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# DHIS2 Android App

DHIS2 Documentation Team



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## About this guide

The DHIS 2 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.

DHIS 2 is a browser-based application. In many cases, screenshots have been included for enhanced clarity. Shortcuts to various functionalities are displayed such as **Data element > Data element group**. The ">" symbol indicates that you should click **Data element** and then click **Data element group** in the user interface.

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.



### Complete

Information contained in these sections, will indicate that these are issues that have been fully implemented.



### Incomplete

Information contained in these sections, will indicate that these are issues that are not implemented and will be ignored.



### N/A Not\_applicable

N/A

Information contained in these sections, will indicate that these are issues not applicable.



### Work\_in\_progress

Information contained in these sections, will indicate that these are issues or features not completely implemented or with unexpected behaviour already reported.

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..](#)

## Introduction

This guide is designed to assist you in configuring DHIS 2 for use with the Android Capture App.

It is not a tutorial or training manual; it is designed to complement the core DHIS 2 documentation and training materials with specific reference material for the Android application.

The document is divided into sections, which are intended to describe all the features that have been implemented in the app, those that have not yet been implemented and those that will not be supported. Where applicable, an explanation of problems with the use of a particular feature in Android app will be provided. Recommendations or tips will also be presented for a better understanding and use of the app.

In addition, the document has sections for new features in the login, visual configurations, synchronization management and a list of known important errors.

## Recommendations for a DHIS 2 mobile deployment

If you plan to deploy the DHIS2 Android App in the field, we strongly recommend you to read the [Mobile Implementation Guidelines](#) published by UiO. It includes chapters on technology requirements, security and configuration aspects, and testing and roll out recommendations. Below you will find some key aspects briefly introduced, we recommend reading the extended document.

### Mobile device specifications

The DHIS2 Android App is compatible and supported for DHIS 2 versions 2.35 to 2.37. And has no breaking changes with 2.30 to 2.34.

It requires a device that is running Android v4.4 (not recommended but supported until Apr 2022) or higher. The minimum recommended for new devices: Android 7 or higher.

In [the specific section of the Mobile Implementation Guidelines](#) you will find recommendations for new mobile device acquisitions for a Dhis2 Android deployment.

### Testing and Piloting

If you plan to deploy the DHIS 2 Android App in the field, you should first do a full round of testing of the app in your own configuration.

The app has been extensively tested with the demo servers, and during Beta testing it was tested against some real configurations as well. We know, however, that every DHIS 2 configuration is special in many senses, and might cause inconsistencies that we have not been able to identify.

It is strongly advised to carry out a comprehensive testing of the app in your own server before piloting it.

## Contribute to the App

### How to report a bug

First of all, please check the [List of already reported bugs in JIRA](#)

The list is always updated as you add new bugs and we work on them. You need an active, free DHIS 2 Jira account.

When reporting a bug please specify together with your description:

- DHIS 2 version and build revision
- DHIS 2 Android App version
- Android OS version
- Device (when possible)
- Error log (when possible)

### How to suggest Icons to the library

DHIS 2 and the new DHIS 2 Android App allows you to select icons for programs, datasets and the options of an optionset. DHIS 2 2.30 incorporates 125 icons. We plan to expand the collection of icons on each future version of DHIS 2- for that we need your help: we are seeking ideas for new icons - please submit yours using [this form](#).

### How to add translations

The steps to contribute to the translation of the app are:

1. Create an account in [Transifex](#)
2. Join Existing Organization
3. Search for HISP UiO and select the organization not the projects
4. Select ANDROID: Capture project
5. Join the team for the selected language

Please let us know if it doesn't work well or if you need to add a new language by sending a message in the community to the user dhis2-android.

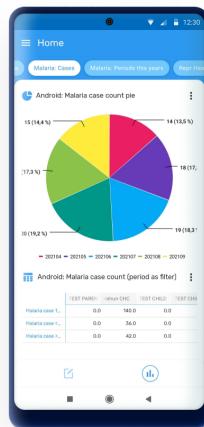
## Visual configurations

### Local Analytics (New 2.5)

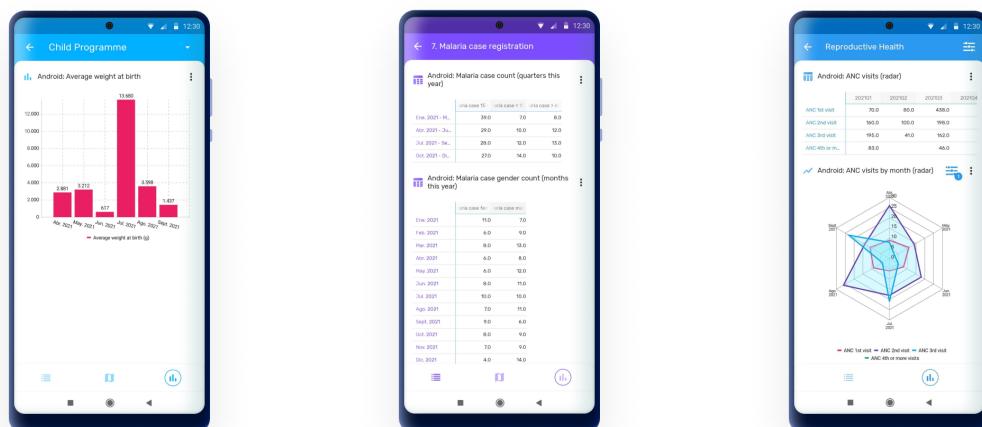
The DHIS2 Android App can now render analytics that have been created in the Data Visualizer app in DHIS2. Analytics to be displayed require to be configured using the Android Settings WebApp where administrators will be able to decide the charts and tables to be displayed for end users.

To configure analytics open the Android Settings WebApp on your DHIS2 server and follow the steps below:

1. Select Home, Program or Data set from the Analytics menu
2. Click on the "Add Visualization" button
3. Search by typing the name of the visualization and select it by clicking on it
4. Add an alternative title, otherwise, the app will display the name of the visualization



Analytics are created and configured using the web tools, however, the data aggregation happens offline using only data stored in the device.



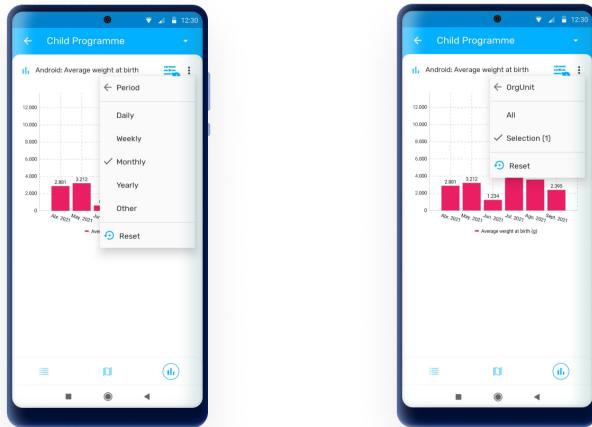
## Analytics Types and Filters

The analytics supported in the Android App are:

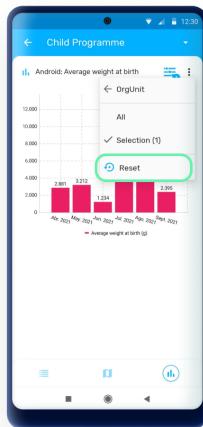
- Pivot Tables
- Column Chart
- Line Chart
- Pie Chart
- Radar chart
- Single Value

For each visualization object, the user will be able to filter in the app by:

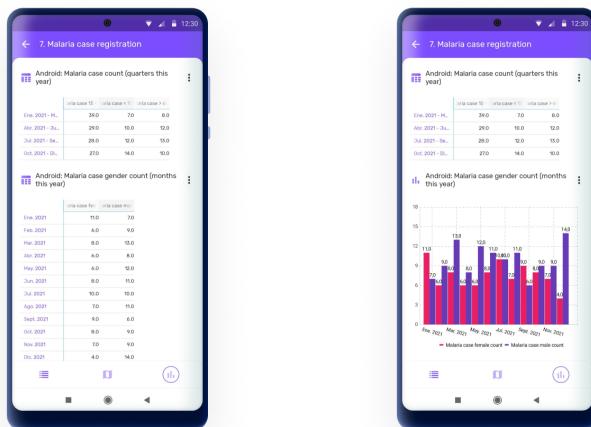
- Period: Daily, Weekly, Monthly, Yearly, This Quarter, Last Quarter, Last 4 Quarters and Quarter this year.
- OrgUnit: Select "All" to display all the org units available to the user or "Selection" to specify one or multiple org units.



A reset button will be displayed if a filter is applied. Select Reset to display the default visualization.



Users can also change The anlytics type between chart, table or single value.



## Groups

All these visualizations can be organised and displayed in groups. Groups are also configured using the Android Settings Webapp following the steps below:

1. Open the Android Settings App
  2. Click to Add a new visualization in the Analytics Menu (Home, Program or Data set)
  3. Select a visualization
  4. Mark the "Use a group visualization" checkbox
  5. Create or select a created group
  6. Save the visualization

You can name your different groups, they will be displayed as a button in the top bar of the analytics screen.



### **Limitations**

Android uses tables and charts created using the web Visualizer app, however only the configuration parameters of the object are used by the Android App: data elements, indicators, chart type, title, periods...; all the aggregations are calculated offline by the android application. The results will be based on the data stored in the device at that exact moment.

Since the aggregations and calculations displayed are calculated in the device, the implementation of analytics is limited compared to web. In summary the compatible and supported objects and features are:

- Well formed analytic objects (series, categories, filters)
- User has view access
- Limitations for Pivot Tables
  - Number of header lines: 1
  - Number of header columns: 1
- Limitations for Charts
  - Number of Series: No limit (but remember you are rendering in a small screen)
  - Number of Categories (doesn't apply for pie chart): No limit

There are many more restrictions which apply to Android Analytics regarding the many configuration options available in the Web Visualizer as well as the supported functions and calculations related to indicators and program indicators. [This table](#) summarises all supported features.

## Interface language (New 2.5)

The language of the interface will correspond to the language set in the DHIS2 user configuration. If the language is not available in the app, it will pick the language of the device.

If none of the language configurations are available, the app will default to English.

Translations set up in DHIS2 for metadata will also be shown according to the language in the user configuration.



## Personalize your Icon

You can set your icon in the wallpaper using the DHIS 2 App Widget. The icon will be the flag configured in your server.

**Note**

How to add a widget:

- Long press in your wallpaper
- Select Widgets
- Look for the DHIS 2 Widget
- Select

It will add a shortcut to your app.

## Personalise the colour of the App

You can set the generic theme of the app by configuring them in our server:

The screenshot shows the 'Appearance' section of the DHIS2 web settings. The left sidebar has a 'Appearance' tab selected. The main area shows language and flag selection, interface language, and database language settings.

**Note**

How to set the server theme and flag:

Go to **System Settings > Appearance > Style**

- Select your style
  - Green,

- India (Orange),
- Light Blue,
- Myanmar (red),
- Vietnam
- Select your flag



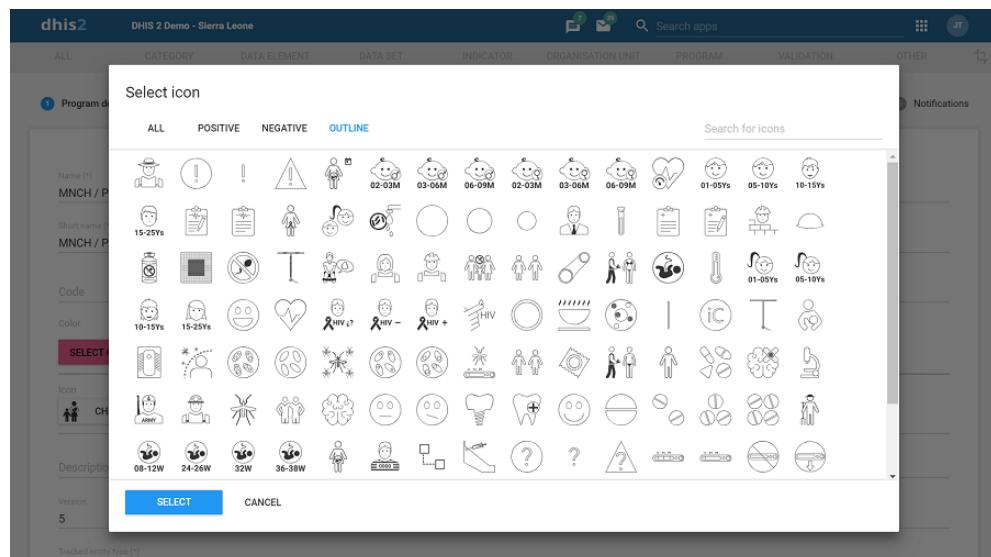
## Icon library for metadata

There are currently 134 icons available that you can choose from. You can search by name in the icon picker widget. Icons are available in positive, negative and outlined shapes. We will be adding many more icons in future releases.

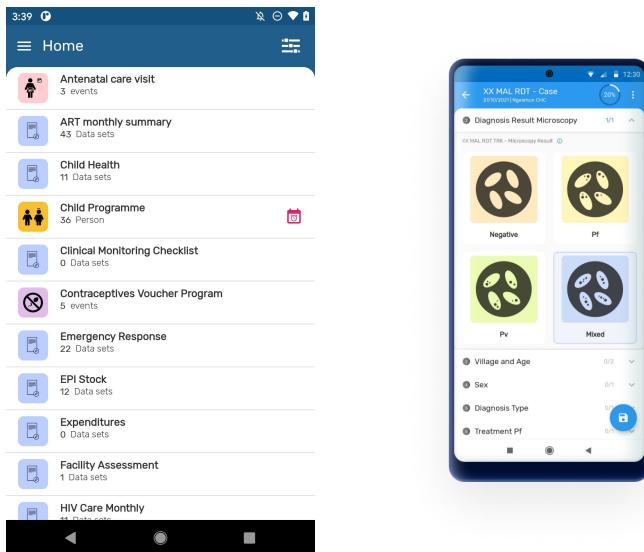
Icons can be associated to programs, stages, data elements and the options of an option set. This is configurable through the Maintenance App.

### Note

This feature is available from DHIS 2 2.30 onwards



In the DHIS2 Android App icons render in the home screen to illustrate all the programs available to a user, or while adding an stage. For data elements and options, the icons render for single event programs, when a section contains a single DE, showing the option set as a matrix or sequence of images.



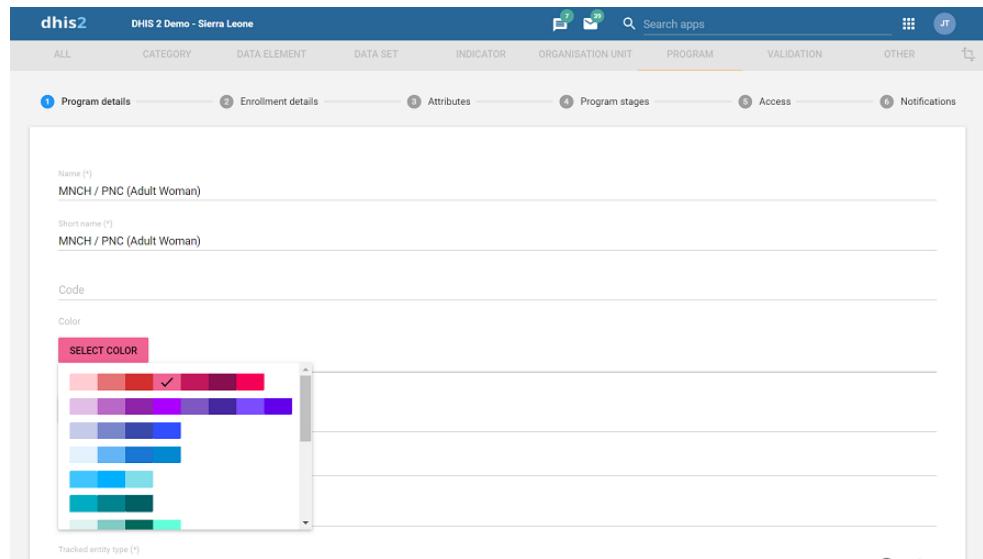
### Note

Icons will initially only render in the new Android app. The new web-based Capture App will incorporate them in the near future.

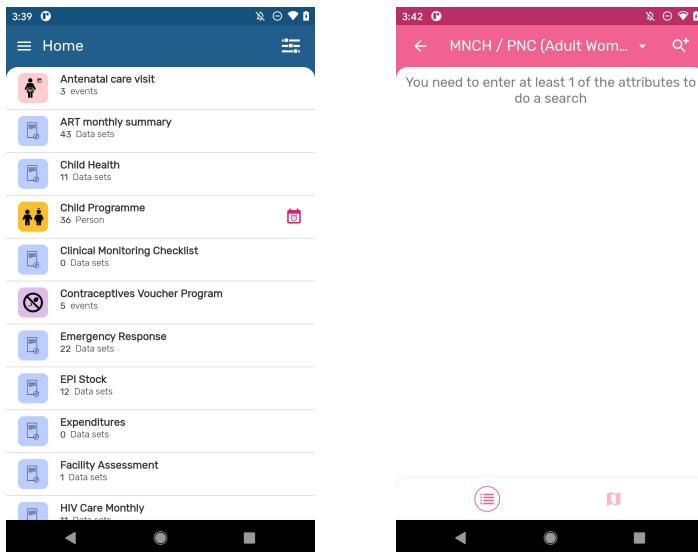
We plan to expand the collection of icons on each future version of DHIS2 for that we need your help: we are seeking ideas for new icons - please submit yours using [this form](#).

### Colour palette for metadata

Tracker and Event capture now have the ability to render colours for programs, stages, data elements and options in option sets. A colour picker is integrated in the Maintenance App, which shows as a palette, except for options which allows the selection of any colour.



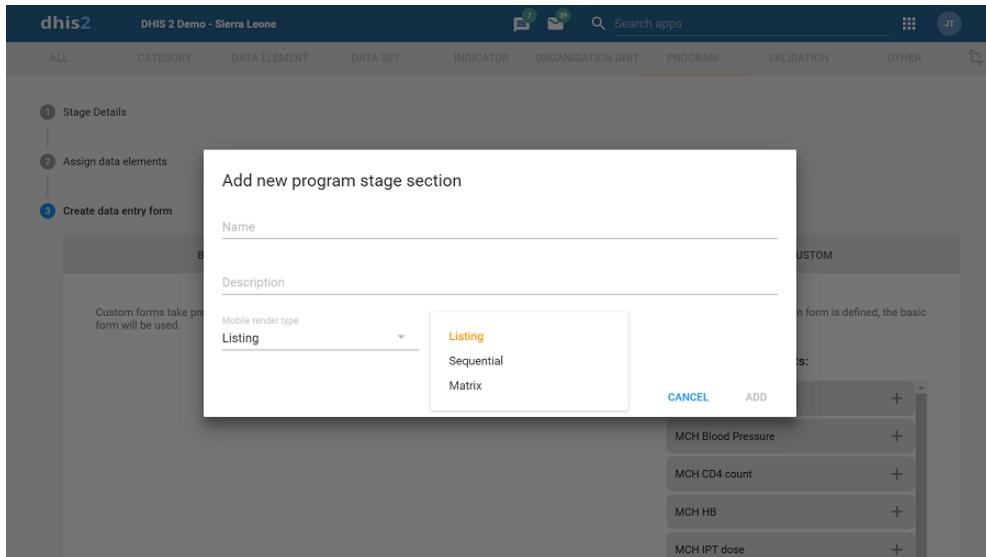
In the Android App, the color will be rendered as background color for programs and stages combined with an icon (if selected). For options it renders as the background colour during data entry form for single event programs. When the user selects a program with an assigned colour, that colour becomes the background theme for all screens in the domain of the program.



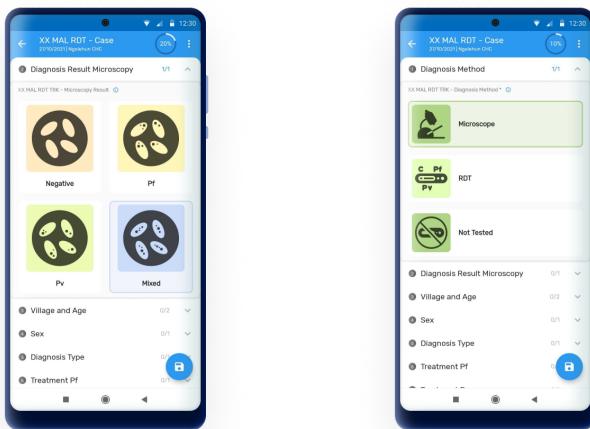
### Note

Colours will first be available in the new Android app, followed in future releases by the new web-based Capture App.

## Rendering Types for Program Sections (Improved 2.5)



**Program Section:** when used in combination with icons, a Program Section with a single data element and associated Option Set can render the options in sequential or matrix layout (see screenshots). If the icon is not found, the app displays the DHIS logo.



### Note

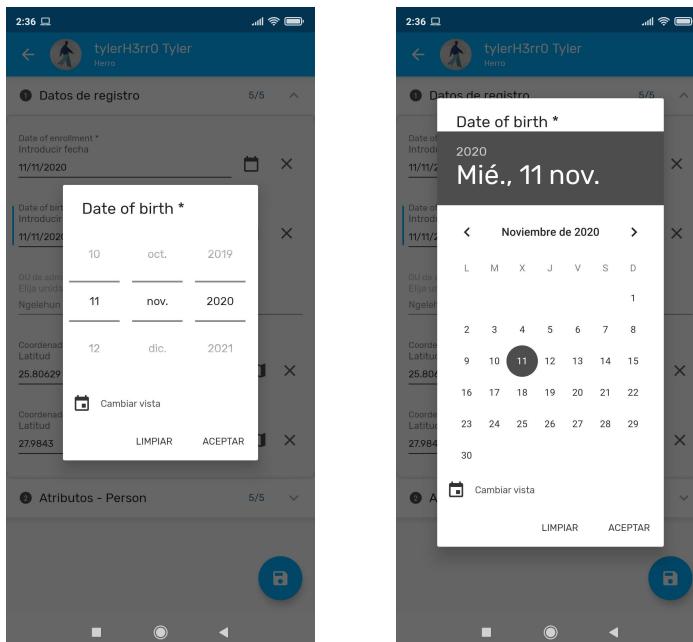
Render type for sections will first be available in the Android app, followed in future releases by the new web-based Capture App UI.

## Calendar

Now it is possible to use two different calendars. The one on the left is the first to appear but you can change it by clicking on the calendar icon on the lower left corner.

This is available when:

1. Making a new enrollment.
2. Creating a new event (Programs with and without registration).
3. Using period filters in data sets and programs with and without registration.



### Note

For Android versions 4.4, 5.1 and small devices, the Accept option is not visible in the second calendar view.

## Render types

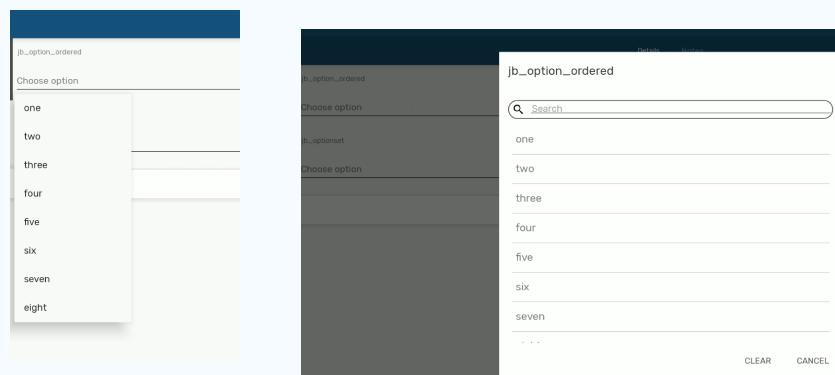
The available rendering options have been expanded to include horizontal and vertical radio buttons, checkboxes and toggles. The allowed options depend on the value type.

