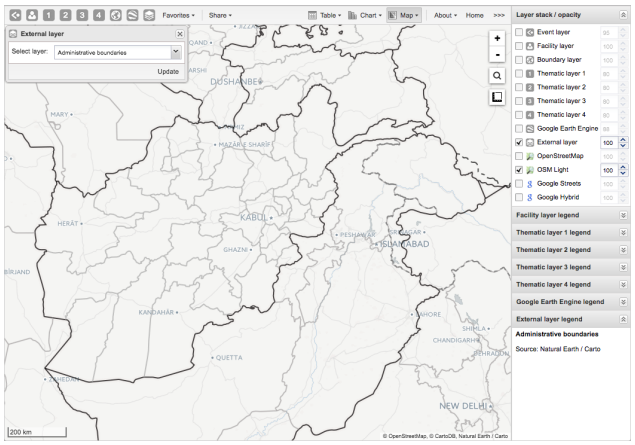
4. Click Update.

   To remove a layer, click Clear.

   To hide a layer, go to the Layer stack/opacity menu pane and clear the External layer checkbox.

Here are some examples of external layers:

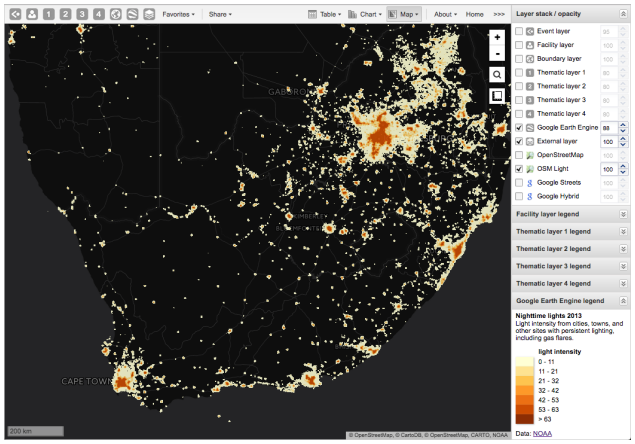
Example 1: First-order administrative boundaries



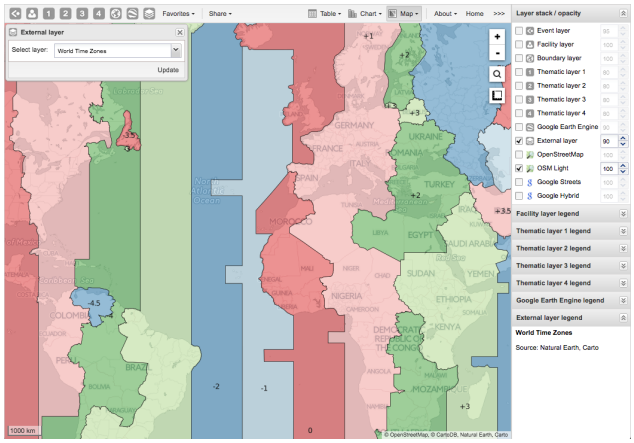
Example 2: Aerial imagery of Dar-es-Salaam



Example 3: Dark basemap with nighttime lights from Google Earth Engine



Example 4: World time zones

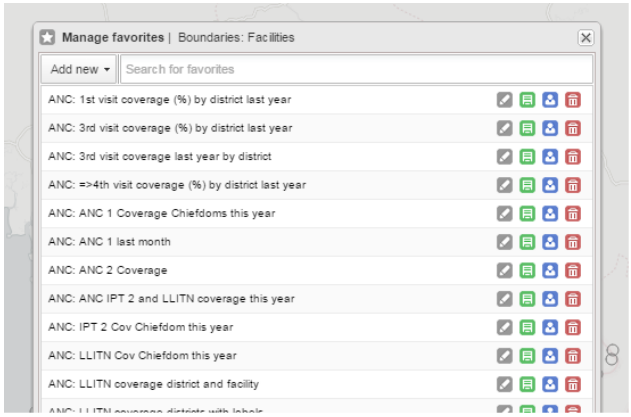


Note

To define external map layers, see the Maintenance app documentation.

7.10. Manage map favorites

Favorite maps



Saving your maps as favorites makes it easy to restore them later. It also gives you the opportunity to share them with other users as an interpretation or put it on the dashboard. You can save all types of layers as a favorite. A favorite always opens with the default background map.