- Yes Only: can be rendered as radio button or checkbox.
- Yes/No: can be rendered as horizontal/vertical radio buttons or horizontal/vertical checkboxes or toggle.
- Text: When is linked to an option set can be rendered as horizontal/vertical radio buttons or horizontal/vertical checkboxes. The option set must be configured with value type "Text", any other value type will be displayed as a drop-down list.



### Note

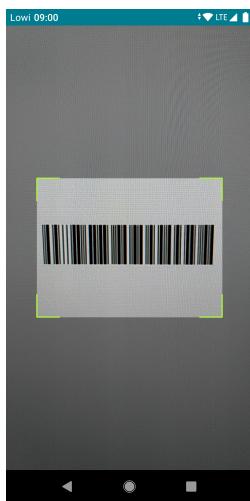
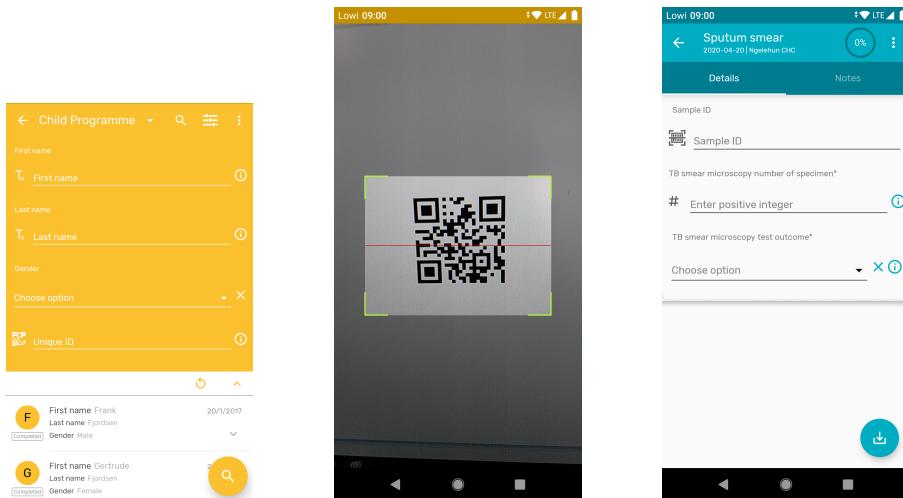
The default rendering option will automatically display a search box whenever there are more than 15 elements in the option set to ease the selection.



## QR and Barcodes (Improved 2.5)

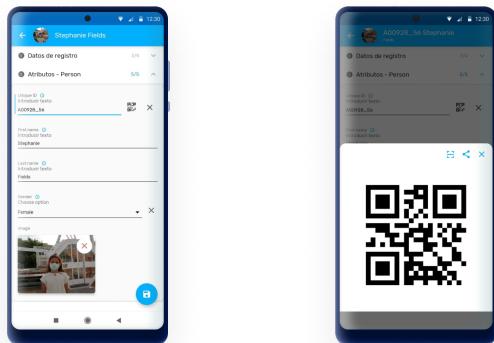
Data elements or attributes type text can be also configured as QR or barcodes. When a Data Element or Attribute is rendered as QR/Barcode, the app will open the device camera to read the code image. When the QR/Barcode is a TEI attribute configured as searchable, the user will be allowed to scan the code in order to search and identify the Tracked Entity Instance. This will also work for option sets.

Barcodes also allow the user to manually enter the value.

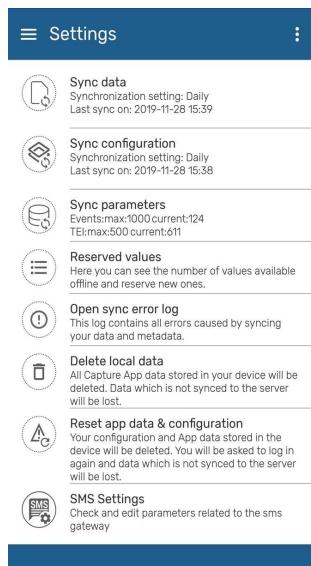


### Export/Share

Users are now able to display a bar or QR code in an image so that it can be shared for printing, take a screenshot or show it on the screen for scanning.



## Settings



*Settings window*

**Sync data** : User is able to choose from a drop-down list if the data entered in the app is uploaded to the server manually or scheduled every 15 min, 1 hour or 1 Day. By default the app will sync every 24h. This kind of Syncing includes new and updated events and TEI's.

**Sync configuration (also known as sync metadata)** : User is able to choose from a drop-down list if the data entered in the app is uploaded to the server manually or scheduled every day or week. By default the app will sync every 24h. This sync will update changes in programs or configurations in web.

**Sync parameters** : These parameters allow the user to specify the maximum number of TEI's and events that can be stored in the local device. The user can also specify if limits apply per organisation unit or in total. Values can be set to default by clicking on "Reset to default".

### Note

Sync data, Sync configuration and Sync parameters can be overwritten using the Android Settings Web App as described [in the specific section] [\[#capture\\_app\\_android\\_settings\\_webapp\\_synchronization\]](#)

**Reserved values** : This will specify the number of reserved Id's available in your device and will allow you to refill them.

**Open sync errors log** : The sync error log gives details about the error and is prepared to be shared with admins.

**Delete local data** : This action will delete local data without having to log out.

### Warning

Using this functionality might lead to data loss if changes have not been previously synced to the server.

**Reset app data & configuration** : This action will log out the user and delete all data and metadata, this means user and server information is also deleted. It is similar to resetting the App.

### Warning

Using this functionality might lead to data loss if changes have not been previously synced to the server.

SMS Settings : This sections allows to check or edit the parameters related to the sms gateway.

## Generic features

### Login

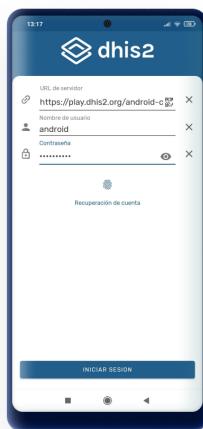
There are two ways to access the application:

1. Manual: The user must type the corresponding URL of the server to be used and enter the username and password.

#### Note

Take note that login is only possible with servers from version 2.29.

2. QR: The user can use a QR code instead of typing the URL but username and password must be entered manually.



#### Note

1. After a successful login the DHIS2 Android App will keep these values cached (URL and username) and will suggest them for future connections without having to type them.

After a successful login the user should be able to perform an *offline* login only (only available for the last combination of URL/Username). Offline usage gives the possibility of using the application without any type of connectivity. All data will still be stored and user can perform a synchronization once the connection is reestablished or available.

#### Warning

In DHIS2 versions up to 2.30 if a user attempts an on-line login and their account has been disabled as explained in the [DHIS 2 Manual - Disable User](#) all the data will be wiped from the phone. Make sure that before disabling a user all the data has been synced or that you are using this feature to remotely wipe sensitive data in case of a device getting lost.

Due to a change in the login API this feature is not available in 2.31, 2.32, 2.33, 2.34, 2.35 and 2.36.

## Account Recovery

The users will be able to restore their own password if they have the setting enabled: Enabled User Account Recovery.



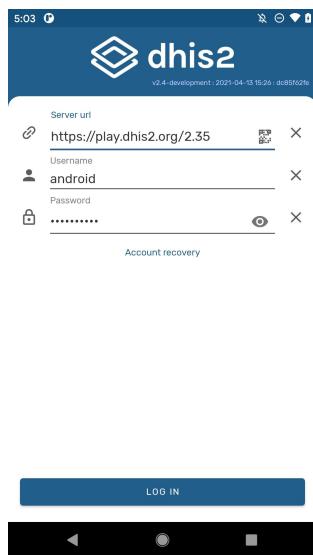
Account recovery

Username

Recover

## Blocking session (PIN)

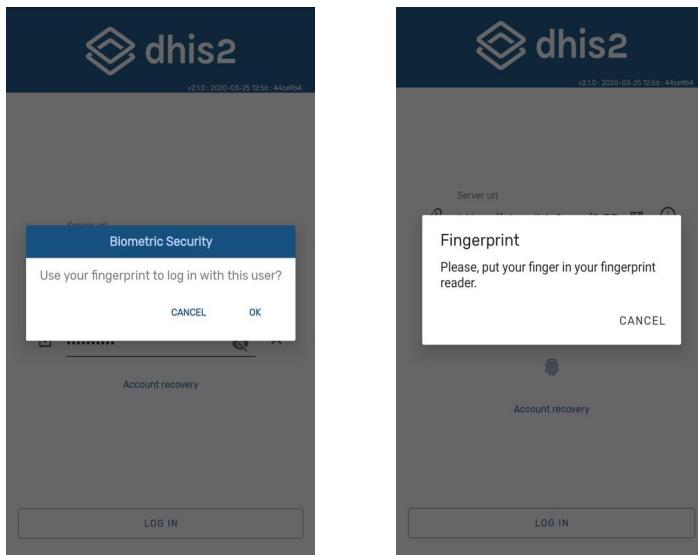
User is able to lock the session using a 4 digit PIN. This allows to move to other apps in your phone without deleting the local data. If the user forgets the PIN number, log in by entering the credentials is also available.



## Fingerprint

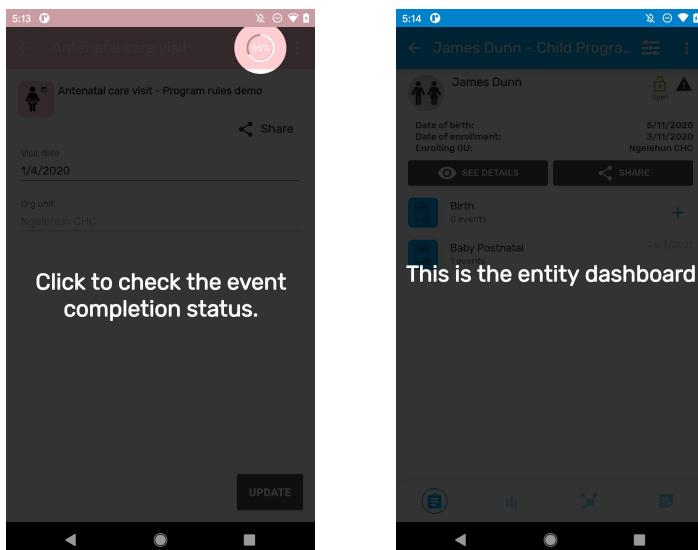
User is able to use the fingerprint scanner if the feature is activated in the device.

- When the fingerprint scanner is enable and not the PIN, every time the app closes, goes to background or the device is blocked, the session will be locked. Once the app is open again, the user needs to tap the fingerprint icon to activate the scanner.
- If the PIN and the fingerprint are set, when the session is locked and the user open the app again, the PIN will be asked.



## Instructions/information buttons

A contextual guide is available in Event details and TEI dashboard screen.

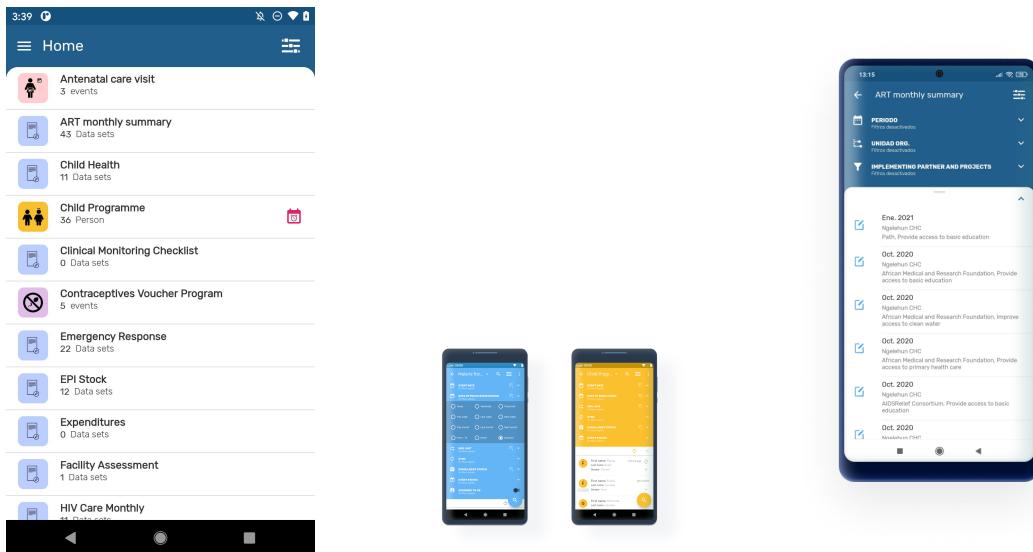


### Tip

User is able to re-open the instructions by clicking on the three dots at the top right corner of the screen.

## Filter

A filter can be applied in all listing screens (home, event listing, tei search and dataSets) which narrows down the data displayed. The filters available are: period, org. unit, sync state, event status, category option combination and "assigned to me".



Filters will adapt to the different programs and data sets.

1. Program without registration: Date, Org. Unit, Sync State, Event Status and, Category Combination.
2. Program with registration: Event Date, Date of enrollment, Org. Unit, Sync, Enrollment Status, Event Status and Assigned to me. The filter icon will show only if a list of events is available (Display front page list feature or search)
3. Data Sets: Period, Org. Unit, and Sync State.

### **Assigned to me**

It is possible to filter events based on its assignment to the current user. The “Assigned to me” filter has been added to the single event program list, the TEI list and the TEI Dashboard and the map views. It will only be displayed when the active program is configured to assign events to users.

### **Event Date/Date/Period**

Filter the Events, TEIs(based on their events) and data sets, the following periods of time are available:

- Today
- This week
- This month
- Yesterday
- Last week
- Last month
- Tomorrow
- Next week
- Next month
- From-to
- Other (Opens a date picker)
- Anytime

### **Org. Unit (Improved 2.5)**

Allows the user to type the search or select an organisation unit from the tree. The filter will not be visible if the user has only one Organisation Unit configured.

---

**Sync**

Filer by:

- Synced (events, TEIs, Data Sets)
- Not Synced
- Sync Error
- SMS Synced

**Event Status**

Filter the events by:

- Open
- Schedule
- Overdue
- Completed
- Skipped

Multiple status selection is permitted. Once you open a TEI, the filter will be kept in the dashboard and show only the events with the selected status.

Events shown are up to 5 years old.

**Date of Enrollment**

The 'Date of Enrollment' will apply to the Enrollment date of the TEI in the program. If there is more than one enrollment date, it should sort the results by the most recent one. The label of this filter will display when available.

**Enrollment Status**

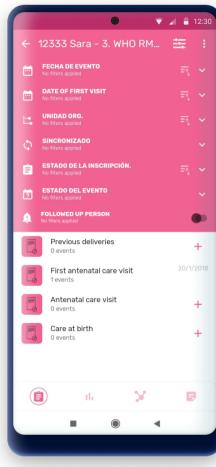
The filter 'Enrollment status' offers three options: Active, Completed, Cancelled. Only one option can be selected at time. If you filter by "completed" and the TEI has more than one enrollment, the app will open the "active" enrollment. To see the completed one, select the three dot menu at the top right corner of the dashboard and select "program enrollments".

**Follow-Up (New 2.5)**

The 'Follow Up' filter allowes the user to filter out the TEIs that have been marked as 'Follow-up'. TEIs can be marked to be followed up in the TEI Dashboard.

**Filtering added in TEI Dashboard:**

Filters have been added to the TEI dashboard. It is possible to filter the events of a Tracked Entity Instance enrollment per period, organisation unit, sync status, event status, and user assignment.

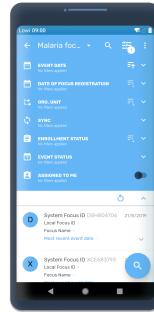


## Sorting

Sorting has been integrated in the filter menu.

The sorting button will be on the filter bars with the following behavior:

- Only one sorting applies at a time. If the user clicks a different one, the previous one is disabled.
- The icon for applied sorting shows it is active, the others are inactive.
- Repeated clicks keep changing the order to the reverse.



## Dates (Period, Date, Event Date or Enrollment Date)

- Event Date precedes due date, only use due date when there is no event date.
- Order from most recent to less recent. Future events (due date) goes first.

## Org. Unit

- List will be sorted in alphabetical order by org unit name.

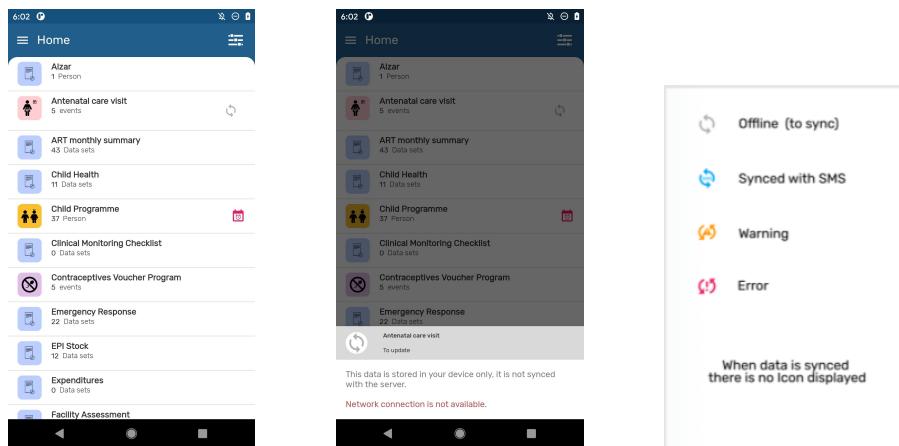
## Enrollment Status

- List will be sorted in alphabetical order by status name.



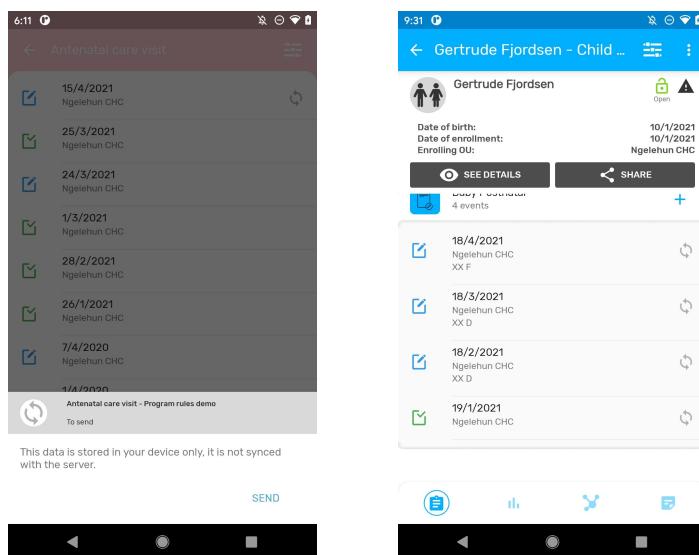
## Sync Information

Next to each program or data set an icon will be displayed which allows the user to check sync information. Synced records will not show display any icon. Unsynced (grey arrows), error (red arrows), warning (orange) or SMS (blue and including the SMS word inside) icons are be displayed according to the status.



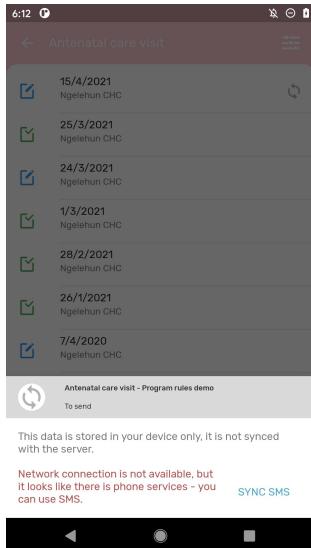
## Granular Sync

Users can click on the grey arrows (which means record(s) stored online in the device) to perform a sync. These options are available at top level (programs/dataset) or individually (TEI, events, datavalue).



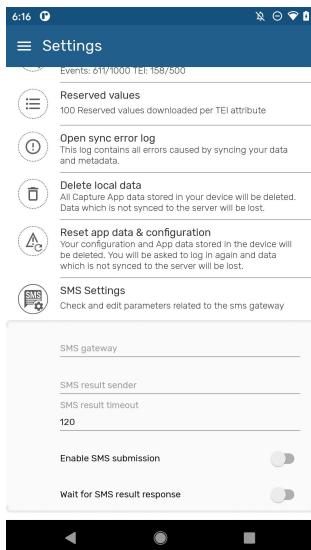
## SMS Sync

When there is no Internet connection (either via WiFi or Mobile Data) but there is still mobile connectivity, users can synchronize via SMS if the gateway has been previously established in the app and properly configured at server level. The information will be sent via one or more SMS messages and the status will be updated to display either error or marked as “SMS synced”.



### Tip

Edit parameters related to SMS gateway in the SMS Settings (Settings Menu) or set this globally via the  
[#capture\\_app\\_android\\_settings\\_webapp\\_general](#)



### Note

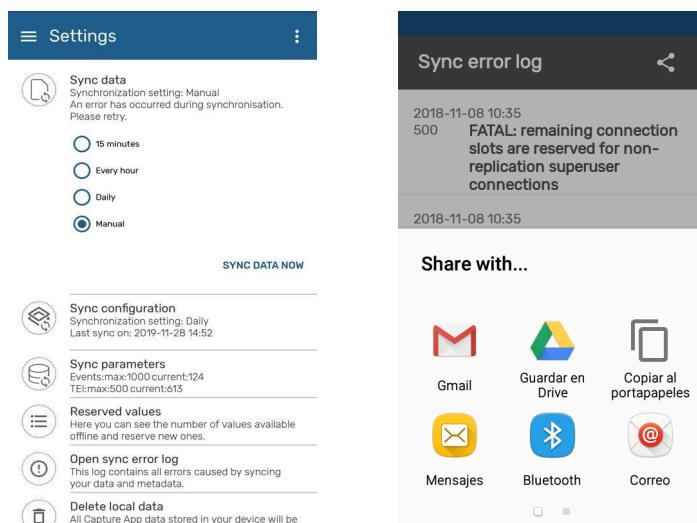
Note that in order to user the SMS sync capabilities the SMS services needs to be enabled in the server side as described in the [https://docs.dhis2.org/master/en/dhis2\\_user\\_manual\\_en/mobile.html#sms-service](https://docs.dhis2.org/master/en/dhis2_user_manual_en/mobile.html#sms-service).

You can also find more information on how to use different gateways in the

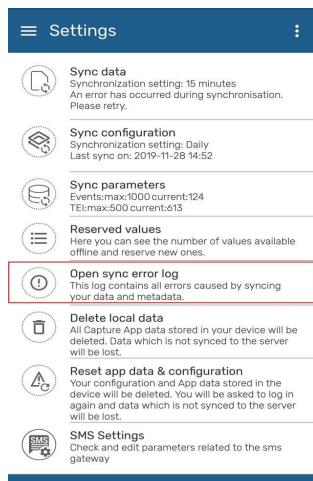
[https://docs.dhis2.org/master/en/dhis2\\_android\\_implementation\\_guideline/about-this-guide.html](https://docs.dhis2.org/master/en/dhis2_android_implementation_guideline/about-this-guide.html)

## Meta data sync error

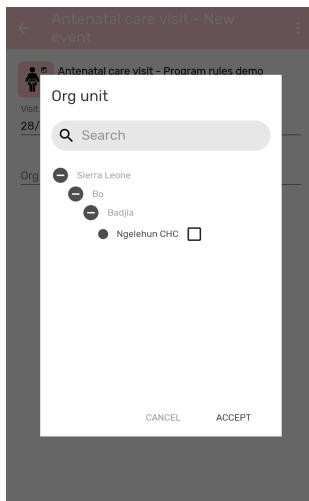
In case of errors during the sync process, a message is displayed in the settings menu ('Sync data' or 'Sync configuration' section). Also, a red sync icon is displayed next to the program in the Home screen. The sync error log gives details about the error and is prepared to be shared with admins.