7.10.1. Save a map as a favorite

When you have created a map it is convenient to save it as a favorite:

1. Click Favorites.

   The Manage favorites dialog box opens.

2. Click Add new.

   The Create new favorite dialog box opens.

3. In the text field, type the name you want to give your pivot table.

4. Click Create.

   Your favorite is added to the list.

7.10.2. Open a favorite

1. Click Favorites.

   The Manage favorites dialog box opens.
2. Find the favorite you want to open. You can either use Prev and Next or the search field to find a saved favorite. The list is filtered on every character that you enter.
3. Click the name.

7.10.3. Rename a favorite

1. Click Favorites.

   The Manage favorites dialog box opens.
2. Find the favorite you want to rename.

   You can either use Prev and Next or the search field to find a saved favorite.
3. Click the grey rename icon next to the favorite's name.

   The Rename favorite dialog box favorite opens.
4. Type the new name and click Update.

7.10.4. Overwrite a favorite

To save the current map to an existing favorite (overwrite):

1. Click Favorites.

   The Manage favorites dialog box opens.
2. Find the favorite you want to overwrite.

   You can either use Prev and Next or the search field to find a saved favorite.
3. Click the green overwrite icon next to the favorite's name.
4. Click OK to confirm that you want to overwrite the favorite.

7.10.5. Share a map interpretation

For certain analysis-related resources in DHIS2, you can share a data interpretation. An interpretation is a link to the relevant resource together with a text expressing some insight about the data.

To create an interpretation of a map and share it with all users of the system:

1. Open or create a favorite map.
2. Click Share > Write interpretation.

   The Write interpretation dialog box opens.
3. In the text field, type a comment, question or interpretation.
4. Click Share.

   The dialog box closes automatically. You can see the interpretation on the Dashboard.

7.10.6. Modify sharing settings for a favorite

After you have created a map and saved it as a favorite, you can share the favorite with everyone or a user group. To modify the sharing settings:

1. Click Favorites.
2. Find the favorite you want to share.

   You can either use Prev and Next or the search field to find a saved favorite.
3. Click the blue share icon next to the favorite's name.
4. In the text box, enter the name of the user group you want to share your favorite with and click the + icon.

   The chosen user group is added to the list of recipients.

   Repeat the step to add more user groups.
5. If you want to allow external access, select the corresponding box.
6. For each user group, choose an access setting. The options are:
   - None
   - Can view
   - Can edit and view
7. Click Save.

7.10.7. Delete a favorite

1. Click Favorites.

   The Manage favorites dialog box opens.
2. Find the favorite you want to delete.

   You can either use Prev and Next or the search field to find a saved favorite.
3. Click the red delete icon next to the favorite's name.
4. Click OK to confirm that you want to delete the favorite.

7.11. Save a map as an image

1. Take a screenshot of the map with the tool of your choice.
2. Save the screenshot in desired format.

7.12. Embed a map in an external web page

Certain analysis-related resources in DHIS2, like pivot tables, charts and maps, can be embedded in any web page by using a plug-in. You will find more information about the plug-ins in the Web API chapter in the DHIS2 Developer Manual.

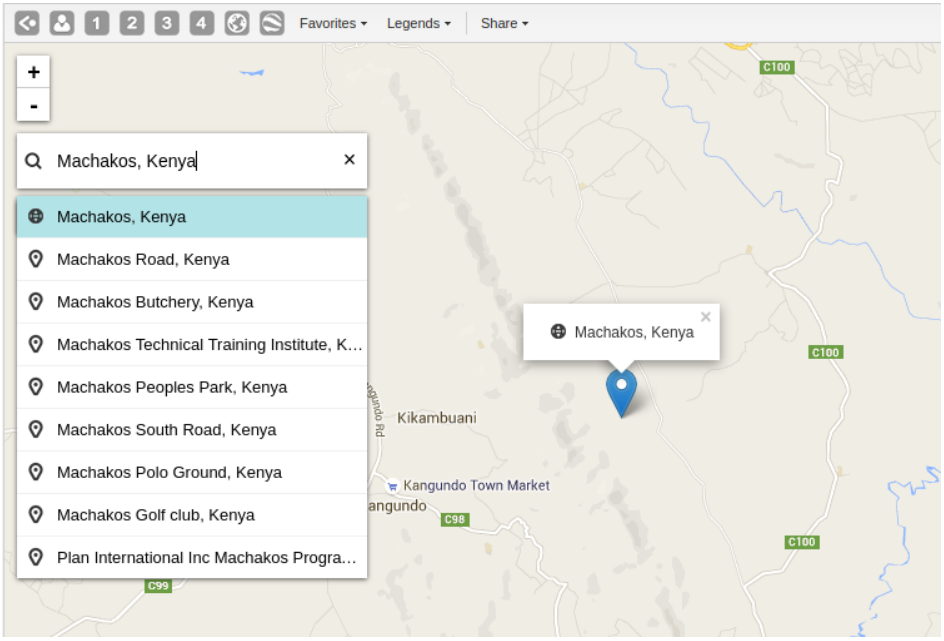
To generate a HTML fragment that you can use to display the map in an external web page:

1. Click Share > Embed in web page.

   The Embed in web page window opens.
2. Click Select to highlight the HTML fragment.

7.13. Search for a location

The place search function allows you to search for almost any location or address. The place search is powered by the Mapzen mapping platform. This function is useful in order to locate for example sites, facilities, villages or towns on the map.



1. On the left side of the GIS window, click the magnifier icon.
2. Type the location you're looking.

   A list of matching locations appear as you type.
3. From the list, select a location. A pin indicates the location on the map.

7.14. Measure distances and areas in a map

1. In the upper left part of the map, put the cursor on the Measure distances and areas icon and click Create new measurement.
2. Add points to the map.
3. Click Finish measurement.

7.15. Get the latitude and longitude at any location

Right-click a map and select Show longitude/latitude. The values display in a pop-up window.



7.16. View a map as a pivot table or chart

When you have made a map you can switch between pivot table, chart and map visualization of your data. The function is inactive if the data the map is based on cannot render as a chart or table.

7.16.1. Open a map as a chart

1. Click Chart > Open this map as chart.

   Your current map opens as a chart.

7.16.2. Open a map as a pivot table

1. Click Chart > Open this map as table.

   Your current map opens as a pivot table.

7.17. See also

- Manage legends

Chapter 8. Dashboards

8.1. About dashboards

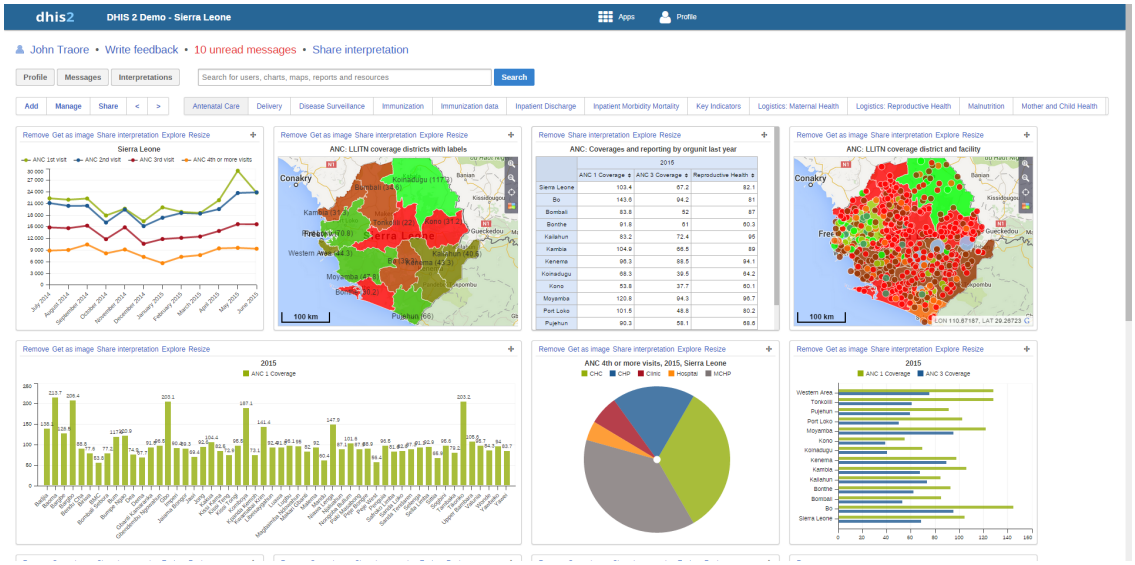
Dashboards are intended to provide quick access to different analytical objects (maps, charts, reports, tables, etc) to an individual user. Dashboards can also be shared with user groups.