You can also open the sync errors log from **Settings**:



## Org unit



The whole organisation unit tree is displayed. Organisation units not available for data entry will be colored in grey. User must check the box to select the org unit wanted.

### Caution

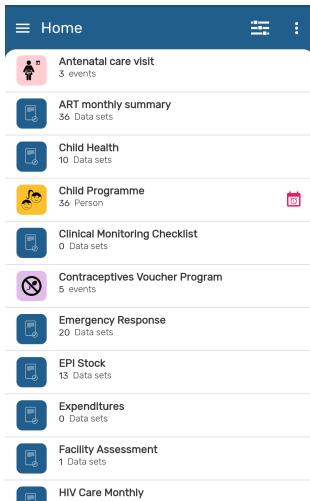
Mobile users are not expected to access the org. unit hierarchy of a whole country. Maximum number of org units is difficult to set, as the App does not set the limit, but the resources on the device (memory, processor). We could say below 250 org units should be safe, but still believe that is a very big number for a mobile use case.

## Data Sets

The user can now enter aggregate data for an organisation Unit, a period and a set of data elements and send it to the server.

Facility Infrastructure	Values
Date of assessment	2015-03-24
Time of assessment	03:34
Appropriate hand washing facilities are available	4
Blood pressure monitor, electronic or manual available	4
Examination table with pad	1
Glucometer is present	

## Differentiating Data Sets, Tracker and Event programs

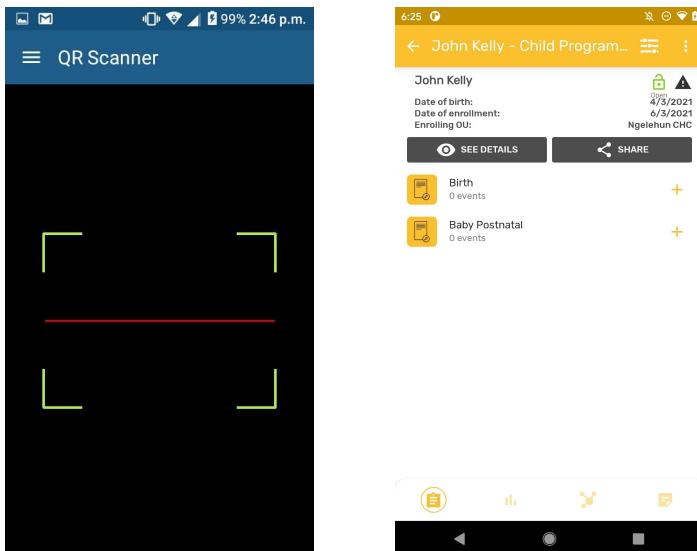


### Tip

An easy way to differentiate them is by looking at the word at the bottom left corner. The word 'Event' will always be in event programs. In tracker will appear the name of the tracked entity type (person, patient, building, etc.). For data sets, the word 'DataSets' will be shown next to the number of records.

## Sharing Data

Users can share TEI via QR codes. This allows transferring/sharing information between devices without the need of transferring via the server (useful when connectivity might be missing). To do this users should open any TEI and click on the *SHARE* button.



## Capture Coordinates

### TEI coordinates

Capture the TEI coordinates in the registration form. Enable this feature in the TET feature type.

[← Enroll in Tracker Program Test](#)

enrollment date ne  
2019-11-13

incident date ne  
2019-11-13

Enrolling OU:  
Ngeleuhn CHC

Coordinates for the Person

Latitude \_\_\_\_\_ Longitude \_\_\_\_\_

Enrollment coordinates

Polygon \_\_\_\_\_

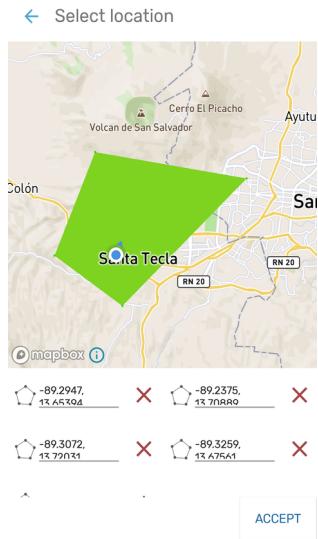
T<sub>x</sub> Unique ID \_\_\_\_\_

T<sub>x</sub> First name\* \_\_\_\_\_

T<sub>x</sub> Last name\* \_\_\_\_\_

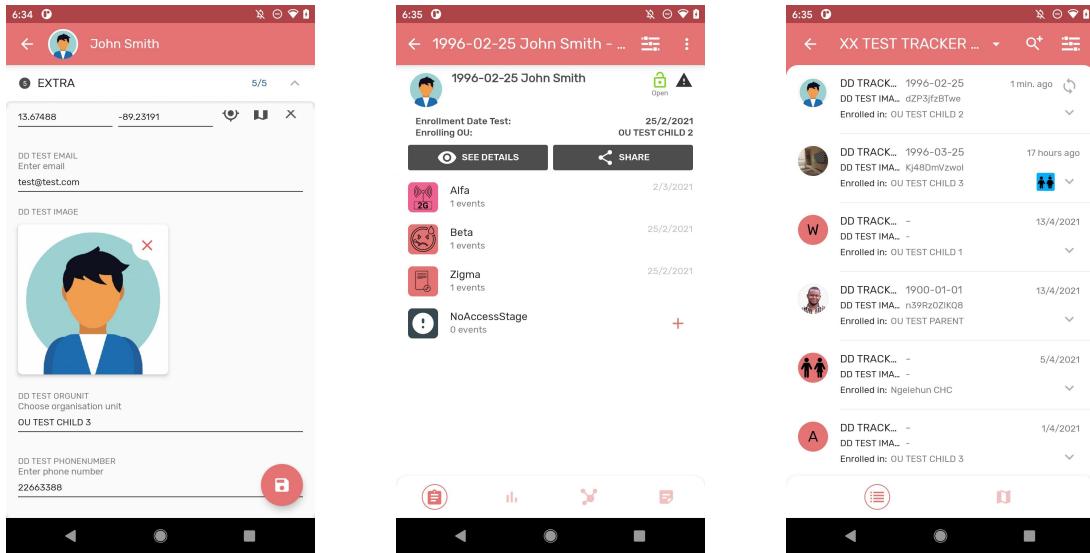
## Polygons

The app now supports the geoJSON format and the user is able to capture polygons.

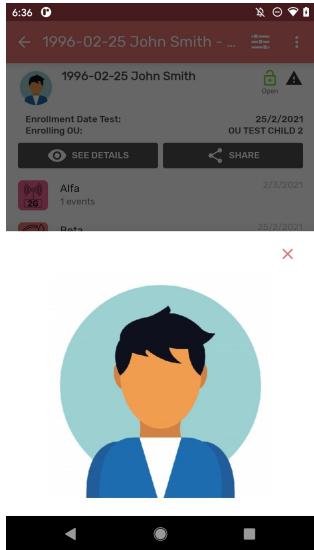


## Images

ValueType image can be used in Android to capture data and also, depending on the program configuration to be displayed in the TEI dashboard. When this value type the first data element/attribute marked as displayed in the program configuration it will be used as the TEI profile image.

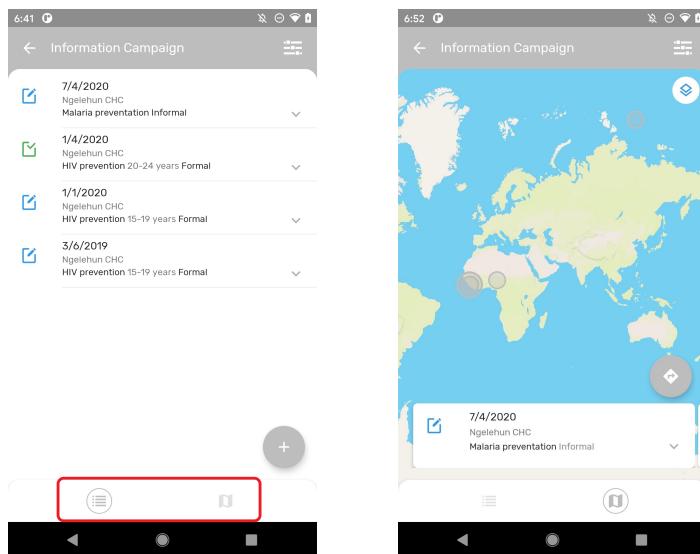


Open the TEI profile image by clicking on it.

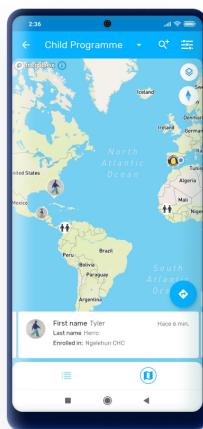


## Display events and TEIs in maps

When a program stage or tracked entity type have a feature type (and for programs with registration the option `displayFrontPageList` is enabled) the listings can be switched to display the information in a map. Make the switch by clicking on the map icon in the navigation panel.



If the TEI has a profile image, the map will display it.



## Personalized Calendar View (New 2.5)

In the DHIS2 Android Capture App users can switch date selection from spinner to calendar view. In this version, the app will remember the last visualization selected by the user and use it the next time the user needs to select a date.

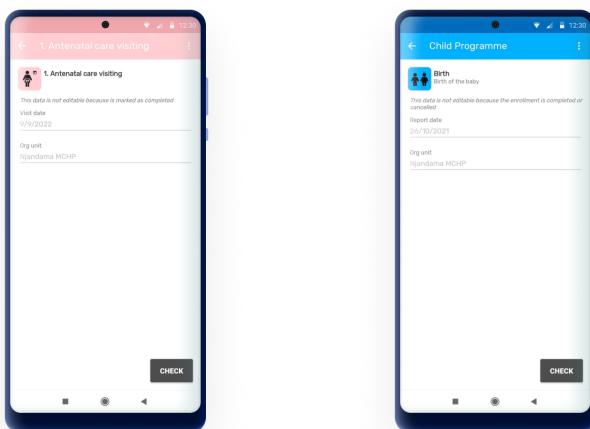


## Reason for non-editable data (New 2.5)

Data can be blocked for many reasons in DHIS2, because of access restrictions or expiration among others. When an Event, TEI or Data Set are not editable the user will be able to find the reason on the "Details" section.

The following list contains all possible reasons:

- Event completion
- Enrollment completion
- Expired event
- Closed organization unit
- Organization unit out of capture scope
- No access to capture data in the program or data set
- No access to a category option in the program or data set



## Data sets

### Navigation Bar

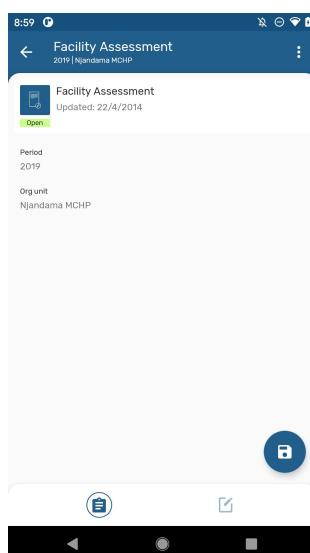
Use the navigation bar located at the bottom of the data set to switch between the data entry form and the overview screen.



### Overview Screen

The new overview tab contains the following details:

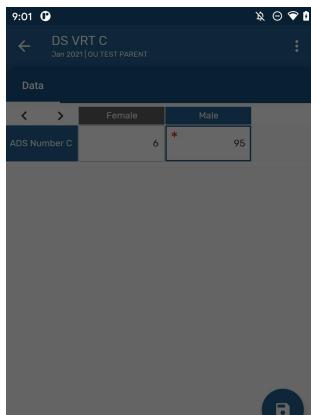
- Data set name
- Last Update
- Open/Close Status
- Period
- Org Unit
- Category option combo



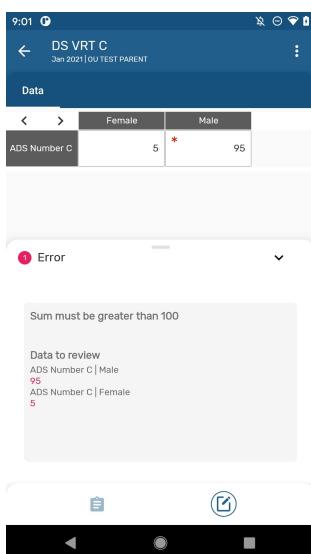
## Saving a data set

Validation rules and completion of data sets are integrated in the save button actions:

- When a Data set is configured to *complete only if validation passes*. If the validation is successful, a dialog asking to mark as complete will show up. The App will allow completion only if all mandatory fields have value.



- if it is not successful, then an error dialog should show and the dataset will not be marked as complete. The description and instructions of the validation rule will be displayed to help the user identify the error.



- On a dataset that does not have setup "Complete allowed only if validation passes". When clicking on the save button; if the data set has validation rules associated to it, then the app will ask the user to run the validation rules.

Female	Male
5	5

Saved!

Do you want to check data quality?

NO YES

- If the validation is not successful, an error dialog should show but with the possibility to complete the data set anyway. The description and instructions of the validation rule will be displayed to help the user identify the error.

Female	Male
5	5

Error

B Male should not be equal to B Female

Data to review

ADS Number B | Male  
5

ADS Number B | Female  
5

COMPLETE ANYWAY

- If the data set does not have validation rules, the data set will be marked as complete if all mandatory fields have value.

### Increase Row Headers

The length of the first column in data set is adjusted to show the full text for the Data Elements names. Users can use the arrows on the top to adjust the width according to their needs.

CMC COPE has been introduced at the facility and staff conducted a COPE exercise during the past quarter	no
CMC Clients offered information on range of methods exist	no
CMC Counselling rooms in FP and CAC service units ensure client privacy and confidentiality	yes
CMC Date of clinical monitoring visit	
CMC FP and CAC commodity requests correctly based on previous consumption / stock at hand	yes
CMC FP and CAC procedure rooms have adequate lighting for the performance of all procedures	no
CMC FP and CAC service units have dedicated hours or space for youth clients	no
CMC FP services available - Contraceptive pills	

## Indicators

Indicators are now available in default and section forms and are displayed at the bottom of the data entry form.

ANC 4th or more visits	
Albendazole given at ANC [2nd trimester]	
IPT 1st dose given at PHU	
IPT 1st dose given by TBA	
IPT 2nd dose given at PHU	
IPT 2nd dose given by TBA	
Iron Folate given at ANC 3rd	
LLITN given at ANC 1st	
ANC visits ...	4
IPT doses ...	0

## Supported features overview

The following is a comprehensive list of all features available for Data Sets in DHIS2 and notes on whether or not these have been implemented in the Android Capture app.

In the notes, 'admin' refers to someone who develops and configures a DHIS2 system, and 'user' refers to someone who uses apps to capture data, update it, and review reports.

Legend	Description
	Feature implemented
	Feature not implemented (will be ignored)
	Not applicable

Legend	Description
	Work in progress. Feature not completely implemented yet or with unexpected behaviour already reported.

Feature	Description of feature	Status	Notes on implementation
Period type	Determines the period covered by data-entry.		
Expiry days	Sets the deadline (days after period) after which DHIS2 locks all data entry for the period (0 means no locks at all). Periods can still be opened, but cells will be greyed out.		
Open future periods for data entry	This setting can be used to unlock the current period or all periods up to a certain point in the future.		
Data input periods	Allows you to set a specific range of dates for a period's data-entry, and prevents data capture for periods outside of this date range.		
Days after period to qualify for timely submission	Sets the deadline (days after period) after which DHIS2 treats data entry as 'late'.		
[Attribute] category combination	Allows an admin to attach a Category (set of Options) to the Data Set, generating a separate data entry screen for each Option (This is called an Attribute Category Combination in DHIS2).		

Feature	Description of feature	Status	Notes on implementation
[Attribute] Category Combination option restrictions	If Attribute Category Combinations (see above) are used, then this features gives admins the ability to restrict which specific options are available in the drop-down. Each option can be restricted to a particular range of dates and/or organisation units, and that option will not be shown if data is being captured outside of these dates or org units.		
Complete notification recipients	Sends a DHIS2 message to the selected User Group when the Data Set is marked 'complete'.		
Send notification to completing user	Sends a DHIS2 message to the data-entry user when the Data Set is marked 'complete'.		
All fields for data elements required	Where one or more Categories are used to disaggregate a data element, this setting forces the user to either complete all disaggregations, or to leave them all empty.		
Complete only if validation passes	Only allows the Data Set to be marked complete if no Validation Rules are triggered.		
Skip offline	Requires the user to add a 'comment' if a value is left blank (or Data Set cannot be 'completed'). Only allows Data set to be selected for data entry while connected to the internet (although once selected, data entry can continue offline).		

Feature	Description of feature	Status	Notes on implementation
Data element decoration	Shows the description of the Data Element when the mouse hovers over the Data Element Name.		
Section forms - render sections as tabs	Displays each section in the form as a separate tab, instead of all together on the same page.		
Section forms - render vertically			
Data Element - CatCombos	Enables an individual Data Element to be automatically disaggregated into one or more categories (eg both male/female and child/adult), with separate fields/values collected for each of these disaggregations.		
Inline indicators / section form totals	Enables the default CatCombo for each data element to be overridden with a different CatCombo for this Data Set only.		
Section forms - render sections as tabs	Adding indicators to Data Sets makes them available for use in section forms and custom forms; row and/or column totals can also be added to these forms. (Both are displayed on the screen alongside data capture cells, and update automatically as values are captured.)		
Organisation unit assignment	Ensures the Data Set is only available for those organisation units to which it has been assigned.		

Feature	Description of feature	Status	Notes on implementation
Compulsory data elements	This allows the marking of specific Data Elements/CatCombos as 'compulsory', which means users must enter a value (they cannot be left blank).		
Forms - default forms	DHIS2 automatically renders the form as table(s), with a new table started every time the Category Combinations change (= different column headings).		
Forms - section forms	Form sections and section titles can be specified, giving you more control over the grouping and layout of the form (but it is still rendered automatically). This section form automatically overrides the default form if implemented.		
Forms - custom forms	A custom HTML form can be designed, giving total control over layout, and enabling JavaScript code to be included within the form. This custom form automatically overrides the default and section forms if implemented.		
Section forms - disable fields (grey)	With section forms, this enables you to individually 'grey out' fields (a whole data element, or specific CatCombo Options) so that users cannot enter data into it.		

Feature	Description of feature	Status	Notes on implementation
Multi-organisation unit forms	When this server setting is enabled, form layouts are changed to show multiple org units as rows, and all data elements/CatCombos as columns (ie very flat and wide form per org unit).		
Data value pop-up: mark value for follow-up	Enables the user to mark this specific data value for follow-up (marked values can be reviewed in the Data Quality web app).		
Data value pop-up: add comment to value	Enables the user to add a comment to this specific data value.		
Data value pop-up: display data element history	Shows the history over time of this specific data element (i.e. previous 12 months' values).		
Data value pop-up: display audit trail	Shows a history of previous edits to this specific data value.		
Data value pop-up: min/max ranges (also accessible via Data Administration app)	This enables users to set minimum and maximum expected values for a data element, enabling DHIS2 to highlight values outside this range during data entry (but it does not prevent saving or 'completing'). You can set min/max ranges automatically/in-bulk (via the Data Administration app) or manually/individually (via the Data Entry app).		
Print form / print blank form	Enables printing of a data-entry form, to permit data capture on paper, and data-entry later.		

Feature	Description of feature	Status	Notes on implementation
Save data	Data entered into the screen is not captured until 'saved' - until then, it is only held in memory, and is lost if power is switched off etc.		
Complete data set	This enables user to mark data-entry for a period/org unit/etc as 'complete'. Note that this is just for data-entry tracking and timeliness purposes, and does not lock the data set or prevent further edits.		
Data elements: validation rules	Enables the creation of rules (at the data element level) to enforce data quality, based on comparing different values/ collections of values. (Eg number of patients seen in the month must be less than the number of visits for the month.)		
Data sharing levels/Can capture data	Enables the user to add new values, edit values and delete values in the dataset.		
Data sharing levels/Can view data	Enables the user to see values within the dataset.		
Data sharing levels/No access	The user won't be able to see the dataset.		
Data approval workflow	If an admin selects a pre-configured Data Approval Workflow, this will be used to enforce an 'approval' or 'acceptance and approval' cascade, enabling users to sign-off and lock data.		The process of the approval has to be done in web. Once a data set is approved, the data will not longer be editable in the app.
Missing values requires comment on complete	Any missing values will require a comment to justify their absence.	-	

## Programs

### Event and Tracker common features

#### Navigation Bar

Use the bottom navigation bar to move from one screen to another.

#### Event Dashboard

While entering information of the event, the bottom navigation bar allows the user to choose among:

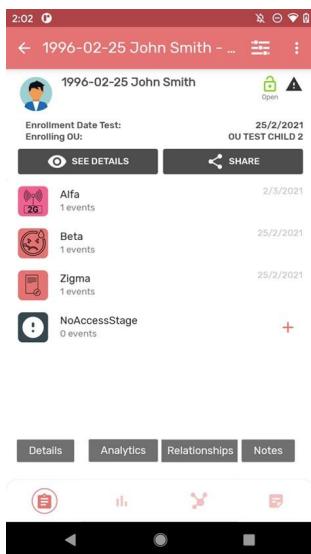
1. Details
2. Data Entry
3. Analytics (when available)
4. Notes



#### TEI Dashboard

While in the TEI dashboard the bottom navigation bar allows the user to choose among:

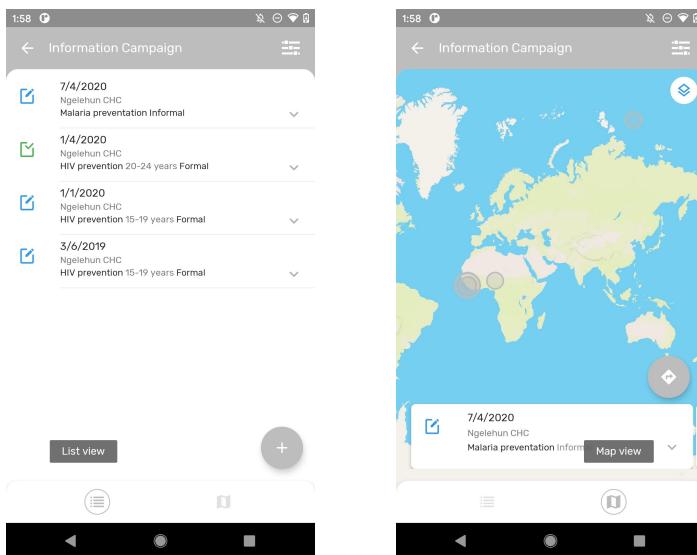
1. Details
2. Analytics (when available)
3. Relationships
4. Notes



### Event listing for event and tracker programs

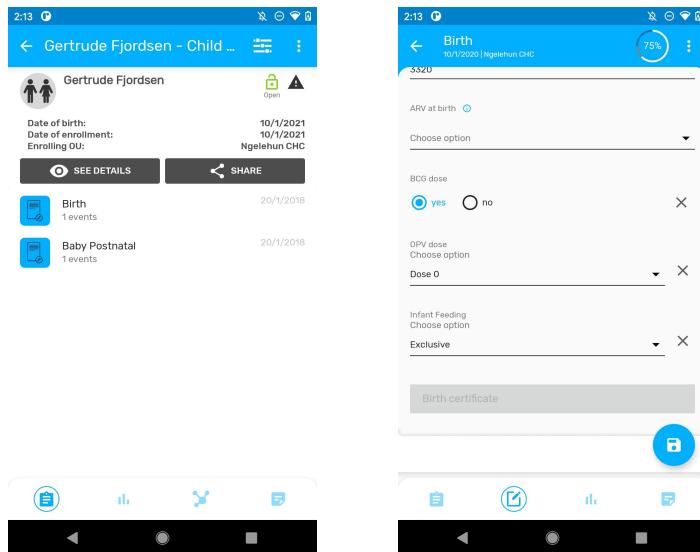
The bottom navigation bar also allows switching the visualization mode if the event program or the tracker program have been defined with coordinates. More information about the map view can be found on the specific section below.

1. List view
2. Map view



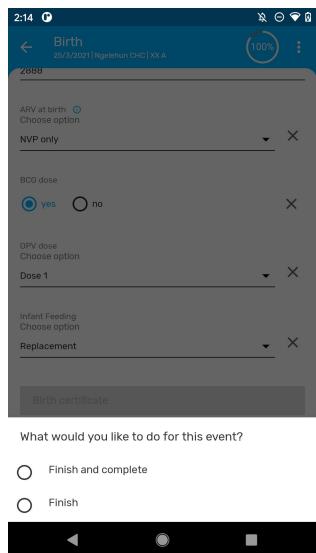
### Complete/Re-open event

When adding an event to an event program or inside a tracker program the user should fill the information and scroll down to make the save icon appear at the bottom right corner.



Two options will be presented:

1. Finish and Complete
2. Finish



#### Note

To verify if an event is completed look at the icon, it must be a green checked box.

#### Note

The app needs to take into consideration if the user has the correct authority ('Uncomplete events') to reopen a completed event.

#### Field completion percentage

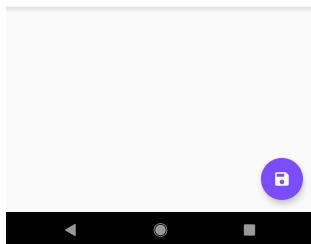
The percentage of data completed in each event is shown in the top right corner of an event when it is opened after first registration.

Malaria case registration  
3/3/2021 Ngeliethun CHC

Age (years) \* Enter number  
23 15 - 30

Gender \* Choose option  
Male

Household location  
Latitude Longitude



### Note

The display of the percentage can be set up to be displayed or not using the [#capture\\_app\\_android\\_settings\\_webapp\\_appearance\\_program](#)

## Sections Navigation

The sections can be collapsed for a simpler user experience. Sections in enrollment forms are also supported and are aligned with the design of the event sections.

Inpatient morbidity and ...  
13/12/2020 | Ngeliethun CHC

1 Patient details 4/5

2 Admission details 4/6

Inpatient morbidity and ...  
13/12/2020 | Ngeliethun CHC

1 Patient details 4/5

Gender Choose option  
Male

Pregnant  
○ yes ○ no

Age (years) Enter number  
59 45 - 60

Height in cm  
Enter number  
83 0 - 100

Weight in kg  
Enter positive integer  
64 60 - 70

2 Admission details 4/6

## Error messages

The app will list the name of the mandatory fields missing when the user tries to complete an event or enrollment. The sections containing the missing fields will be highlighted to help the user find the missing fields.

Inpatient morbidity and  
12/9/2019 | Ngellehun CHC  
54%

Data Notes

② Admission details 2/8

Date of admission Choose date  
28/7/2020 (i)

Place of infection

Choose organisation unit (i)

Mode of Discharge\*

Choose option (i)

What would you like to do for this event?

Some mandatory fields are missing. You can finish data entry and exit, but the event cannot be completed.

Date of admission  
Mode of Discharge

- Finish and complete  
 Finish

The errors and warnings are also shown as an indicator next to the section name including the number of errors for each section.

2:23 ① Inpatient morbidity and  
24/2/2021 | Ngellehun CHC  
63%

① Patient details 5/5

② Admission details (i 3)

Date of admission \* (i)  
Choose date

This field is mandatory

Diagnosis (ICD-10) \* (i)  
Choose option

This field is mandatory

Date of discharge \* (i)  
Choose date

This field is mandatory

Place of Infection

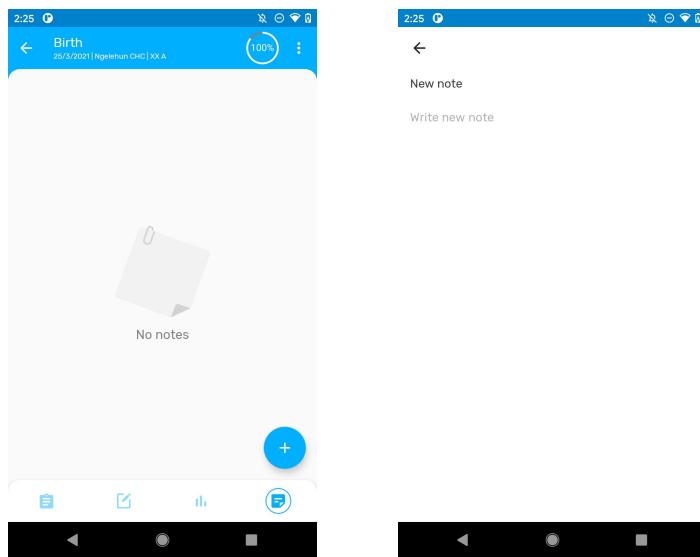
Choose organisation unit

Mode of Discharge \*

(i) (i) (i)

## Event Notes

It is possible to add notes to events in single event programs and program stage events. Notes are available in a new tab at the data entry form.

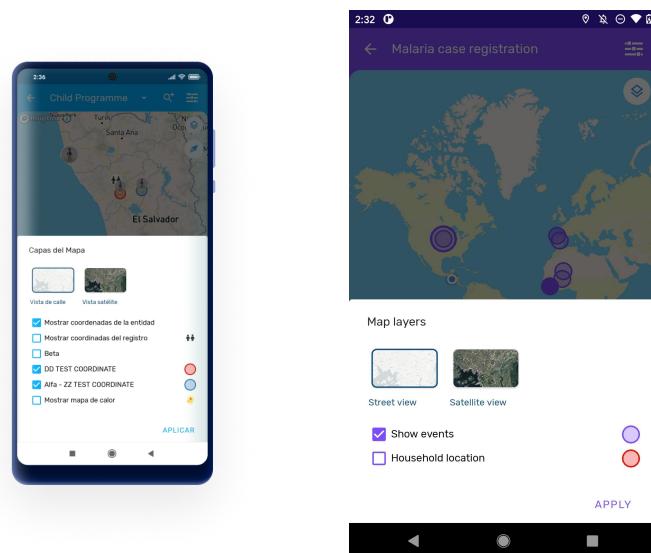


## Maps

### Map Layers

When displaying maps there are different layers that can be displayed by clicking on the specific button on the upper right corner. The user can select one or more layers to be displayed. Both coordinate and polygons types will be displayed. The layers are dependent on the type of program as explained below:

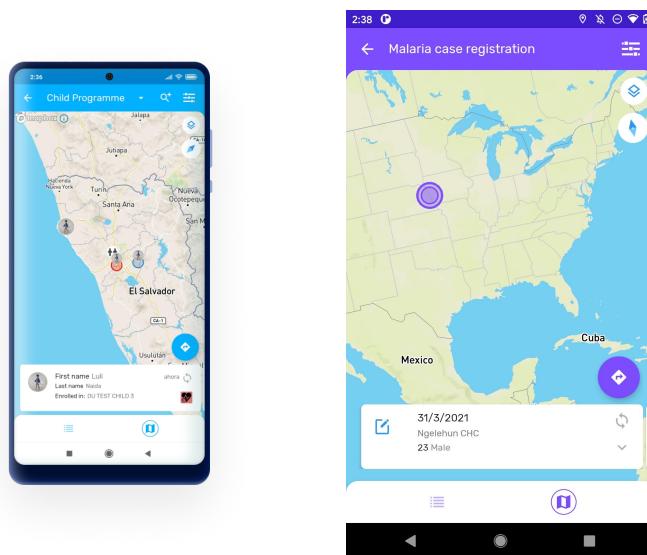
- Show events (For programs without registration)
- Satellite view
- TEI coordinates (By default in programs with registration)
- Enrollment Coordinates (Only for programs with registration)
- Program Stage coordinates (Only for programs with registration)
- Relationships (Only for programs with registration)
- Heatmap (Only for programs with registration)
- Tracked Entity Attributes (Coordinates Value Type - Only for programs with registration)
- Data Elements (Coordinates Value Type)



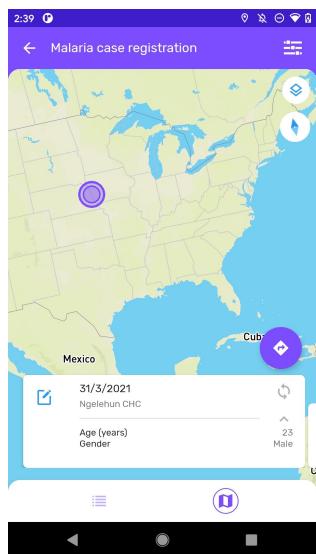
### Map Carousel

On the map view of the program, a carousel of cards is displayed, one for each enrolled TEI (Tracker programs) or Event (Event programs).

- TEI cards on the carousel follow the same design as the TEI list view.
- When scrolling horizontally the carousel, the map zooms into the selected coordinates. If coordinates field is empty a message is shown instead.

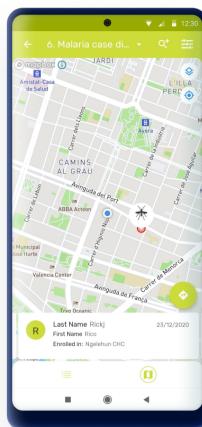


Each card displays Tracked Entity Attributes (for Tracker Programs) and Data Elements (for Event programs) configured as 'Display in list'.



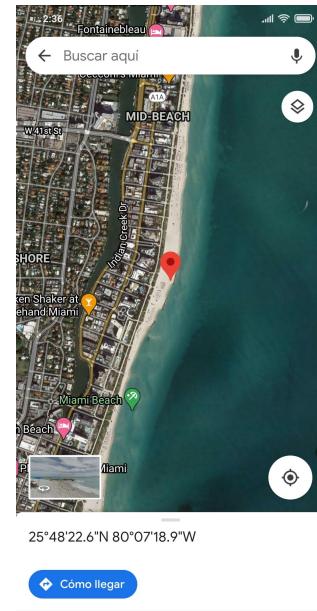
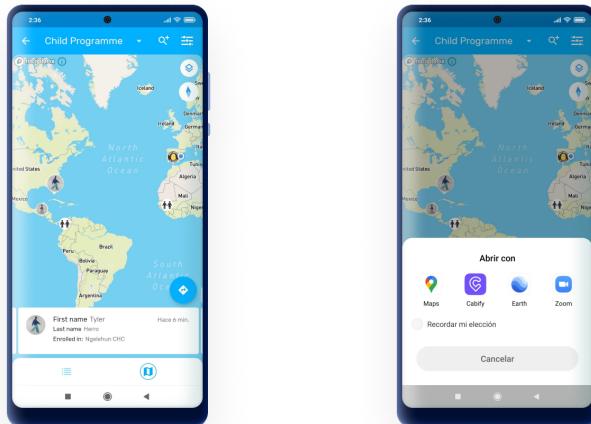
### Current Location displayed in maps (Improved 2.5)

If the user has granted location permissions to the App, the map will show the current location represented as a blue color dot. The maps in the DHIS2 Android Capture App include the possibility to center the map on the user location.



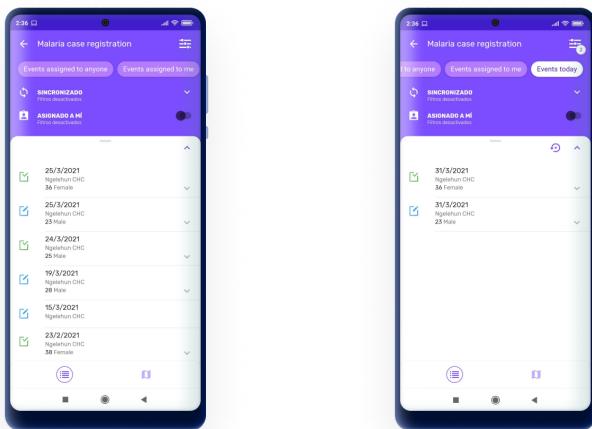
### Navigation to Specific Location

If the TEI or event has coordinates a navigation icon will be displayed at the top right of the card. Click to open the location in the default maps app configured in the device.



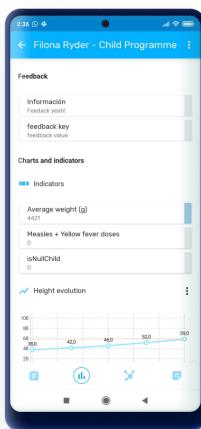
### Working Lists

Working lists are available in Event and Tracker Programs, once a list is selected the filters will be blocked and not allowed to change until the user resets the search.



## Program Indicators

The analytics tab supports displaying text and key/value pair in feedback or indicator section.



## Legends

Legends can be assigned to Data Elements and they will be displayed next to value with the respective color and label.



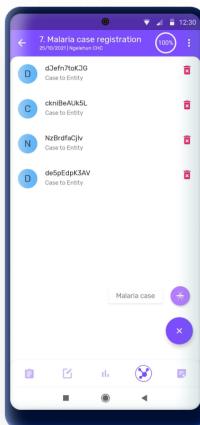
## Event Programs specific features

### Event - TEI relationships (NEW 2.5)

The app allows adding relationships from single events (in event programs) to TEIs. There is a new tab in the event screen, named relationships, that will be displayed only when this type of relationships are configured in the server for the specific program.

#### Note

The current version does not allow TEIs to event relationships, or using events that belong to an enrollment.



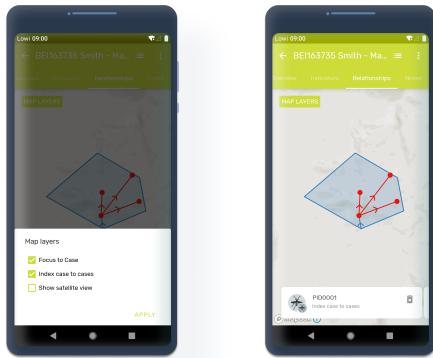
## Tracker Programs (program with registration) specific features

### Relationships in maps

In tracker programs, the user can see relationships on a map by tapping the map icon on the relationships tab.

- An arrow is shown on the direction of the relationship.
- For bidirectional relationships, the arrow points both sides.

- Each relationship type displays a different color.
- If one or both TEIs have a polygon as coordinate, the line goes from (and to) the nearest point in the polygon of both TEIs.



### TEI Dashboard navigation panel (NEW in 2.5)

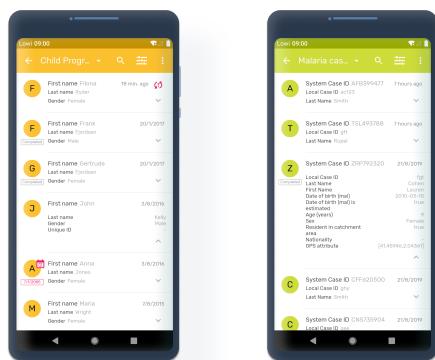
To simplify and personalize the user experience, the user interface actions offered to the user at the TEI dashboard will be tailored to the specific configuration of each program.

- Relationships tab will not be visible if the program relationships are not configured
- "Create event" button will be hidden when the user cannot create more events based on tracker configuration.
- The Indicator tab will not be visible if the program has no program indicators configured.
- Organisation Unit filter will not be visible if the user has only one Organisation Unit configured.

### TEI Card Design

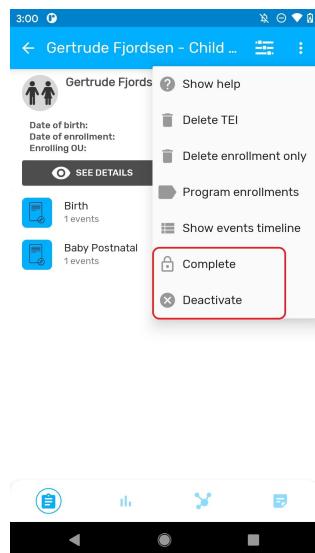
The TEI Card has been designed to display as much information as possible considering the constraints of screen size. Currently it displays the following information:

- Last update date
- The first 2 attributes with displayInList option
  - If there are more, there will be an arrow to display the full list
- Enrollment org unit
- Enrollment status label if **completed** or **cancelled**
- Overdue icon if an overdue event exists with the most recent overdue event date
- Follow-up icon if the TEI is marked
- Card image (one of the following options):
  - Profile picture when available or
  - First letter of the first attribute or
  - Tracked Entity Type icon
  - A hyphen will display if none of the options are available



## Complete/Deactivate Enrollment

To complete or deactivate an enrollment, click on three dot menu in the upper right corner and select "Complete" or "Deactivate".



## Reset Search Fields

All tracker programs will take the user to the search screen. The search fields are used to look up for a specific entity, and the circled arrow to reset the search. All fields will be blank for the user to do a new search.

Before entering a new TEI the user must perform a search to avoid possible duplicates. Once the search is performed the the search button will become "Add" button for the user to create a new enrollment.

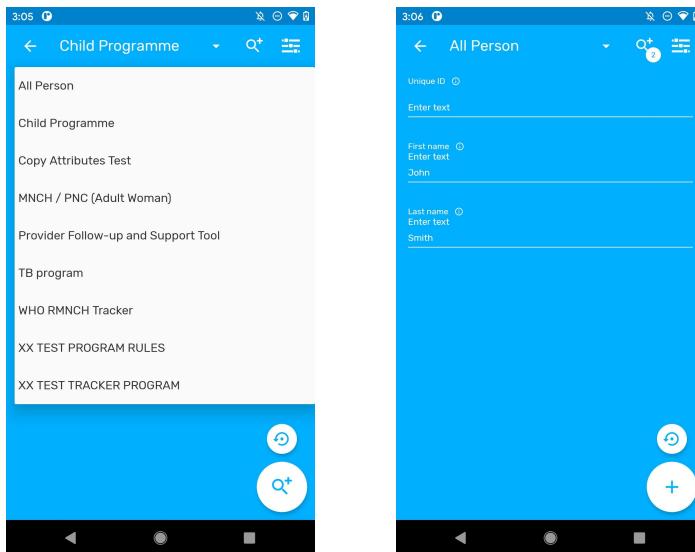
### Info

Searching before entering a new TEI is mandatory to avoid possible duplicates and the DHIS2 Android App has been designed as such. If the device is working offline the search will be performed locally, however, if the device is working in online mode a server search is performed. This behavior cannot be changed.

### Search screen for all Tracked Entity Type

User can search across all programs by specific tracked entity type (TET). In the Search screen there is a drop down which shows all the programs available for the active TET (active TET is defined by the selection of the program in the home screen). That drop down should also have an option with TET name, for example: *All Person*.

When the user selects that option, the search fields available will only be the TET attributes (no program specific attributes). Search restrictions do not apply, because they belong to the programs.



The search will return the found TEI's in the local database and also those in the Search OU of the user (when user is online). For those found online, the user will have to select them and the whole record will be downloaded.

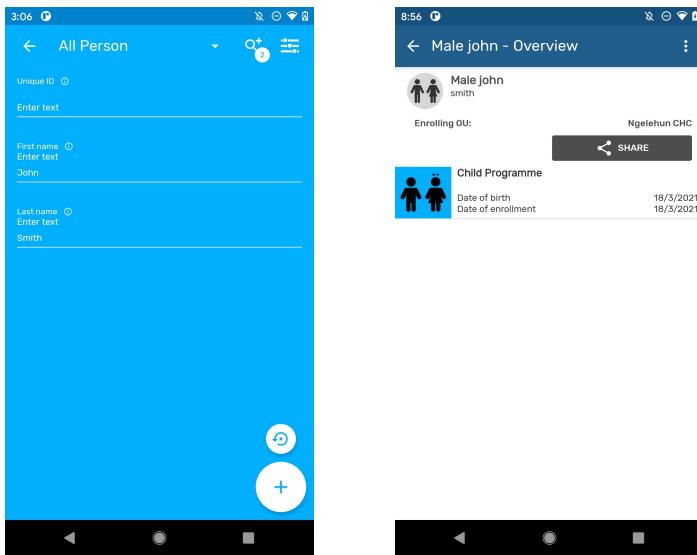
#### Note

When configuring search org. units, make sure that your capture org. units are contained in your search org. units, to do that capture org. units have to be selected as well as search org. units.

### TEI Dashboard across programs

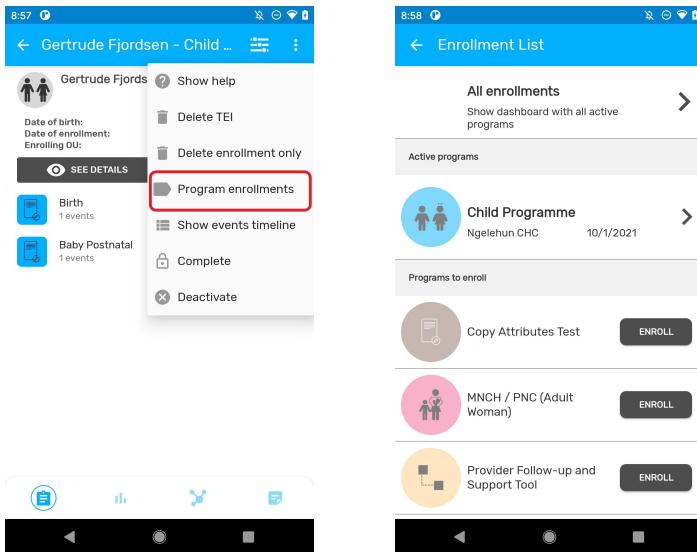
User can see the TEI dashboard without any program by selecting the TEI in the list if the search was without program.

The dashboards will show the list of active enrollments.



### TEI enrollment history and new enrollment

User can see the complete historical records of the TEI. Clicking on the upper right corner menu, select "Program Enrollments". A list of "Active enrollments" will be displayed, followed by a list of "Past enrollments" (completed or cancelled), followed by the programs in which the TEI could be enrolled. User can also return to the "TEI Dashboard" without any program' by selecting "All enrollments".

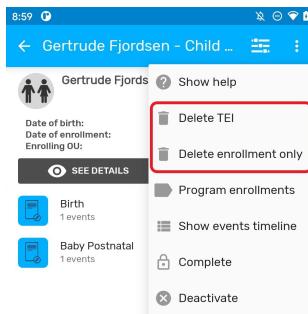


### Delete TEI's & Enrollments

To delete a TEI or an enrollment, select the desired option in the three dots menu of TEI dashboard. Local TEI or Enrollment will be deleted from the database. Records that has been previously synced with the server will be marked for deletion if the user has the following authorities:

- F\_ENROLLMENT CASCADE\_DELETE
- F\_TEI CASCADE\_DELETE

In this case they will be shown in the TEI search list, but will not be accessible.

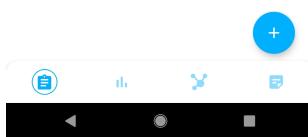
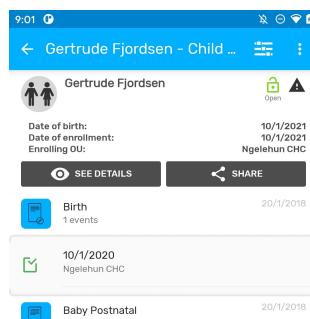
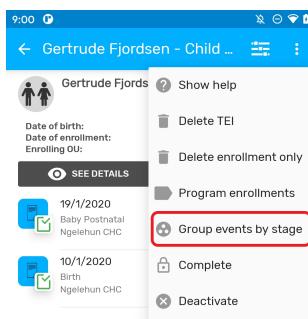


### Warning

When users enter a TEI and while it is not synced to the server they will be able to delete the TEI and the enrollment even if they have not been assigned these authorities. This is by design and to allow users rolling back in case of having entered wrong data (TEI and/or enrollment) and thus preventing it reaching the server and requiring another user with higher privileges to fix the issue.