Example 8.1.

A user or administrator could create a dashboard called "Malaria" which might contain all relevant information on malaria. This dashboard could then be shared with the user group called "Malaria control", which might consist of all users of the malaria control program. All users within this group would then be able to view the same dashboard.

8.2. Setting up the dashboard

The dashboard can contain any number of objects (charts, maps, reports, tables, resources, etc). These can be freely arranged on the dashboard as you wish. Dashboard items can be located and added by searching for favourites, resources, users or messages in the available search box and clicking on the "Add" button.



In this screen shot, the dashboard has already been populated with a number of objects, such as charts, map views, tables and messages. There are several hyperlink options available on each item:

- Remove

  Allows you to remove the item from the dashboard when you have the appropriate user rights.

- Get as Image

  Opens up a pop-up window and allows you to download the image to your computer.

- Share interpretation

  Allows you to share an interpretation of the dashboard item. Your interpretation will be shared publicly with other users of the DHIS2 system, in the "Interpretation" section of the dashboard.

- Explore

Loads the favorite in its corresponding app (ie. a map will open full-sized in the GIS app).

- Resize

  Resizes the dashboard item. There are 3 sizes in which to choose from.

Maps, charts and tables can be viewed as full size as images (in the case of charts and map views) or as HTML resources (in the case of reports, tables and messages).

To reorder how the dashboard appears, simply drag-and-drop any of the objects to a new position. In order to change between the various dashboards which are available, simply select the listed items that are available to review. The list can be scrolled though by using the <, > symbols to the left of the dashboard names.

8.3. Change dashboards name

1. Open a DHIS2 dashboard.
2. Click Manage.
3. In the Name field, type the new name of the dashboard.
4. Click Rename.

8.4. Add message widget to dashboards

1. Open a DHIS2 dashboard.
2. Click Manage and click Messages.

8.5. Delete dashboards

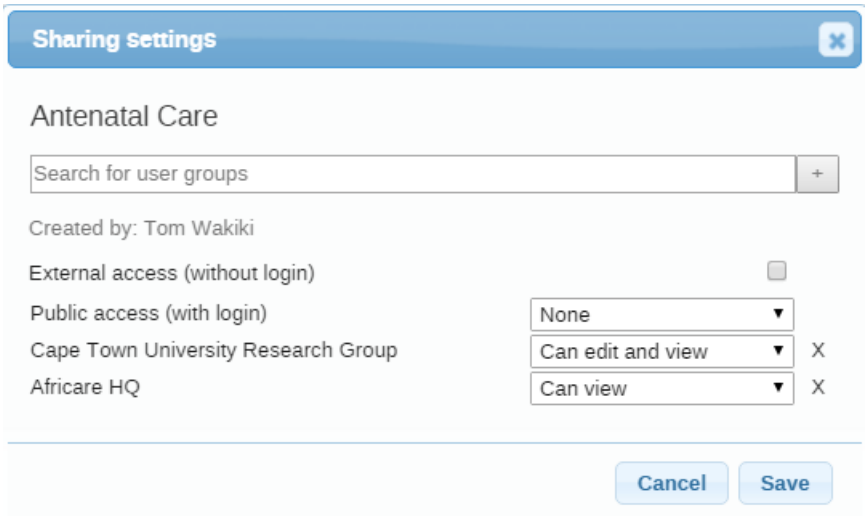
1. Open a DHIS2 dashboard.
2. Click Manage and click Delete.

8.6. Translate dashboard names

1. Open a DHIS2 dashboard.
2. Click Manage and click Translate.
3. Select a locale and enter the dashboard name's translation.
4. Click Save.

8.7. Dashboard Sharing

In order to share a dashboard with user groups, first select "Share" from the dashboard page. This will bring up the dashboard sharing settings options. To share the dashboard with specific user groups, type in their name in the sharing settings dialogue box and click on the "+" sign to add them to the dashboard sharing settings



All dashboards have two sharing groups set by default.