### Group view of Program stages in TEI Dashboard

The TEI Dashboard offers the possibility to change the list of events from the chronological view to a stage grouping view. The stage grouping view will group and collapse the events per program stage. Each program stage group can be expanded by the user and the events will be displayed chronologically.



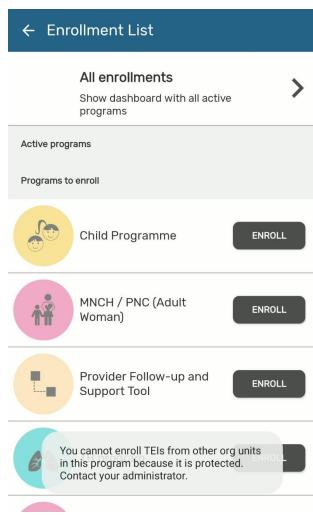
### Inherit Values

When creating a new TEI for a relationship, inherit any program attribute marked with the inherit check in web.

This means that any existing attributes in the first TEI should have pass to the new TEI and be shown in the registration form.

### Breaking the glass

The "breaking the glass" feature is not yet supported in DHIS2 Android Capture App. If the program is configured as "Protected", the default behavior for Android will be the same as if the program is configured as "closed". This means that an Android user will not be able to read or edit enrollments of a TEI outside of their capture org units. TEIs registered in a Search OU will be returned by the TE Type search but if the program is closed or protected the user will not be allowed to see or create a new enrollment. If Android users must be able to access TEI outside of their data capture org unit, the program should be configured with access level "Open".



### Analytic charts

It is possible to display the evolution in data elements as charts, values or tables. These data elements must be a numeric value type and configured in a repeatable stage.

1. Single value: It will display the newest value in the program.



1. Charts: It is possible to display the values as a line chart or as a bar chart.



The Nutrition Growth charts are shown according to the WHO standards. This option will render a background image and apply the axis (0 to 5 monthly)according to the WHO model.



1. Tables: It will display the data elements or indicators in the rows and the periods in the columns.



## Supported features Overview

The following is a comprehensive list of all features available for Programs with and without registration in DHIS2, and notes on whether or not these have been implemented in the Android Capture app.

In the notes, 'admin' refers to someone who develops and configures a DHIS2 system, and 'user' refers to someone who uses apps to capture data, update it, and review reports.

Legend	Description
	Feature implemented
	Feature not implemented (will be ignored)
	Not applicable
	Work in progress. Feature not completely implemented yet or with unexpected behaviour already reported.

### Program

| Feature | Description of feature | Program with registration | Program without registration | Notes on implementation | --- | --- | :-: | --- | --- | | Data entry method for option sets | Enables an admin to choose how options will be displayed on-screen across the entire program (ie either as drop-down lists or as radio buttons) | | | This will be replaced by the new rendering options. | | Combination of categories (Attribute CatCombo) | Allows an admin to attach a Category (set of Options) to the Program, requiring users to categorize each enrolment. (This is called an Attribute Category Combination in DHIS 2.) | | | | Data approval workflow | If an admin selects a pre-configured Data Approval Workflow, this will be used to enforce an "approval" or "acceptance and approval" cascade, enabling users to sign-off and lock data. | | | | Display front page list | If this option is ticked, the landing page displays a list of active enrolments once an Org Unit and Program have been chosen. (Attributes shown are those ticked as "display in list".) | | | | First stage appears on registration page | When this option is chosen, then during Program enrolment, the screen for the first Program Stage is also shown (enrolment and the first event are captured together on one screen). | | | In Android, this is implemented by opening automatically the event after enrollment is completed, instead of adding the form to the same screen. | | Completed events expiry days | Enables admins to lock data-entry a certain number of days after an event has been completed. | | | | Expiry period type + expiry days | Enables admins to set a period (eg weekly, monthly), and to lock data-entry a certain number of days after the end of the period. | | | | Allow future enrolment dates | If ticked, this enables a user to enter future Enrolment dates during enrolment in a Program; otherwise users are restricted to today or past dates. | | | | Allow future incident dates | If ticked, this enables a user to enter future Incident dates during enrolment in a Program; otherwise users are restricted to today or past dates. | | | | Only enrol once (per tracked entity instance lifetime) | If ticked, prevents a TEI (eg person) from being enrolled in this Program more than once. | | | | Show incident date | If ticked, both Enrolment and Incident dates are shown to the user for data capture; otherwise, only the Enrolment date is shown/captured. | | | | Description of incident date | Allows an admin to customize the label that is used for the incident date. | | | | Description of enrolment date | Allows an admin to customize the label that is used for the enrollment date. | | | | Capture coordinates (enrolment) | Enables users to capture geographical coordinates during enrolment in the program. | | | | Capture Polygon (enrolment) | Enables users to capture locations (enclosed areas) during enrolment in the program. | | | | TEI Coordinates | Enables users to capture geographical coordinates for the TEI during the enrolment in the program. | | | | Relationships: create and update | Enables users to create and update relationships. | | | | Relationships - shortcut link to add a relative | This enables admins to add a link for one specific relationship to the Dashboard, enabling users to directly create a linked TEI (eg "child" patient). | | | | Attributes: display in list | This setting determines whether an Attribute can be viewed in lists such as

search results, and whether it can be seen in the shortlist of Attributes shown under "Profile" in the Dashboard. | | | The first three attributes will be shown | | | Attributes: mandatory | This enables an admin to mark an Attribute as "mandatory";, meaning the enrolment can't be saved until a value is captured. | | | | Attributes: date in future | For date Attributes, this enables an admin to either prevent or allow future dates to be captured. | | | | Registration form - default | The default data entry form simply lists all attributes defined for the TEI. | | | | Registration form - custom | This enables an admin to define a custom layout (using HTML) for the registration form. | - | | Custom layouts are not supported in the Android App | | | Program notifications | You can set up automated notifications for when program enrolments or completions occur, or at a set interval before/after incident or enrolment dates. These can be sent as internal DHIS 2 messages, emails or SMSs. | | | This functionality is executed on the server side, once data is received. Will not work when the app is working offline. | | | Activate/deactivate enrolment | Deactivating a TEI dashboard will cause the TEI to become "read-only". This means you cannot enter data, enrol the TEI or edit the TEI profile. | | | | Complete allowed only if validation passes | Select check box to enforce that an event created by this program is only completed when all validation rules have passed. | | | | Org unit opening/closing dates | Enables an admin to set opening and closing dates for an Org Unit, which blocks users from adding or editing events outside of these dates. | | | | Data sharing levels/Can capture data | Enables the user to add new event, edit data and delete events in the program. | | | | Data sharing levels/Can view data | Enables the user to see list of events within the program. | | | | Data sharing levels/No access | The user will not be able to see the program | | |

### Program stage

Feature	Description of feature	Program with registration	Program without registration	Notes on implementation
Event form - default	The default data entry form simply lists all attributes belonging to a program registration			
Event form - section forms	Sections forms allow you to split existing forms into segments			
Event form - custom	Define a custom event form as a HTML page.			Custom layouts are not supported in the Android App.

Feature	Description of feature	Program with registration	Program without registration	Notes on implementation
Program stage notifications	You can set up automated notifications for when the program stage is completed, or at a set interval before/after scheduled event dates. These can be sent as internal DHIS 2 messages, emails or SMS messages.			This functionality is executed on the server side, once data is received. Will not work when the app is working offline.
Repeatable	If Repeatable Is ticked, this stage can be repeated during one program enrollment. If it is not, then the stage can only happen once during a program enrollment.			
Repeatable	If Repeatable Is ticked, this stage can be repeated during one program enrollment. If it is not, then the stage can only happen once during a program enrollment.			
Repeatable + Standard interval days	The system will suggest the due date as the calculation of the last event + standard interval dates.			

Feature	Description of feature	Program with registration	Program without registration	Notes on implementation
Period type	Enables an admin to configure a set of periods (e.g. weeks or months) for each event in the program stage, instead of just a date. When creating events, users are then asked to choose a period (instead of a date) for each new event they create within that program stage.			
Auto-generate event	If ticked, a "booking" is generated for this Program Stage upon enrolment, based on the "Scheduled days from start".			
Generate events based on enrolment date (not incident date)	Check on it for auto-generating due dates of events from program-stages of this program based on the enrollment date. If it is not checked, the due dates are generated based on incident date.			
Open data entry form after enrolment + report date to use	If selected, once an enrolment is complete, an event's data entry form should open directly afterwards.			

Feature	Description of feature	Program with registration	Program without registration	Notes on implementation
Ask user to complete program when stage is complete	If selected, upon completing the program stage the user should be asked to complete the program. (This setting is ignored if "Ask user to create new event" is also ticked.)			
Ask user to create new event when stage is complete	If selected, when the Program Stage is completed the user is prompted to book.			
Hide due date	Only shows the actual date for events, hiding the due date.			
Capture coordinates (event)/Feature Type-Point	Enables the user to capture geographical coordinates when each event is created particularly useful in devices that have GPS (eg Android), as instead of having to type in coordinates, the user can automatically populate them with the press of a button.			
Capture Polygon (event)/Feature Type-Polygon	Enables users to capture locations (enclosed areas) when each event is created. A Polygon must contain at least 4 points.			

Feature	Description of feature	Program with registration	Program without registration	Notes on implementation
Description of report date	Allows an admin to customize the label that is used for the event's date.			
Data elements-compulsory	This enables an admin to mark a data element as "compulsory", meaning an event can not be saved until a value is captured.			
Data elements-allow provided elsewhere	On the form, this places a tick-box next to the selected data element, and enables previous data to be pulled into the data element.			
Data elements-display in reports	Displays the value of this data element into the single event without registration data entry function.			
Data elements-date in future	For date Data Elements, this enables an admin to either prevent or allow future dates to be captured.			
Data elements-render options as radio	Enables an admin to choose how options will be displayed on-screen for each Data Element (i.e. either as drop-down list or as radio buttons).			
Block entry form after completed	Prevents all edits to events after they have been completed.			

Feature	Description of feature	Program with registration	Program without registration	Notes on implementation
Event comments	Enables the user to add overall comments to an event. These comments are cumulative (new comments are added below existing comments).			

### Program with registration: Tracked entity dashboard

| Feature | Description of feature | Status | Notes on implementation | | --- | --- | :-: | --- | --- ||| Messaging | Enables users to send ad-hoc free-text messages to TEIs (e.g. patients) via SMS or email. | | | | Mark for follow-up (button with exclamation triangle) | Enables a user to mark a TEI (e.g. patient) as requiring follow-up. | | | | Display TEI audit history | Enables a user to see a history of all edits to Attributes for this TEI (e.g. patient). | - | | | Inline Program Indicators | If a program indicator "display in form" box is ticked, the indicator appears on the Tracker Capture dashboard, and is updated live as data capture occurs. | | | | Delete events | Enables the user to delete an event. | | | | Schedule events | In the event generation dialogue, the user should also see the option to schedule an event. The process is like creating an event, but the user will be sent back to the TEI dashboard after the event is scheduled. | | | | Referral of patients | In the event generation dialogue, the user should also see the option to refer a patient. The process is like creating/scheduling an event, but the user can change the org unit and has to specify if it is a one-time or permanent referral. One time will just create the event in the specified OU. | | | | Reset search fields | User is able to clean up the search fields by pressing on the rounded arrow icon on the top right corner of the search screen. | | | | Search screen for all TE Type | User is able to search across all program of one tracked entity type (TET). In the Search screen there is a drop down which shows all the programs available for the active TET (active TET is defined by the selection of the program in the home screen). That drop down should also have an option with TET name. (Person in our server). When the user selects that option, the search fields available will only be the TET attributes (no program specific attributes). All search restrictions do not apply, because they belong to the programs. | | | | TEI Dashboard without program | User can see the TEI dashboard without any program by selecting the TEI in the list if the search was without program. The dashboards will show the TET attributes in the details card followed by a list of active enrolments. | | | | TEI enrollment history and new enrollment | User is able to see the complete historical record of the TEI. By clicking on the top right corner icon they will see a list of Active enrolments, followed by a list of past enrolments (completed or cancelled), followed by the programs in which the TEI could be enrolled. Users should be able to navigate to the different enrolments from the list. | | | | Access level-Breaking the glass | If the program is configured with access level protected, and the user searches and finds tracked entity instances that is owned by organisation unit that the user does not have data capture authority for, the user is presented with the option of breaking the glass. The user will give a reason for breaking the glass, then gain temporary ownership of the tracked entity instance. | | |

### Program without registration: Single event program

| Feature | Description of feature | Status | Notes on implementation | | --- | --- | :-: | --- | --- ||| Events listing (grid) | A listing of existing events that is displayed once a program is selected. | | | | Sort and filter events in grid | Allows the user to sort listed events, or to filter events based on keywords or specific ranges of dates/numbers. | | Events are sorted chronologically. The user can filter by period and organisation unit. | | | | Edit events in grid | Allows the user to directly edit the data elements shown

in the events listing/grid. | | | View event audit history | Enables the user to see a history of all changes to the event's data elements. | | | Show/hide columns (in event list/grid) | Enables the user to modify the data elements shown in the event listing/grid (applies to that user only). | | | Field completion percentage | The percentage of data completed in each event is shown in the top right corner of an event when it is opened after first registration. The percentages should be adapted to the effects of the program rules in the forms. | | Delete events | Enables the user to delete an event. | | |

## Program rules supported in Android Capture App

The following is a comprehensive list of all Program Rule components (variable types and actions) available in DHIS2, and notes on whether or not these have been implemented in the DHIS2 Android App.

### Note

Any issues around using a particular feature with Android are highlighted with an exclamation mark !.

legend	description
	Value type implemented
	Value type not implemented, but will be safely ignored (if not compulsory)
	Not applicable
	Work in progress. Feature not completely implemented yet or with unexpected behavior already reported

## Program rule Variable source types supported

Variable type	Description of variable type	Program with registration	Program without registration	Notes on implementation
Data Element from the newest event for a program stage	This source type works the same way as "Data element from the newest event in the current program", except that it only evaluates values from a specific program stage.			
Data element from the newest event in the current program (with registration)	This source type is populated with the newest data value collected for the specified data element within the enrolment.			
Data Element from the newest event in the current program (without registration)	This program rule variable will be populated with the newest data value found within the 10 newest events in the same organization unit.			

Variable type	Description of variable type	Program with registration	Program without registration	Notes on implementation
Data Element in current event (with registration)	Variable takes the data element's value from the current event.			
Data Element in current event (without registration)	Contains the data value from the same event that the user currently has open.			
Data Element from previous event (with registration)	Program rule variables with this source type will contain the newest value from all previous events for the specified data element. The event currently open is not evaluated.			
Data Element from previous event (without registration)	This program rule variable will be populated with the newest data value found within the 10 events preceding the current event date (i.e. not including the current event).			
Tracked Entity Attribute	Populates the program rule variable with a specified tracked entity attribute for the current TEI (e.g. current patient).			
Calculated value	Calculated value.			

### Program rule Actions supported (Data element in current event)

| Action | Description of action | Program with registration | Program without registration | Notes on implementation | --- | --- | :- | :- | --- | --- | | Hide Field | Hides an individual data element if the rule is true. | | ! If you change the value after the field is hidden, it will revert the action depending on the value type rule engine default value. We recommend its use combined with the hasvalue function. | | | Hide Section | Hides a whole section and its data elements if the rule is true. | | | | Hide Option | Hide a single option for an option set in a given data element/tracked entity attribute. When combined with **show option group** the **hide option** takes precedence | | | | Hide Option Group | Hide all options in

a given option group and data element/tracked entity attribute. When combined with **show option group** the **hide option** takes precedence | | | | Show option group | Used to show only options from a given option group in a given data element/tracked entity attribute. To show an option group implicitly hides all options that is not part of the group(s) that is shown. | | | | Assign Value | Assigns a value to a specified data element or attribute if the rule is true. | | To assing text, it must be in single quotes. For example: '2+2' will show the text 2+2 and 2+2, without the single quotes will show 4. | | Show Warning | Shows pop-up warning to the user if rule is true; does not prevent the user from continuing. | | | | Warning on Complete | Shows a pop-up warning to the user if, at the point 'complete' is clicked, a rule is true; this does not prevent the user from continuing. | | | | Show Error | Shows a pop-up error message to the user as soon as a rule is true, and prevents user from continuing until rule is no longer true. | | | The value is not saved, but the text is not cleared so that the user can fix it easily. | | | Error on Complete | Shows a pop-up warning to the user if, when "complete"; is clicked, a rule is true, and prevents user from continuing until rule is no longer true. | | | | Make Field Mandatory | Sets a data element as "mandatory"; if rule is true. | | | | Display Text (Event Programs) | Used to display information that is not an error or a warning, for example feedback. | | | Independently from the source variable type, text will be displayed in the form as the last element of the last section. Text will be displayed as the messages in the indicators tab. | | | Display Text (Tracker Programs) | Used to display information that is not an error or a warning, for example feedback. | | | **1. Program rule configured as "Trigger rule only for program stage"**. Text will be displayed ONLY in the form as the last element of the last section. Text will be displayed as the messages in the indicators tab. -> If the program rule uses any variable type which is not from the current stage, the rule will not be able to evaluate and the message will not be shown.**2. Program rule NOT configured as "Trigger rule only for program stage"**. Text will be displayed ONLY in the indicators tab and NOT in the form. → If the program rule uses any variable of type Current event, the rule will not be able to evaluate and the message will not be shown. | | | Display Key Value/Pair (Event Programs) | Used to display information drawn from a data element. | | | **Variable Type:** \_ Data element from the newest event in the current program\_ Data element from previous event\_ Data element in current event\_ Built-in variableKey/Value Pair will be displayed in the form ONLY in the specified section. | | | Display Key Value/Pair (Traker Programs) | Used to display information drawn from a data element. | | | **1. Variable Type:**\_ Data element in current eventKey/Value Pair will be displayed in the form ONLY in the specified section.**2. Variable Type:**\_ Data element from the newest event in the current program\_ Data element from previous event\_ Data element from the newest event for a program stage\_ Tracked entity attribute\_ Built-in variableKey/Value Pair will be displayed ONLY in the indicators tab and NOT in the form. | | | Hide Program Stage | Hides a whole program stage from the user if the rule is true. | | | Action rule only supported for **Data element from the newest event in the current program type and tracked entity** attribute variables. | | | Send Message | Send Message triggers a notification based on provided message template. This action will be taken whenever there is a change in data value. However this behaviour can be controlled by providing event-enrollment status in program rule expression | | | This feature is executed on the server side. | | | Schedule Message | Schedule Message will schedule notification at date provided by Expression in the data field. | | | This feature is executed on the server side. | |

## Program rule Actions supported (Other variables)

| Action | Description of Action | Data Element from the Newest Event in the Current Program (with registration) | Data Element from the Newest Event in the Current Program (without registration) | Data Element from Previous Event (with registration) | Data Element from Previous Event (without registration) | Data Element from the Newest Event for a Program Stage (with registration) | Tracked Entity Attribute (with registration) | Notes on implementation | | --- | --- | :- | :- | :- | :- | :- | --- | --- | --- | --- | | Hide Field | Hides an individual data element if the rule is true. | | | | | | Hide Section | Hides a whole section and its data elements if the rule is true. | | | | | | Hide Option | Hide a single option for an option set in a given data element/tracked entity attribute. When combined with **show option group** the **hide option** takes precedence. | | | | | | Hide Option Group | Hide all options in a given option group and data element/tracked entity attribute. When combined with show option group the hide option takes precedence. | | | | | | Assign Value | Assigns a value to a specified data element or

attribute if the rule is true. | | | | | To assing text, it must be in single quotes. For example: '2+2' will show the text 2+2 and 2+2, without the single quotes will show 4. | | Show Warning | Shows pop-up warning to the user if rule is true; does not prevent the user from continuing. | | | | | | | Warning on Complete | Shows a pop-up warning to the user if, at the point "complete" is clicked, a rule is true; this does not prevent the user from continuing. | | | | | | | Show Error | Shows a pop-up error message to the user as soon as a rule is true, and prevents user from continuing until rule is no longer true. | | | | | | | The rule will let the user to finish the enrollment but will prevent from completing the events until rule is no longer true. The value is not saved, but the text is not cleared so that the user can fix it easily. | | | Error on Complete | Shows a pop-up warning to the user if, at the point "complete" is clicked, a rule is true; this does not prevent the user from continuing. | | | | | | | Make Field Mandatory | Sets a data element as "mandatory" if rule is true. | | | | | | | Display Text (Event Programs) | Used to display information that is not an error or a warning, for example feedback. | | | | | | | Independently from the source variable type, text will be displayed in the form as the last element of the last section. Text will be displayed as the messages in the indicators tab. | | | Display Text (Tracker Programs) | Used to display information that is not an error or a warning, for example feedback. | | | | | | | **1. Program rule configured as "Trigger rule only for program stage".** Text will be displayed ONLY in the form as the last element of the last section. Text will be displayed as the messages in the indicators tab. -> If the program rule uses any variable type which is not from the current stage, the rule will not be able to evaluate and the message will not be shown.**2. Program rule NOT configured as "Trigger rule only for program stage".** Text will be displayed ONLY in the indicators tab and NOT in the form. → If the program rule uses any variable of type Current event, the rule will not be able to evaluate and the message will not be shown. | | | Display Key Value/Pair (Event Programs) | Used to display information drawn from a data element. | | | | | **Variable Type:** \_ Data element from the newest event in the current program\_ Data element from previous event\_ Data element in current event\_ Built-in variableKey/Value Pair will be displayed in the form ONLY in the specified section. | | | Display Key Value/Pair (Traker Programs) | Used to display information drawn from a data element. | | | | | | | **1. Variable Type:** \_ Data element in current eventKey/Value Pair will be displayed in the form ONLY in the specified section.**2. Variable Type:** \_ Data element from the newest event in the current program\_ Data element from previous event\_ Data element from the newest event for a program stage\_ Tracked entity attribute\_ Built-in variableKey/Value Pair will be displayed ONLY in the indicators tab and NOT in the form. | | | Hide Program Stage | Hides a whole program stage from the user if the rule is true. | | | | | | | Action rule only supported for **Data element from the newest event in the current program variable** type. If the event is auto-generated, the rule will not apply. | | | Send Message | Send Message triggers a notification based on provided message template. This action will be taken whenever there is a change in data value. However this behaviour can be controlled by providing event-enrollment status in program rule expression | | | | | This feature is executed on the server side. | | | Schedule Message | Schedule Message will schedule notification at date provided by Expression in the data field. | | | | | This feature is executed on the server side. | |

## Functions to use in program rule expressions

| Function | Description of function | Status | Notes on implementation | | --- | --- | :-: | --- | --- | | d2:ceil | Rounds the input argument up to the nearest whole number. | | | d2:floor | Rounds the input argument down to the nearest whole number. | | | d2:round | Rounds the input argument to the nearest whole number. | | | d2:modulus | Produces the modulus when dividing the first with the second argument. | | | | d2:zing | Evaluates the argument of type number to zero if the value is negative, otherwise to the value itself. | | | d2:oizp | Evaluates the argument of type number to one if the value is zero or positive, otherwise to zero. | | | d2:concatenate | Produces a string concatenated string from the input parameters. Supports any number of parameters. | | Use d2:concatenate function instead of using "+" as the expression evaluator in the app will be adding numbers if it can. | | | d2:daysBetween | Produces the number of days between the first and second argument. If the second argument date is before the first argument, the return value will be the negative number of days between the two dates. The static date format is 'yyyy-MM-dd'. | | | d2:weeksBetween | Produces the number of full weeks between the first and second argument. If the second argument date is before the first argument, the return value will be the negative number of weeks between the two dates. The static date format is

'yyyy-MM-dd'. | | | d2:monthsBetween | Produces the number of full months between the first and second argument. If the second argument date is before the first argument the return value will be the negative number of months between the two dates. The static date format is 'yyyy-MM-dd'. | | | d2:yearsBetween | Produces the number of years between the first and second argument. If the second argument date is before the first argument, the return value will be the negative number of years between the two dates. The static date format is 'yyyy-MM-dd'. | | | d2:addDays | Produces a date based on the first argument date, adding the second argument number of days. | | | d2:count | Counts the number of values that is entered for the source field in the argument. | | | d2:countIfValue | Counts the number of matching values that is entered for the source field in the first argument. Only occurrences that matches the second argument is counted. | | | d2:countIfZeroPos | Counts the number of values that is zero or positive entered for the source field in the argument. The source field parameter is the name of one of the defined source fields in the program. | | | d2:hasValue | Returns the number of numeric zero and positive values among the given object arguments. Can be provided with any number of arguments. | | | d2:validatePattern | Evaluates to true if the input text is an exact match with the supplied regular expression pattern. The regular expression needs to be escaped. | | | d2:left | Evaluates to the left part of a text, num-chars from the first character. | | | d2:right | Evaluates to the right part of a text, num-chars from the last character. | | | d2:substring | Evaluates to the part of a string specified by the start and end character number. | | | d2:split | Split the text by delimiter, and keep the nth element (0 is the first). | | | d2:length | Find the length of a string. | | | d2:zpsc | Returns the number of numeric zero and positive values among the given object arguments. Can be provided any number of arguments. | | | d2:inOrgUnitGroup\* | Evaluates whether the current organization unit is in the argument group. The argument can be defined with either ID or organization unit group code. | | | d2:hasUserRole\*\* | Returns true if the current user has this role otherwise false. | | | d2:zScoreWFA\*\*\* | Function calculates z-score based on data provided by WHO weight-for-age indicator. Its value varies between -3.5 to 3.5 depending upon the value of weight. | | |

#### Note

- Available in DHIS2 v2.30 \*\* Available in DHIS2 v2.31 and greater \*\*\*  
Available in DHIS2 v2.32 and greater

## Standard variables to use in program rule expressions

Available in DHIS2 v2.30

Variable	Description of function	Status	Notes on implementation
V{current_date}	Contains the current date whenever the rule is executed.		
V{event_date}	Contains the event date of the current event execution. Will not have a value at the moment the rule is executed as part of the registration form.		
V{event_status}	Contains status of the current event or enrollment.		

Variable	Description of function	Status	Notes on implementation
V{due_date} *	This variable will contain the current date when the rule is executed. Note: This means that the rule might produce different results at different times, even if nothing else has changed.		
V{event_count}	Contains the total number of events in the enrollment.		
V{enrollment_date} *	Contains the enrollment date of the current enrollment. Will not have a value for single event programs.		
V{incident_date} *	Contains the incident date of the current enrollment. Will not have a value for single event programs.		
V{enrollment_id} *	Universal identifier string(UID) of the current enrollment. Will not have a value for single event programs.		
V{event_id}	Universal identifier string(UID) of the current event context. Will not have a value at the moment the rule is executed as part of the registration form.		
V{orgunit_code}	Contains the code of the orgunit that is linked to the current enrollment. For single event programs the code from the current event Org Unit will be used instead.		

Variable	Description of function	Status	Notes on implementation
V{environment}	Contains a code representing the current runtime environment for the rules. The possible values is "WebClient", "AndroidClient" and "Server". Can be used when a program rule is only supposed to run in one or more of the client types.		
V{program_stage_id}	Contains the ID of the current program stage that triggered the rules. This can be used to run rules in specific program stages, or avoid execution in certain stages. When executing the rules in the context of a TEI registration form the variable will be empty.		
V{program_stage_name}	Contains the name of the current program stage that triggered the rules. This can be used to run rules in specific program stages, or avoid execution in certain stages. When executing the rules in the context of a TEI registration form the variable will be empty.		

**Notes**

\* Only applies to tracker

**Differences between the Program Rules in the web and the Android version**

As the web and the Android application are currently using a different *program rule engine* there might be programs rule that work in one system and not in the other. In general terms it can be said that the Android *program rule engine* is more strict and so, some Program Rules that work in the web version of DHIS2 will fail in Android. This subsection describes the main differences and how to adapt the rules in order to have them working in both systems.

### Evaluation of type Boolean

DHIS2 web version considers the type boolean as 0 or 1 (which can be evaluated to true or false), however Android evaluates them only as true or false. While this makes possible the addition of booleans in web, it will fail in Android; in order to fix this an additional *program rule variable* is needed to transform the boolean into an number that can be operated. Check the table below for examples and possible solutions.

For the examples belows consider the following:

- yn\_prv1: is a program rule variable that has been configured to get the value of a 'Yes/No' data element
- yn\_prv2: is a program rule variable that has been configured to get the value of a 'Yes/No' data element
- prv\_boolean\_one: is a program rule variable that has been configured to get the value of a 'Yes/No' data element
- prv\_boolean\_two: is a program rule variable that has been configured to get the value of a 'Yes/No' data element
- prv\_boolean\_one\_to\_number: is a program rule variable with calculated value
- prv\_boolean\_two\_to\_number: is a program rule variable with calculated value
- sometimes true is used as program rule condition meaning the action is always performed
- The following acronyms are used:
  - DE (Data Element)
  - PR (Program Rule)
  - PRE (Program Rule Expression)
  - PRC (Program Rule Condition)
  - PRV (Program Rule Variable)
  - PRA (Program Rule Action)

Program Rule Condition(s)	Program Rule Action(s)	Web version	Android version	Comment
d2:hasValue('yn_prv1')    d2:hasValue('yn_prv2')	Assign fixed value to DE			
#{yn_prv1}    #{yn_prv2}	Assign fixed value to DE			
d2:hasValue('yn_prv1')    d2:hasValue('yn_prv2')	Assign value to DE: #{yn_prv1} + #{yn_prv2} + 1			Crashes in Android whenever a boolean is marked as the expression would result in true+false+1
d2:hasValue('yn_prv1')    d2:hasValue('yn_prv2')	Assign value to DE: #{yn_prv1} + #{yn_prv2} + 1			Crashes in Android whenever a boolean is marked as the expression would result in true+false+1

Program Rule Condition(s)	Program Rule Action(s)	Web version	Android version	Comment
PR1: #{prv_boolean_o ne}	PRA1. Assign value "1" to PRV "#[prv_bool_one _to_number]"			There are 2 variables for boolean, one gets the value via a PRV definition "value form DE" and the other one via a PRA. If a boolean is not marked it is counted as string instead of a number
PR2: #{prv_boolean_t wo}	PRA2. Assign value: "1" to PRV "#[prv_bool_two_to_number]"			
PR3: #{prv_boolean_o ne}    #{prv_boolean_t wo}	PRA3. Assign value to DE: "#[prv_bool_one _to_number} + #[prv_bool_two_t o_number} + 1"			

Program Rule Condition(s)	Program Rule Action(s)	Web version	Android version	Comment
Four PR to assign 1 or 0 to the booleans and an additional for the addition. Priorities go from top to bottom  PRC1: ! d2:hasValue('prv_boolean_one')    ! #{prv_boolean_o ne}  PRC2: d2:hasValue('prv_boolean_one') && #{prv_boolean_o ne}  PRC3: ! d2:hasValue('prv_boolean_two')    ! #{prv_boolean_t wo}  PRC4: d2:hasValue('prv_boolean_two') & & #{prv_boolean_t wo}  PRC5: true	PRA1: Assign value: "0" to PRV "#{prv_bool_one _to_number}"  PRA2: Assign value: "1" to PRV "#{prv_bool_one _to_number}"  PRA3: Assign value: "0" to PRV "#{prv_bool_two_to_number}"  PRA4: Assign value: "1" to PRV "#{prv_bool_two_to_number}"  PRA5: Assign value: "#{prv_bool_one _to_number} + #{prv_bool_two_t o_number} + 1" to DE			There are 2 variables for boolean, one gets the value via a PRV definition "value form DE" and the other one via a PRA.

### Evaluation of numbers

DHIS2 web version evaluate numbers in a more flexible way casting values from integer to floats if required for a division, however, Android take numbers as such (without a casting) which my end up giving unexpected results. Check the table below for examples and possible solutions.

Program Rule Condition(s)	Program Rule Action(s)	Web version	Android version	Comment
true	Assign value to DE: d2:daysBetween( '2020-05-13', '2020-05-17') / 3			The user would expect the division to be calculated as 4/3 with a result of 1.3333. However, Android does not cast 4 to a float (4.0 as the web version does) so the result in Android is a pure 1 as the result of the integer division 4/3
true	Assign value to DE: d2:daysBetween( '2020-05-13', '2020-05-17') / 3.0			Division results in 1.33333 in both web and Android

## Changes in Program Rules (as from version 2.2 of the app )

In the version 2.2 of the application (released on August, 2020) a new rule-engine was included. This rule-engine requires some optional and some mandatory changes to be performed on the program rules expressions in order to make it work in the new application. A list of those changes, how to detect them and how to fix them is included in the following subsections.

### Evaluation of 'd2:hasValue'

#### Description

This is an optional change. `d2:hasValue` now works with both single quotes or full variable expression. The following expressions is valid: `(d2:hasValue('variable_name'))` and `d2:hasValue(${variable_name})`

#### How to identify via API?

Get `programRules` where either the condition or the program rule action uses the `d2:hasValue` function.

```
https://example.org/api/programRules?
fields=program[name],name,programRuleActions[data],condition&filter=programRuleActions.data:like:hasValue&filter=
```

```
<programRule name="PR01 - Check variable with hasValue(${variable})">
<condition>d2:hasValue(${Age in years})</condition>
<program name="JB_Testing_2.2"/>
<programRuleActions>
<programRuleAction/>
</programRuleActions>
</programRule>
<programRule name="PR01 - Check variable with hasValue('variable')">
```

```
<condition>d2:hasValue('Age in years')</condition>
<program name="JB_Testing_2.2"/>
<programRuleActions>
<programRuleAction/>
</programRuleActions>
</programRule>
```

## How to fix it?

The example above shows how different ways of using the hasValue function will have the same effect as from version 2.2. There are no mandatory changes but have in mind that while writing new program rules being consistent might help avoiding problems.

## Evaluation of a variable

### Description

This is a mandatory change. `!#{variable_name}` can only be used boolean type variables (BOOLEAN and TRUE\_ONLY).

### How to identify via API?

Get programRulesVariables with dataElements of the type NOT BOOLEAN or TRUE\_ONLY

```
https://example.org/api/programRuleVariables?fields=name&filter=dataElement.valueType:!in:\[TRUE\_ONLY,BOOLEAN\]&paging=False
```

Get all programRule.conditions

```
https://example.org/api/programRules?fields=displayName,condition&paging=False
```

Check manually (or programmatically via a script) if in the list of programRule.conditions (obtained via the second API call) any of the program rules variables (obtained via the first API call) is being used.

For example, from the first list we get:

```
<programRuleVariable name="AdditionalMedication"/>
<programRuleVariable name="age"/>
<programRuleVariable name="Age in years"/>
<programRuleVariable name="AgeYears"/>
<programRuleVariable name="allergies"/>
<programRuleVariable name="apgarcomment"/>
```

And we can compare with the second list:

```
<programRule>
<condition>!#{Pregnant}</condition>
<displayName>PR03- !#{variable_name} - BOOLEAN</displayName>
</programRule>
<programRule>
<condition>!#{Age in years}</condition>
<displayName>PR03- !#{variable_name} - NOT BOOLEAN</displayName>
</programRule>
<programRule>
```

```
<condition>#{PregnancyStatus} != 'YES'</condition>
<displayName>Pregnancy status : false</displayName>
</programRule>
```

This shows that a NON BOOLEAN variable is being used wrongly.

### How to fix it?

Make sure that you are evaluating BOOLEAN or TRUE\_ONLY variables in your conditions. In case the program rule variable is not of that type update your program rule condition with d2:hasValue("#{variable\_name}") or d2:hasValue('variable\_name')

In the example above the condition should change from:

```
<condition>!#{Age in years}</condition>
```

To:

```
<condition>d2:hasValue('Age in years')</condition>
```

## Evaluation of texts

### Description

This is a mandatory change. In program rule actions of the type ASSIGN, DISPLAY TEXT, DISPLAY KEY/VALUE PAIR, SHOW WARNING, SHOW ERROR, WARNING ON COMPLETE or ERROR ON COMPLETE if the Expression to evaluate and assign/display is a text, it must be enclosed with single quotes.

### How to identify via API?

Get the Program Rules which actions are of type text, with something on the field data and verify their data content to find strings without quotes.

```
https://example.org/api/programRules?
fields=program[name],name,programRuleActions[programRuleActionType,content,data]&filter=programRuleActions.programRuleActionType:ASSIGN,DISPLAYTEXT,DISPLAYKEYVALUEPAIR,SHOWWARNING,SHOWERROR&filter=programRuleActions.data:!
null&paging=false
```

For example we can detect here an error of a text field without quotes in the first Program Rule Action while the second one is correct.

```
<programRule name="PR04- !#{variable_name} - BOOLEAN - Assign text without quotes">
<program name="JB_Testing_2.2"/>
<programRuleActions>
<programRuleAction>
<programRuleActionType>SHOWWARNING</programRuleActionType>
<data>embarazada</data>
<content>PR04 text with quotes is: </content>
</programRuleAction>
</programRuleActions>
</programRule>
```

```
<programRule name="PR04- !#{variable_name} - BOOLEAN - Assign text with quotes">
<program name="JB_Testing_2.2"/>
<programRuleActions>
<programRuleAction>
<programRuleActionType>SHOWWARNING</programRuleActionType>
<data>'embarazada'</data>
<content>PR04 text with quotes is: </content>
</programRuleAction>
</programRuleActions>
</programRule>
```

### How to fix it?

Scan the generated list (via the suggested API calls) to find data components of the Program Rule Action where text is not quoted, then go to each of the identified Program Rules and update them.

### Concatenation of string and objects

#### Description

This is a mandatory change. In program rule actions of the type ASSIGN, DISPLAY TEXT, DISPLAY KEY/VALUE PAIR, SHOW WARNING, SHOW ERROR, WARNING ON COMPLETE or ERROR ON COMPLETE if the Expression to evaluate and assign/display is a text, it must be enclosed with single quotes (same as previous change); but, on top of that, if it requires to concatenate two strings or a combination of functions it is mandatory to use the *d2:concatenate* function.

#### How to identify via API?

Get the Program Rules which actions are of type text, with any content on the field data and verify their data content to check if in case of two or more strings (or other objects) are being joined the *d2:concatenate* function is used

Get the Program Rules which actions are of type text and verify their data content to find strings without quotes.

```
http://localhost:8034/api/programRules?
fields=program[name],name,programRuleActions[programRuleActionType,content,data]&filter=programRuleActions.programRuleActionType:[ASSIGN,DISPLAYTEXT,DISPLAYKEYVALUEPAIR,SHOWWARNING,SHOWERROR]&filter=programRuleActions.data:!null&paging=false
```

For example we can detect here an error of two strings in an action without the use of *d2:concatenate*.

```
<programRule name="PR08- Assign text and variable without concatenate">
<program name="JB_Testing_2.2"/>
<programRuleActions>
<programRuleAction>
<programRuleActionType>SHOWWARNING</programRuleActionType>
<data>'Age is 10 and modulus' 'another string'</data>
<content>PR05 text without concat is: </content>
</programRuleAction>
</programRuleActions>
</programRule>
```

**How to fix it?**

Scan the generated list (via the suggested API calls) to find data components of the Program Rule Action where two or more objects are being concatenated and update them to use the d2:concatenate function.

In the example above the data should change from:

```
<data>'Age is 10 and modulus' 'another string'</data>
```

To:

```
<data>d2:concatenate('Age is 10 and modulus','another string')</data>
```

## Program Indicators

The following is a comprehensive list of all Program indicator variables available in DHIS2, and notes on whether or not these have been implemented in the Android Capture app.

Any issues around using a particular feature with Android are highlighted with an exclamation mark.

legend	description
	Component implemented
	Component not implemented (rule fails)
	Not applicable
	Work in progress. Feature not completely implemented yet or with unexpected behaviour already reported.

## Common functions to use in a program indicator expression or filter

Function	Description	Status	Notes on implementation
if	Evaluates the boolean expression and if true returns the true expression value, if false returns the false expression value. The arguments must follow the rules for any indicator expression.		
isNull	Returns true if the element value is missing (null), otherwise false.		
isNotNull	Returns true if the element value is not missing (not null), otherwise false.		
firstNonNull	RReturns the value of the first element that is not missing (not null). Can be provided any number of arguments. Any argument may also be a numeric or string literal, which will be returned if all the previous objects have missing values.		

Function	Description	Status	Notes on implementation
greatest	Returns the greatest (highest) value of the expressions given. Can be provided any number of arguments.		
least	Returns the least (lowest) value of the expressions given. Can be provided any number of arguments.		

**(d2) Functions to use in a program indicator expression or filter**

Function	Description	Status	Notes on implementation
addDays	Produces a date based on the first argument date, adding the second argument number of days.		
ceil	Rounds the input argument up to the nearest whole number.		
condition	Evaluates the boolean expression and if true returns the true expression value, if false returns the false expression value. The conditional expression must be quoted. The true-expr and false-expr arguments must follow the rules of any program indicator expression (including functions).		
count	Counts the number of data values that has been collected for the given program stage and data element in the course of the enrollment. The argument data element is supplied with the #{programStage.dataElement} syntax.		

Function	Description	Status	Notes on implementation
countIfCondition	Counts the number of data values that matches the given condition criteria for the given program stage and data element in the course of the enrollment. The argument data element is supplied with the #{programStage.dataElement} syntax. The condition is supplied as a expression in single quotes.		
countIfValue	Counts the number of data values that matches the given literal value for the given program stage and data element in the course of the enrollment. The argument data element is supplied with the #{programStage.dataElement} syntax. The value can be a hard coded text or number.		
countIfZeroPos	Counts the number of values that is zero or positive entered for the source field in the argument.		
daysBetween	Produces the number of days between two data elements/attributes of type date.		
floor	Rounds the input argument down to the nearest whole number.		
hasUserRole	Returns true if current user has this role otherwise false.		
hasValue	Returns true if the data element/attribute has a value.		

Function	Description	Status	Notes on implementation
inOrgUnitGroup	Evaluates whether the current organisation unit is in the argument group. The argument can be defined with either ID or organisation unit group code.		
left	Evaluates to the left part of a text, num-chars from the first character.		
length	Find the length of a string.		
minutesBetween	Produces the number of minutes between two data elements/attributes of type "date and time".		
modulus	Produces the modulus when dividing the first with the second argument.		
monthsBetween	Produces the number of full months between the first and second argument.		
oizp	Returns one if the expression is zero or positive, otherwise returns zero.		
relationshipCount	Produces the number of relationships of the given type that is connected to the enrollment or event. When no type is given, all types are counted.		
right	Evaluates to the right part of a text, num-chars from the last character.		
round	Rounds the input argument to the nearest whole number.		
split	RSplit the text by delimiter, and keep the nth element(0 is the first).		

Function	Description	Status	Notes on implementation
substring	Evaluates to the part of a string specified by the start and end character number.		
validatePatten	Evaluates to true if the input text is an exact match with the supplied regular expression pattern.		
weeksBetween	Produces the number of full weeks between two data elements/attributes of type date.		
yearsBetween	Produces the number of years between the first and second argument.		
zing	Returns zero if the expression is negative, otherwise returns the expression value.		
zpvc	Returns the number of numeric zero and positive values among the given object arguments.		

### Variables to use in a program indicator expression or filter

| Variable type | Description of variable type | Status | Notes on implementation | | --- | --- | :-: | --- | --- | |

Event Date

event\_date | The date of when the event took place. | | | Creation Date\*

creation\_date | The date of when an event or enrollment was created in the system. | | | Due Date

due\_date | The date of when an event is due. | | | Sync Date\*

sync\_date | The date of when the event or enrollment was last synchronized with the Android app. | | |

| Incident Date

incident\_date | The date of the incidence of the event. | | | Enrollment Date (not visible on UI)

enrollment\_date | The date of when the tracked entity instance was enrolled in the program. | | |

Enrollment Status

enrollment\_status | Can be used to include or exclude enrollments in certain statuses. | | | Current Date

current\_date | The current date. | | | Completed Date | The date the event is completed. | | | Value Count

value\_count | The number of non-null values in the expression part of the event. | | | Zero or positive value count

zero\_pos\_value\_count | The number of numeric positive values in the expression part of the event. | | |

| Event Count

event\_count | The count of events (useful in combination with filters). | | | Enrollment Count

enrollment\_count | The count of enrollments (useful in combination with filters). | | Indicators in the Android App are calculated in the domain of one TEI enrollment. Value always 1. | | | TEI Count

tei\_count | The count of tracked entity instances (useful in combination with filters). | | Indicators in the

Android App are calculated in the domain of one TEI enrollment. Value always 1. | | | Program Stage Name

program\_stage\_name | Can be used in filters for including only certain program stages in a filter for tracker programs. | | | Program Stage ID

program\_stage\_id | Can be used in filters for including only certain program stages in a filter for tracker programs. | | | Reporting Period Start

reporting\_period\_start | Can be used in filters or expressions for comparing any date to the first date in each reporting period. | | Indicators in the Android App are calculated in the domain of one TEI enrollment. | | | Reporting Period End

reporting\_period\_end | Can be used in filters or expressions for comparing any date to the last inclusive date in each reporting period. | | Indicators in the Android App are calculated in the domain of one TEI enrollment. | | | Organisation Unit Count

organisationunit\_count | . | | |

[Documentation Reference](#)

## Value types supported

The following is a comprehensive list of all value types available in DHIS 2, and notes on whether or not these have been implemented in the Android Capture app.

Any issues around using a particular feature with Android are highlighted with an exclamation mark !.

Legend	Description
	Value type implemented
	Value type not implemented, but will be safely ignored (if not compulsory)
	Work in progress. Feature not completely implemented yet or with unexpected behaviour already reported

Value type	Description of value type	Program with registration	Program with registration	Program without registration	Data Set	Notes on implementation
		Attributes	Data Elements	Data Elements	Data Elements	
Time	Time only					
Date & Time	Date plus time					
Date	Date only					
Age	Enables entry of either an age in years/ months/ days or a date-of- birth (both are stored as date-of- birth)					
Phone number	A valid phone number					
Email	An email address in a valid format					
Yes/no	Boolean yes/no (or no response)					
Yes only	Yes or no response					

Value type	Description of value type	Program with registration	Program with registration	Program without registration	Data Set	Notes on implementation
Number	Any valid number, including decimals					
Integer	Any integer (whole numbers, no decimals)					
Positive Integer	Only positive integers (no zero or negative values)					
Positive or Zero Integer	Only zero or positive integers (no negative values)					
Negative Integer	Only negative integers (no zero or positive values)					
Percentage	Any decimal value between 0 and 100					
Unit interval	Any decimal value between 0 and 1					
Text	Text (length of text up to 50,000 characters)					
Long text	Text (no constraints on length)					
Letter	A single letter					

Value type	Description of value type	Program with registration	Program with registration	Program without registration	Data Set	Notes on implementation
File	Enables upload of files in various formats (requires appropriate storage to be configured)					
Organisation unit	Enables selection of a DHIS2 organisation unit as the chosen value					
Tracker Associate	Enables selection of an existing Tracker 'tracked entity instance' (e.g. a person) as the value					
Username	Enables selection of a valid DHIS2 username as the value					
Coordinate	Enables manual entry of geographical coordinates (doesn't enable automatic capture of coordinates)					

Value type	Description of value type	Program with registration	Program with registration	Program without registration	Data Set	Notes on implementation
URL	Enables manual entry of a URL.					
Image	Enables upload of images.					