- External access (without login)

  This option, when selected, provides access to the dashboard as an external resource. This is useful for when you are creating an external web portal but would like to call information from a dashboard you have made internally within DHIS2. By default, this option is not selected.
- Public access (with login)

  This option allows the selected dashboard to be pushed to all users within your DHIS2 instance. This can also be hidden from public view by selecting the "None" option, which is the default option for new dashboards.

User groups which have been added manually can be assigned two types of permissions within the dashboard

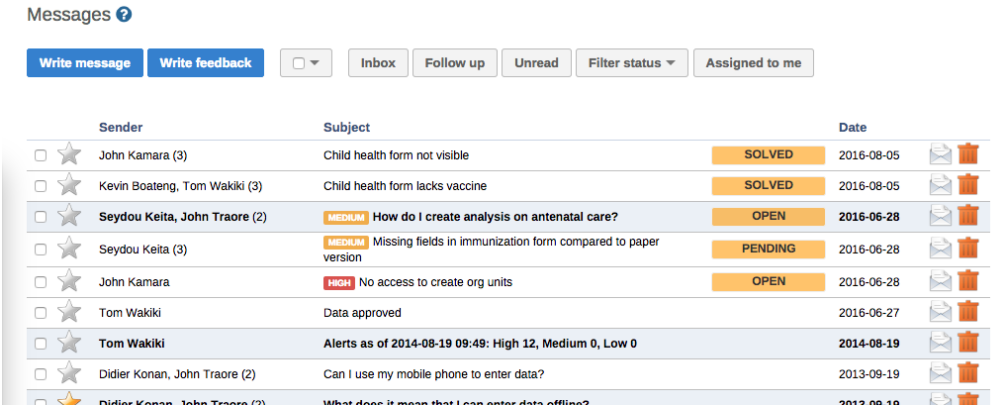
- Can view

  Provides the user group with view only rights to the dashboard.
- Can edit and view

  Allows the user groups to edit the dashboard in addition to viewing it. Editing allows for altering the layout, resizing and removing items, renaming/deleting the dashboard etc.

8.8. Manage messages and feedback messages

8.8.1. About messages and feedback messages

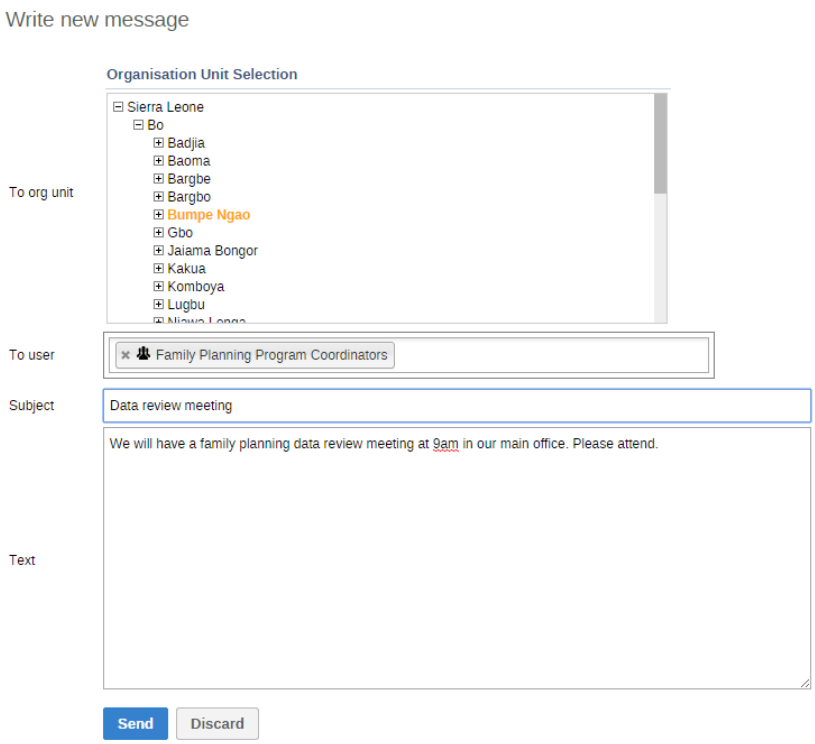


Within DHIS2 you can send messages and feedback messages to users, user groups and organisation units. When you send a feedback message, it is routed to a particular user group. If you're a member of this user group, you've access to feedback handling tools. You can for example set the status of an incoming feedback to "Pending" while you're waiting for information.