## Android Settings Web App

### Overview

This section focuses on the [Android Settings Web App](#) implementation.

The <https://apps.dhis2.org/app/a1bd6b5b-de8c-4998-8d34-56c18a139683> allows admins to configure synchronization parameters for the DHIS2 Android App, encrypt the local database of the Android devices, customize the appearance of Programs, Data sets, and Home screen, and add TEI Analytics items. The configuration parameters defined within this web app will overwrite the settings of all Android devices using the DHIS2 Android Capture App.

Please note that in this version of the Web App, only users with 'ALL' authority are able to define those parameters in the configuration. Other users having access to the web app can see the value of the parameters, but cannot edit them.

#### Warning

This version comes with improvements and disruptive features, so previous versions are no longer supported, the settings stored there will be removed.

### General settings

Includes configurations such as the Matomo URL and project ID, the number of reserved values to download per TEI, and encrypt the device database.

## General Settings

Analytics reporting URL (Matomo)

`https://usage.analytics.dhis2.org/matomo.php`

Must be a valid url

Analytics reporting ID (Matomo)

3



Must be at least 1 character long

SMS Gateway phone number

+84566464

Must start with + and be at least 4 characters long.

SMS Result Sender phone number

+9456498778

Must start with + and be at least 4 characters long.

Reserved values downloaded per TEI attribute

100



Encrypt device database

Encrypt all data stored on device. Data can be lost if there are problems with an encrypted database. This will not affect the DHIS2 database stored on an external server.

[Disable all settings](#)

This will disable and remove all General, Program and Data set settings.

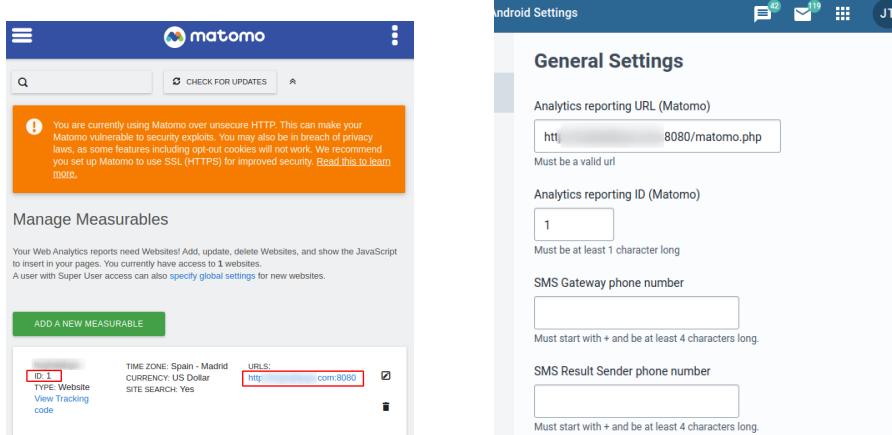
[Save](#)

[Reset all values to default](#)

## Matomo configuration

The DHIS2 Android App sends anonymised analytics that can be used to evaluate performance and/or detect problems at an early stage. [Matomo](#) is the tool used for this and running in a specific server not accessible to the general public. However, implementations can set up their own Matomo instance (or using the cloud version) in order to collect and analyse the statistics.

Once you have your Matomo instance ready you should get the URLs and the project ID like shown in the picture below (left). The ID can be introduced directly but the URL needs to be followed with / *matomo.php* as shown below (right).



## Encrypt device database

This will force all the devices to store the database encrypted increasing the security level against data theft attacks.

### Mobile configuration

This section allows admin users to edit the SMS gateway ad result sender phone number.

### Reserved values

This will specify the number of values per TEI attribute reserved to download in the devices.

### Encrypt device database

By default, the DHIS2 Android App database is not encrypted, but an admin can check the *Encrypt device database* to encrypt the metadata and data stored in every device. Encrypting the database will have an impact on the database volume and performance (degradation between 10-15%) of the Android app. Note that at the moment of selecting or unselecting this option, no data is lost (even if it hasn't been previously synchronized with the server)

#### Warning

This is a critical action and will affect the local database of all Android devices synchronizing with the server (it won't affect the server DHIS2 database).

By default, the Android app database is not encrypted, but an admin can check the *Encrypt device database* to encrypt the metadata and data stored in every device. Encrypting the database will have an impact on the database volume and performance of the Android app. Note that at the moment of selecting or unselecting this option, no data is lost (even if it hasn't been previously synchronized with the server)

### Disable all settings

By clicking this button, the user will remove all Android configuration settings. No configuration will be applied to the Android App (if this is the case, the sync parameters applied are the ones defined in the Android Capture app).

### Synchronization

It offers additional parameters to control metadata/data synchronization.

## Global

Metadata sync : Admin users can choose how often the metadata will sync. e.g. Sync metadata every 24 hours.

Data sync : Admin users can choose how often the data will sync. e.g. Syncing data every 6 hours.

The screenshot shows a 'Global sync settings' page. At the top, there is a yellow warning box stating: 'Manual options. Manual options for data and metadata sync are only available from android app version 2.3.0 onwards.' Below this, there are two dropdown menus: 'How often should metadata sync?' set to '1 Day', and 'How often should data sync?' also set to '1 Day'. At the bottom of the page are two buttons: 'Save' and 'Reset all values to default'.

## Program

This section controls the program data synchronization parameters. It has a section to define global or default parameters to be used in the synchronization of all programs.

### Global settings

Global settings apply to all programs that an Android user has access to. The settings can be enabled globally, per Org Unit, per program or per OU and program.

The screenshot shows a 'Programs global download sync settings' page. It specifies that the settings apply to all programs an Android user has access to. A dropdown menu 'Setting level' is set to 'Global'. Below are four input fields: 'Maximum Tracked Entity Instance (TEI) downloads' set to 50; 'Download TEI that have been updated within' set to 'Last month'; 'Maximum Event downloads' set to 100; and 'Download Events with event date within' set to 'Last 3 months'.

TEI to download : Maximum number of TEIs to download from the server.

TEI download period : It downloads the TEIs that have been updated within a period. e.g. TEIs that have been updated within last month

Event to download : Maximum number of Events to download.

Event download period : It downloads Events which event date belongs to a specific period.

### Specific settings

This section allows the admin users to specify the behaviour of a particular program/s when syncing the data. The specific configuration overwrites the general settings for the programs listed in this section. To add a setting for a specific program:

- Click on *Add a Program-specific setting*, a Dialog will appear.
- Below "Values per Program" title, click and find a list of programs.
- Clicking on a program will show the different parameters to configure. The number of parameters depends on the program type (with or without registration).

### Settings for Program Without Registration

**Values per Programs**

Antenatal care visit	All Org Units
Setting level	1000
Maximum Event downloads Default:1000	1000
Download Events with event date within	Any time period

**Cancel** **Add/Save**

## Settings for a Program With Registration

**Values per Programs**

Child Programme	All Org Units
Setting level	500
Maximum Tracked Entity Instance (TEI) download per program Default:500	500
Download TEI with status	All statuses
Download TEI with enrollment date within	Any time period
Download TEI that have been updated within	Any time period

**Cancel** **Add/Save**

In the case that any specific settings has been saved, a table will show a summary with the specific configuration per program, and the options to edit or delete these settings.

**Programs specific download sync settings**  
Applies only to the assigned program. Program specific settings will overwrite the global settings above.

Information Campaign	0 events per OU	Edit	Delete
Malaria case diagnosis, treatment and investigation	500 TEI	Edit	Delete
<b>Add a Program specific setting</b>			

### Caution

Using specific settings per program might have unexpected results in the number of TEIs downloaded and the total amount might exceed the one defined in the Global Settings. This is due to how the application download the TEIs from the server. The Android client will first download a max number of TEIs from the server based on the Organisation Units where the user has access and based on the lastUpdate field. Afterwards it will download a max number of TEIs from the specific programs. Therefore, if the TEIs downloaded from the Global setting (500 in the example above) have been updated more recently than any of the TEIs from a specific program (500 for Malaria case diagnosis, treatment and investigation) the Android client will end up downloading 1000 TEI.

This might look confusing at first, but once understood can be used to ensure a minimum (and maximum) number of TEIs for a specific program will be downloaded which can be very useful in specific implementations.

Imagine an implementation where it must be ensured that the Android user has all the TEIs of a specific program in a server where the same user has access to other Organisation Units where other TEIs might be enrolled in another program. The program is called Community Care and it has 17 TEIs which have been updated very long time ago. The administrator can ensure that the 17 TEIs will be downloaded by setting anything in Global Settings (if needed to reduce bandwidth a very low value should be set) and at least 17 for the specific program as shown in the image below:

**Programs global download sync settings**  
Applies to all Programs an Android user has access to. Specific Program settings can be defined in the section below.

Setting level

Maximum Tracked Entity Instance (TEI) downloads

Download TEI that have been updated

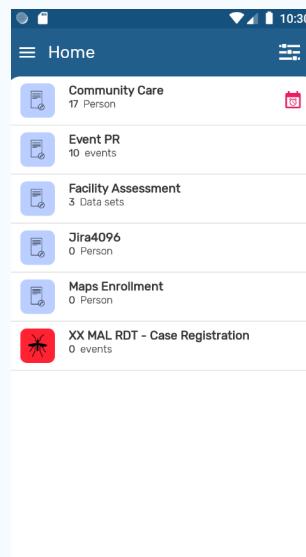
Maximum Event downloads

Download Events with event date with

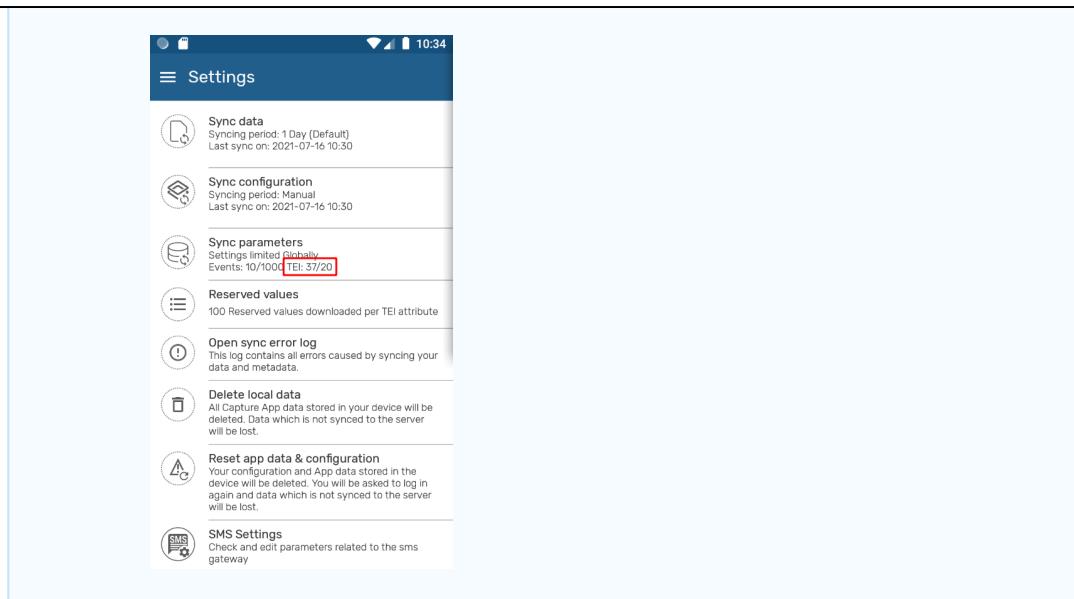
**Programs specific download sync settings**  
Applies only to the assigned program. Program specific settings will overwrite the global settings above.

Community Care  
20 TEI     

When the initial synchronization is triggered the Android device will first download the last TEIs updated on the server (which according to our example do not belong to the specific program) and secondly up to 20 TEI from the specific program resulting in the following (notice all the TEIs for the program were downloaded):



And by going to the settings it can be appreciated how the total number of TEIs is the expected 37, 20 from the Global Setting, and 17 from the program specific.



### Reset all values

By clicking on *Reset all values*, the admin user will restore the default settings values of the program section. Please note that in this case it means no specific settings per program.

To save any configuration, the admin user needs to click on the *Save* button (this button is disabled for the users who don't have the 'ALL' authority)

### Data set

This section controls the aggregated data synchronization parameters.

#### Global settings

The first part is for global settings that apply to all data sets an Android user has access to.

**Data Sets global download sync settings**  
Applies to all Data Sets an Android user has access to. Specific Data Set settings can be defined in the section below.

Maximum number of periods to download data sets for

Number of Periods : Maximum number of periods to download.

#### Specific Settings

To add a specific setting:

- Click on *Add a Data set specific setting*, a dialog with a list of data sets will appear.
- Click on a data set, and this field will be autocompleted with the default value based on the dataset period type.

**Values per Data Sets**

Child Health

Maximum number of periods to download data sets for (Monthly)   
Default : 11

Data Sets specific download sync settings	
Applies only to the assigned data set. Data Set specific settings will overwrite the global settings above.	
DS VRT A 11 Monthly period	<a href="#">Edit</a> <a href="#">Delete</a>
ART monthly summary 13 Monthly period	<a href="#">Edit</a> <a href="#">Delete</a>
DS TEST DATASET 59 Daily period	<a href="#">Edit</a> <a href="#">Delete</a>
<a href="#">Add a Data Set specific setting</a>	

## User Sync Test

This section checks the amount of data and metadata a user would sync to his/her device. You can run this test on any user that you have access to. This test shows up the number of organisation units, data sets, program rules, programs, etc., that an android user has access to (so the resources that the android app will download), and the metadata and data download size (approx estimation). Please note that a user doesn't need to have the 'ALL' authority to run this test.

User sync test		
Check the amount of data a user would sync to their device.		
User	Fernando Gomez	
5	org units available for data capture	Recommended maximum: 10
5	org units available for data search	Recommended maximum: 5
28	data sets linked to capture org units	Recommended maximum: 20
17	programs linked to org units	Recommended maximum: 20
191	program rules linked to org units	Recommended maximum: 50
2136	metadata download size	Recommended maximum: 1000
1464	data download size	Recommended maximum: 2000
	<a href="#">Run test</a>	

### Note:

The values that are highlighted in red are because the value is considered greater than the maximum recommended value.

## Appearance

These settings give control over the appearance of the data entry and list forms.

- Filter: it defines the filters that can be enabled in the different app menus.
- Completion spinner: it turns on/off the completion spinner that shows the progress in the data entry form.

These settings refer to visual components, so they must be consumed by the app.

### Home screen

It allows the admin user to enable or disable the option to show the filters related to Date, Organisation Unit, Sync Status, and Assigned to me on the Home screen.

**Home Screen**  
Customize the available filters and sorting options for the home screen. Filters and sorting options set here will only affect the home screen.

	Show Filter
Date	<input checked="" type="checkbox"/>
Organisation Unit	<input checked="" type="checkbox"/>
Sync status	<input checked="" type="checkbox"/>
Assigned to me	<input checked="" type="checkbox"/>

**Save** **Reset all values to default**

## Program

It allows the admin user to specify which filters should be shown and enable or disable the option to show the completion percentage of the data entry form.

### Global settings

Global settings apply to all programs that an android user has access to.

**Program**  
Customize filter and sorting options available for programs. Settings below apply to all programs a mobile user has access to. Settings specific to individual programs can also be applied.

**Global settings**

Show percentage (%) complete in Program toolbar

	Show Filter
Assigned to me	<input checked="" type="checkbox"/>
Enrollment Date	<input checked="" type="checkbox"/>
Enrollment status	<input checked="" type="checkbox"/>
Event Date	<input checked="" type="checkbox"/>
Event status	<input type="checkbox"/>
Organisation Unit	<input type="checkbox"/>
Sync status	<input checked="" type="checkbox"/>

### Specific settings

This section allows to admin user to customize the filter and percentage completion appearance option. To add a specific setting:

- Click on *Add a Program Settings*, and a dialog will appear.
- Click on the dropdown that will show a list of programs.
- Clicking on a program will show the different filters to configure. The category combo filter depends on the category combo name.

### Program specific settings

Information Campaign ▼

Show percentage (%) complete in Program toolbar

**Show Filter**

Assigned to me	<input checked="" type="checkbox"/>
Enrollment Date	<input checked="" type="checkbox"/>
Enrollment status	<input checked="" type="checkbox"/>
Event Date	<input checked="" type="checkbox"/>
Event status	<input checked="" type="checkbox"/>
Organisation Unit	<input checked="" type="checkbox"/>
Sync status	<input checked="" type="checkbox"/>

Cancel
Save Program

If any specific settings have been saved, a table will summarize the particular configuration per program, and the options to edit or delete these settings.

Specific settings		
Antenatal care visit	<a href="#">Edit</a>	<a href="#">Delete</a>
Filters: Assigned to me, Enrollment Date, Enrollment Status, Sync Status		
Child Programme	<a href="#">Edit</a>	<a href="#">Delete</a>
Filters: Event Date, Event Status, Organisation Unit		
TB program	<a href="#">Edit</a>	<a href="#">Delete</a>
Filters: Assigned to me, Enrollment Date, Enrollment Status, Event Date, Event Status, Organisation Unit, Sync Status		
<a href="#">Add a Program Settings</a>		

### Data set

It allows admins to enable/disable filters for the Data set section

### Global settings

The first part is for global settings that apply to all data sets an android user has access to.

Data set		
Customize filter and sorting options available for data sets. Settings below apply to all data sets a mobile user has access to. Settings specific to individual data sets can also be applied.		
Global settings		
<b>Show Filter</b>		
Period	<input checked="" type="checkbox"/>	
Organisation Unit	<input checked="" type="checkbox"/>	
Sync status	<input checked="" type="checkbox"/>	

## Specific settings

To add a specific setting:

- Click on *Add a Data set Settings*. A dialog box will pop up with a dropdown with a list of data sets.
- Click on a data set, and a list of options to enable or disable filters will be displayed.

### Data set specific settings

Facility Assessment ▾

Show Filter

Period	<input checked="" type="checkbox"/>
Organisation Unit	<input checked="" type="checkbox"/>
Sync status	<input checked="" type="checkbox"/>

Cancel Save Data set

Emergency Response Filters: Category Combo, Period, Sync Status	Edit	Delete
ART monthly summary Filters: Category Combo, Period, Organisation Unit, Sync Status	Edit	Delete
Child Health Filters: Period	Edit	Delete

Add a Data set Settings

## Analytics

Analytics settings define TEI, Home, Program and Data Set analytics items (charts, tables) that will be displayed to the user. Any item defined in the settings app will overwrite the default behaviour of the android app, only showing the items defined in the settings app.

Also, even though these analytics are created using the android settings web app, the data aggregation happens offline using only data stored in the device.

### TEI

The scope of the analysis is the TEI, so the visualizations will be displayed in the TEI dashboard of the android app.

The purpose of this section is to define visualizations to show evolution of dataelements and program indicators over time. Based on that, it will only take into consideration dataelements that belongs to a repeatable program stage, or programindicators which formula contains at least one dataelement that belongs to a repeatable program stage.

To create a **TEI Analytics** item:

1. Click on *Add TEI Analytics*. A dialog box will pop up with a small form.
2. Choose a program and a repeatable program stage, and fill the form. The **Short name** is the only optional field.

3. If an item visualization other than WHO Nutrition has been chosen, the next fields to select are the period type (monthly, weekly, daily), an element type (Program Indicator, Data Element), and an element that will be based on the element type previously selected. Remember that these elements are related to the program and repeatable program stage chosen at the beginning.

## Add TEI Analytics

### Program

TB program

### Program Stage

Lab monitoring

### Title and name

#### Analytics chart title \*

Lab monitoring weekly weight

### Short name

### Choose visualization type \*

- Bar chart
- Line chart
- Pivot table
- Single value
- WHO nutrition

### Choose a period type

Weekly

### Visualization elements

#### Choose element type

Attribute

#### Choose element

Weight in kg

Cancel

Add TEI Analytics

To create a **WHO Nutrition Analytics** item:

1. Select a program, a program stage, and WHO nutrition as visualization type.
2. Choose a WHO visualization type that can be Height for Age (HFA), Weight for Age (WFA) or Weight for Height (WFH).
3. Select the trackedentityattribute that represents the gender. You have then to specify the option for Male 'Male title' and the option for Female 'Female title'. Normally they will be option codes.

4. Choose the dataelement/programindicator that will be displayed in the Horizontal (x) axis
5. Choose the dataelement/programindicator that will be displayed in the Vertical (y) axis

## Add TEI Analytics

Title and name

Analytics chart title \*

Short name

Choose visualization type \*

- Bar chart
- Line chart
- Pivot table
- Single value
- WHO nutrition

Choose WHO visualization type \*

- Height for age
- Weight for age
- Weight for height

Gender Attributes

Choose attribute

Female title \*

Male title \*

Horizontal (x) axis

Choose element type

Choose element

[Cancel](#)

[Add TEI Analytics](#)

If any TEI Analytics item has been created, a table will show the item's title and program name, and action buttons to delete or edit that item.

**TEI Analytics**

Manage Tracked Entity Instance (TEI) analytics for tracker programs. The settings below apply to all tracker programs an Android user has access to.

**Foci response quarterly bar**

Malaria focus investigation

[Edit](#) [Delete](#)**Antenatal WFA**

WHO RMNCH Tracker

[Edit](#) [Delete](#)[Add TEI Analytics](#)**Home**

Home visualizations are displayed in the home screen (Analytics tab) of the android app.

All items available are first created in the Data visualizer app in DHIS2 and configured in the android settings app.