Note

Messages and feedback messages are not sent to users' e-mail addresses, the messages only appear within DHIS2.

8.8.2. Create a message



1. From the Dashboard, click Messages.
2. Click Write message.
3. Define who you want to receive the message. You can send a message to organisation units, users and user groups.
   - In the To org unit field, select the organisation units or group of organisation units you want to send the message to.
   - In the To user field, select the users or user groups you want to send the message to.
4. Type a subject and a message.
5. Click Send.

8.8.3. Read a message

1. From the Dashboard, click Messages.
2. Click a message.

   If the message is part of a conversation, you'll see all messages in this conversation.

8.8.4. Create a feedback message

1. From the Dashboard, click Write feedback.

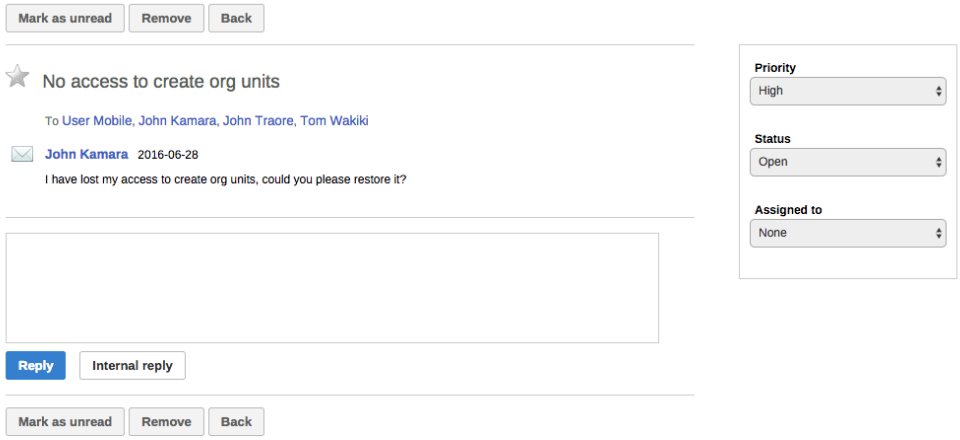
2. Type a subject and a feedback message.
3. Click Send.

   The feedback message will appear in all of the specified users' inboxes.

8.8.5. Manage feedback messages

Note

You'll only see feedback messages and have access to the feedback handling tools if you are a member of the user group that is set up to handle feedback messages.



You'll receive feedback messages to your Messages inbox. For feedback messages you've the following options in addition to the messages options:

Table 8.1. Feedback handling tools

Function	Description
Priority	You can mark a feedback message with different priorities: None, Low, Medium or High. Setting the priority makes it easier to keep track of which feedback message you need resolved first, and which feedback messages that can wait.
Status	All feedback messages get the status Open when created. To keep track of existing feedback messages, you can change the status to Pending, Invalid or Solved. You can filter feedback messages in your inbox

Function	Description
	based on their status. This makes it easier to switch between feedback messages and normal messages.
Assigned to	You can assign a feedback message to any member of the user group that is set up to handle feedback messages. None means that you haven't assigned a user to the feedback message.
Internal reply	When you work in a feedback handling team you might want to discuss the feedback before sending an answer to the sender. You can keep this discussion in the same message conversation as the feedback itself. To send a reply that within the feedback handling user group, click Internal reply.

8.8.6. Configure feedback message function

To configure the feedback message function, you must:

1. Create a user group (for example "Feedback message recipients") that contains all the users who should receive feedback messages.
2. Open the System Settings app and click General > Feedback recipients and select the user group you created in the previous step.

Chapter 9. User account preferences

In User settings, users can change the display language of DHIS2 and the language of the database. The database language is the translated content of the metadata, such as data elements and indicators. Users can also choose a display style, and enable or disable SMS and email notifications. If they wish to, users can choose to display a short name, such as "Joe" in the analysis modules, rather than their full name.

In User profile, users can add personal information to their profile such as their email address, mobile phone number, date of birth and more. When users send messages, the person receiving the message can see their profile details.

In Account settings, users can reset their password.