To create a **Home** item:

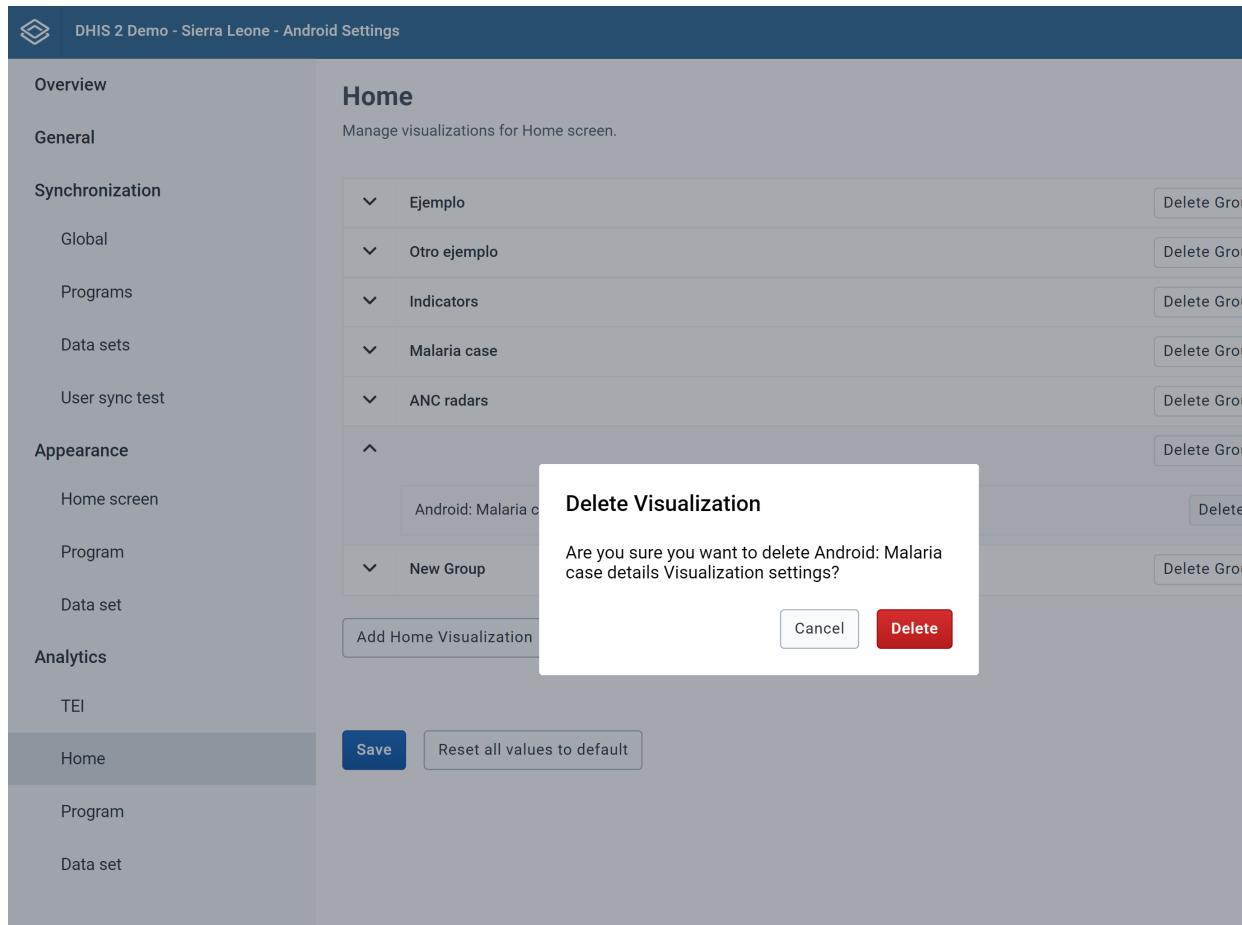
1. Click on "Add Home Visualization"
2. Click on the search box and select the visualization from the list or type the name of the visualization item.
3. Add an alternative title, otherwise, the app will display the name of the visualization
4. By default, the app will enable the group visualization setting.
  1. Create a new group: A free text box will pop-up to type the name or
  2. Select a created group visualization: Choose an option from the list to add the visualization or
  3. Disable the group visualization by clicking on the checkbox.
5. Click on the "Save" button.

The screenshot shows the 'Add Home visualization' dialog box over a dark grey background. The dialog has a light blue header bar with the title 'Add Home visualization'. Below it is a section for 'Visualization item' containing a dropdown menu with 'Android: Malaria case details' selected. There is also a 'Clear' button. A note below says 'This will override the visualization title when shown in the app'. Underneath is a checkbox 'Use a group visualization' which is checked, and a radio button 'Create a new group' which is selected. A dropdown menu shows 'New Group' as the option. Another radio button 'Select a created group visualization' is available. Below this is a 'Visualization user test' section with a search bar and a 'Run test' button. At the bottom right are 'Cancel' and 'Add Home Visualization' buttons.

This screenshot is similar to the one above, but the 'Select a created group visualization' dropdown menu is open. It lists several items: 'Ejemplo', 'Otro ejemplo', 'Indicators', 'Malaria case', and 'ANC radars'. A search bar at the bottom of the dropdown shows 'ANC radars'. The rest of the dialog box and interface are identical to the first screenshot.

To remove a **Home** item:

1. Search for the item by expanding the groups
2. Click the "Delete" button next to the item's name
3. Click on "Delete"
4. Click on the "Save" button



To remove a **Home** group:

1. Search for the specific group to delete
2. Click on "Delete Group"
3. Click on "Delete"
4. Click on the "Save" button

All of the items associated to that group will be deleted

The screenshot shows the 'Home' tab selected in the left sidebar. The main area displays a list of visualization groups under the heading 'Manage visualizations for Home screen.' The groups listed are Ejemplo, Otro ejemplo, Indicators, Malaria case, ANC radars, and New Group. Each group entry includes a 'Delete Group' button. A modal dialog box is overlaid on the page, titled 'Delete Visualization Group', with the message 'Are you sure you want to delete New Group visualization group?'. It contains two buttons: 'Cancel' and a red 'Delete' button.

To reset all values:

1. Click on "Reset all values to default"
2. Click on the "Save" button

## Program

Program visualizations are displayed in the search screen (Analytics tab) in tracker programs or in the list screen (Analytics tab) in event programs of the android app.

All items available are first created in the Data visualizer app in DHIS2 and configured in the android settings app.

To create a **Program** item:

1. Click on "Add Program Visualization"
2. Select a Program
3. Click on the search box and select the visualization from the list or type the name of the visualization item.
4. Add an alternative title, otherwise, the app will display the name of the visualization
5. By default, the app will enable the group visualization setting.
  1. Create a new group: A free text box will pop-up to type the name or
  2. Select a created group visualization: Choose an option from the list to add the visualization or
  3. Disable the group visualization by clicking on the checkbox.
6. Click on the "Save" button.

The screenshot shows the 'Program' visualization configuration screen. On the left, there's a sidebar with navigation links: Overview, General, Synchronization, Global, Programs, Data sets, User sync test, Appearance, Home screen, Program, Data set, Analytics, TEI, Home, Program, and Data set. The 'Program' link in the sidebar is highlighted. The main content area has a title 'Program' and a subtitle 'Manage visualizations for program.' Below this is a form titled 'Add Program visualization'. It includes fields for 'Program' (set to '7. Malaria case registration'), 'Visualization item' (set to 'Android: Malaria case details'), 'Visualization title' (set to 'Malaria Case'), and a note 'This will override the visualization title when shown in the app'. There are two radio buttons: 'Use a group visualization' (checked) and 'Create a new group' (unchecked). A 'Details' button is also present. Below this is another section titled 'Visualization user test' with a 'Search by user' field and a 'Run test' button. At the bottom right of the modal are 'Cancel' and 'Add Program Visualization' buttons.

To remove a **program** item:

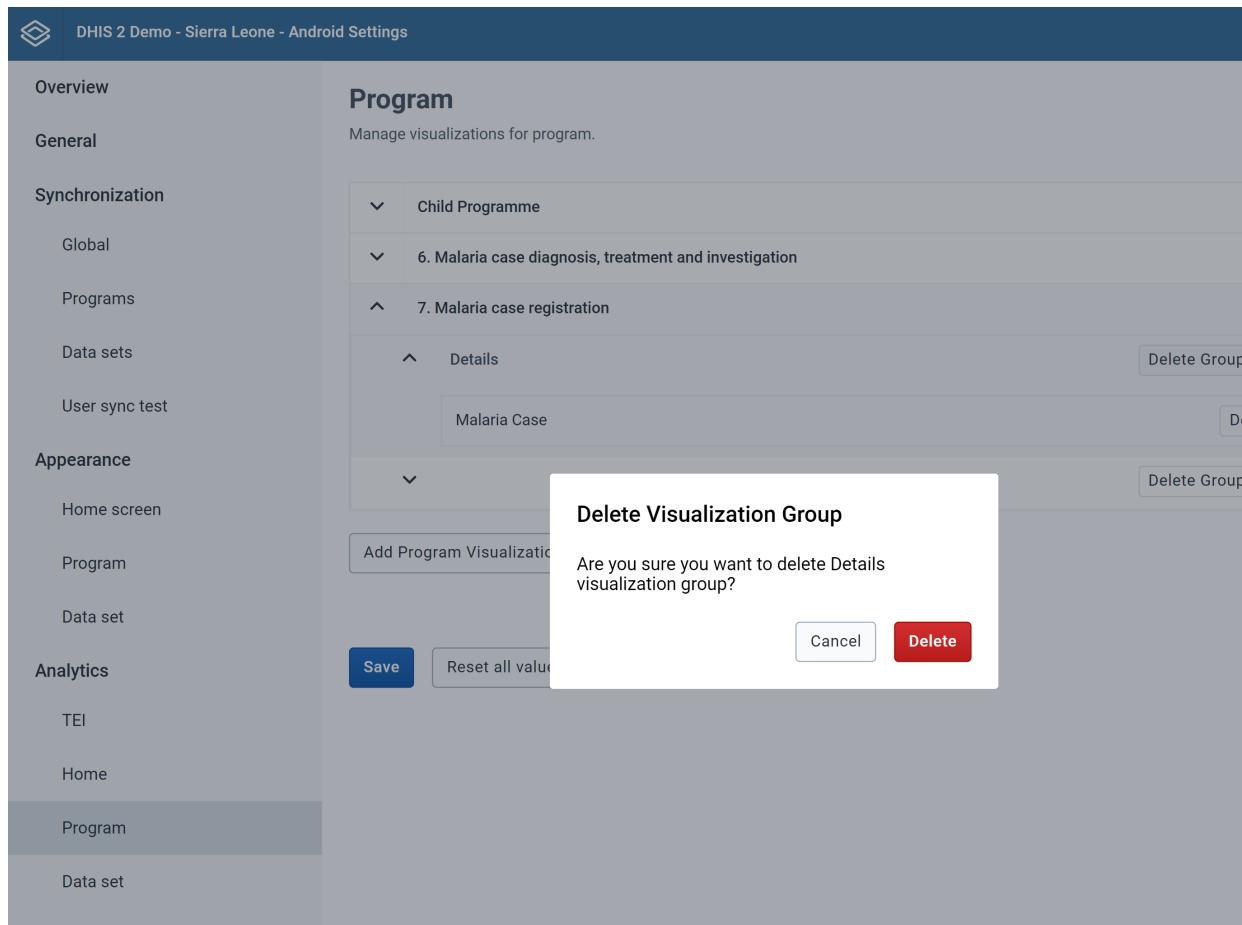
1. Search for the item by expanding the program and group
2. Click the "Delete" button next to the item's name
3. Click on "Delete"
4. Click on the "Save" button

The screenshot shows the 'Program' section of the DHIS 2 Demo - Sierra Leone - Android Settings. On the left sidebar, under 'Program', the 'Program' option is selected. In the main content area, under 'Child Programme', there are two items: '6. Malaria case diagnosis, treatment and investigation' and '7. Malaria case registration'. Under '7. Malaria case registration', there is a 'Details' button. To the right of the 'Delete Group' buttons for each item, a modal dialog is displayed with the title 'Delete Visualization'. The dialog contains the message 'Are you sure you want to delete Android: Malaria by age Visualization settings?' with 'Cancel' and 'Delete' buttons.

To remove a **program** group:

1. Search for the specific group to delete in the corresponding program
2. Click on "Delete Group"
3. Click on "Delete"
4. Click on the "Save" button

All of the items associated to that group will be deleted



To reset all values:

1. Click on "Reset all values to default"
2. Click on the "Save" button

## Data Set

Data Set visualizations are displayed in the list screen (Analytics tab) in a Data Set of the android app.

All items available are first created in the Data visualizer app in DHIS2 and configured in the android settings app.

To create a **Data Set** item:

1. Click on "Add Data Set Visualization"
2. Select a Data Set
3. Click on the search box and select the visualization from the list or type the name of the visualization item.
4. Add an alternative title, otherwise, the app will display the name of the visualization
5. By default, the app will enable the group visualization setting.
  1. Create a new group: A free text box will pop-up to type the name or
  2. Select a created group visualization: Choose an option from the list to add the visualization or
  3. Disable the group visualization by clicking on the checkbox.
6. Click on the "Save" button.

The screenshot shows the 'Data set' configuration screen in the DHIS 2 Demo - Sierra Leone - Android Settings application. The left sidebar lists various settings categories: Overview, General, Synchronization, Global, Programs, Data sets, User sync test, Appearance, Home screen, Program, Data set, Analytics, TEI, Home, Program, and Data set. The 'Data set' category is currently selected and highlighted in blue. The main content area is titled 'Data set' and has a sub-header 'Manage visualizations for data set.' Below this, a dropdown menu shows '2. Child Health'. A modal window titled 'Add Data set visualization' is open. It contains fields for 'Dataset' (set to 'Reproductive Health'), 'Visualization item' (set to 'Android: Reproductive health lines'), 'Visualization title' (set to 'Reproductive Health Lines'), and a checkbox for 'Use a group visualization' which is unchecked. Under 'Visualization user test', there is a search bar ('Search by user') and a 'Run test' button. At the bottom of the modal are 'Cancel' and 'Add Data set Visualization' buttons.

To remove a **Data Set** item:

1. Search for the item by expanding the Data Set and group
2. Click the "Delete" button next to the item's name
3. Click on "Delete"
4. Click on the "Save" button

The screenshot shows the 'Data set' section of the DHIS 2 Demo - Sierra Leone - Android Settings. On the left sidebar, 'Data set' is selected. The main area displays a tree structure under '2. Child Health'. The 'Reproductive Health' group is expanded, showing 'Radars' and 'Reproductive Health Lines'. A modal dialog titled 'Delete Visualization' is open, asking 'Are you sure you want to delete Reproductive Health Lines Visualization settings?'. It has 'Cancel' and 'Delete' buttons.

To remove a **Data Set** group:

1. Search for the specific group to delete in the corresponding Data Set
2. Click on "Delete Group"
3. Click on "Delete"
4. Click on the "Save" button

All of the items associated to that group will be deleted

The screenshot shows the 'Data set' section of the DHIS 2 Demo - Sierra Leone - Android Settings. On the left sidebar, under 'Data sets', 'Data set' is selected. In the main area, there's a tree view with '2. Child Health' expanded, showing 'Reproductive Health' and 'Radars'. Under 'Reproductive Health', 'Reproductive Health Lines' is listed. A modal dialog titled 'Delete Visualization Group' is displayed, containing the message 'Are you sure you want to delete default visualization group?' with 'Cancel' and 'Delete' buttons.

To reset all values:

1. Click on "Reset all values to default"
2. Click on the "Save" button

### Visualization user test

The visualization user test is a feature available in Home, Program and Data Set Analytic setting that helps the admin user to identify if any particular user will be able to see the visualization.

The android settings app checks for at least one of these three permissions:

1. Visualization is public
2. User has individual access to the visualization
3. User is in a group that has access to the visualization

To run the test:

1. Select the user from the list
2. Click on "Run test"

**Data set**

Manage visualizations for data set.

2. Child Health

### Add Data set visualization

Dataset: Reproductive Health

Visualization item: Android: Reproductive health table

Visualization title: (empty)

This will override the visualization title when shown in the app.

Use a group visualization

Create a new group  
 Select a created group visualization

Visualization user test: Amas Farah

Amas Farah can visualize Android: Reproductive health table visualization

Run test

Cancel Add Data set Visualization

DHIS 2 Demo - Sierra Leone - Data Visualizer

Pivot table

Update File Options Download

Columns: Period: 1 selected ...  
Rows: Data: 4 selected ...  
Filter: Organisation Unit: 1 selected ...

MAIN DIMENSIONS: Data, Period, Organisation Unit

OTHER DIMENSIONS: Assigned Categories

YOUR DIMENSIONS: AGE, Age CIM11, Age CIM11aa, Area, break\_cat\_ABC, Clément\_AGE, Clément\_Origine, Clément\_SEXE, CM AGE, CM AL, CM AL TDR, CM SEXE, CNG AGE, CNG Ce service est-il dans votre hôpital/Clinique?, CNG Service, CNG SEXE, Commodities, Diagnosis, Donor, DS TEST CATEGORY 123, DS TEST CATEGORY 45, EPI/nutrition age, Facility Ownership, Facility Type

Android: Reproductive health table

Created by: Tom Wakiki

Sharing settings

Who has access:

- Public access: Anyone can find and view
- METADATA: Can edit and view
- External access: No access
- Can view only (selected)
- No access

Add users and user groups

Enter names

CLOSE

**Overview**

**Data set**  
Manage visualizations for data set.

**Synchronization**

Global  
Programs  
Data sets  
User sync test

**Appearance**

Home screen  
Program  
Data set

**Analytics**

TEI  
Home  
Program  
Data set

**2. Child Health**

**Add Data set visualization**

**Dataset**  
Reproductive Health

**Visualization item**  
Android: Reproductive health lines

**Visualization title**  
This will override the visualization title when shown in the app

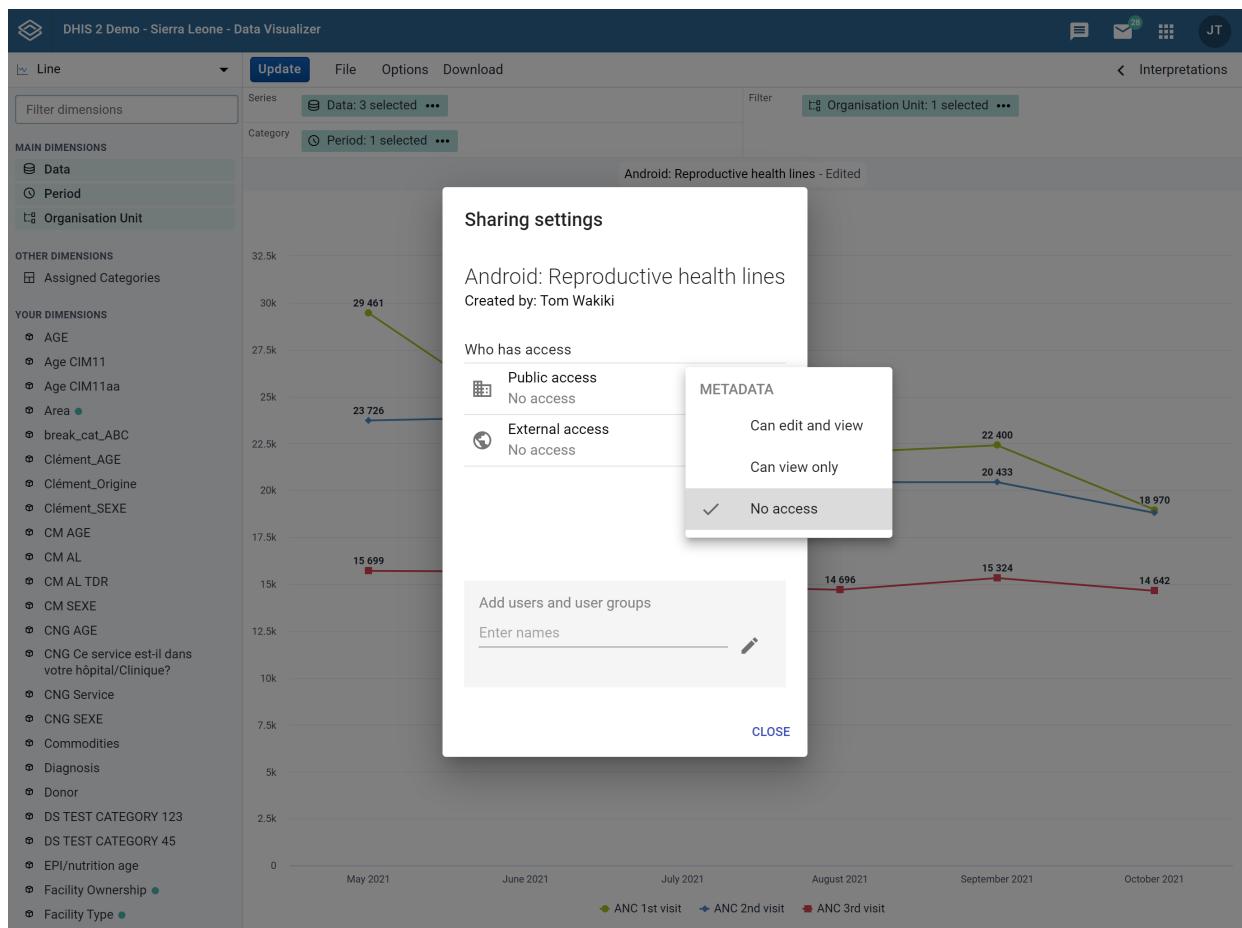
Use a group visualization  
 Create a new group  
 Select a created group visualization

**Visualization user test**

Amas Farah

Amas Farah can not visualize Android: Reproductive health lines visualization

Run test



## Analytics Limitations

Since the aggregations and calculations displayed are calculated in the device, the implementation of analytics is limited compared to web. In summary the compatible and supported objects and features are:

- Well formed analytic objects (series, categories, filters)
- User has view access
- Limitations for Pivot Tables
  - Number of header lines: 1
  - Number of header columns: 1
- Limitations for Charts
  - Number of Series: No limit (but remember you are rendering in a small screen)
  - Number of Categories (doesn't apply for pie chart): No limit

There are many more restrictions which apply to Android Analytics regarding the many configuration options available in the Web Visualizer as well as the supported functions and calculations related to indicators and program indicators. [This table](#) summarises all supported features.

## Installation

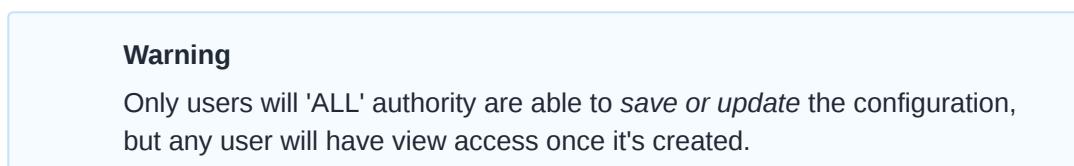
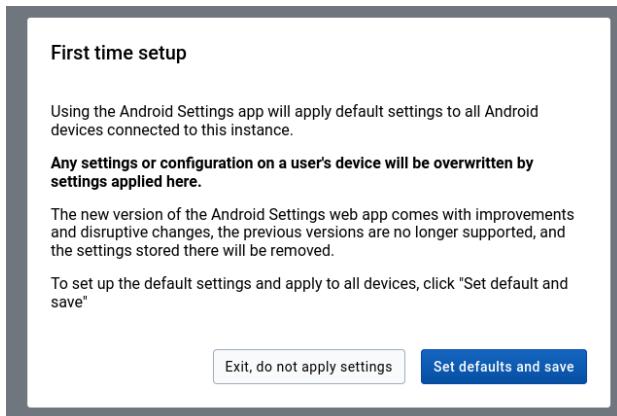
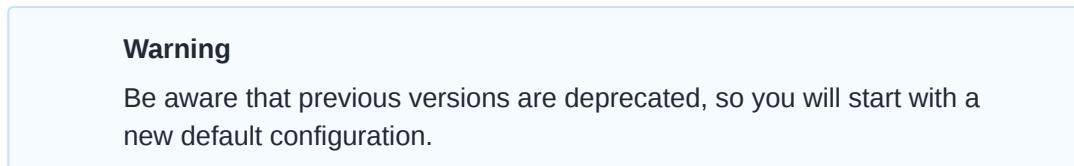
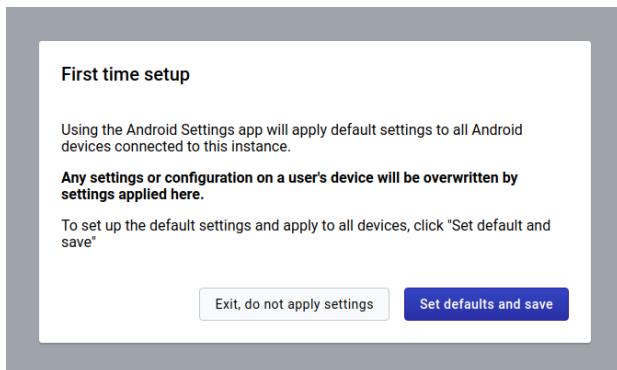
A user can easily install the Android Settings Web App by logging into the DHIS2 and going to **App Management**.

- Click on **App Store**
- Go to *Android Settings App*
- Click on *Install V2.X.X*

The screenshot shows the DHIS2 Demo - Sierra Leone - App Management page. On the left, there's a sidebar with icons for Standard Apps, Dashboard Apps, Tracker Dashboard Apps, Resource Apps, and App Hub (which is selected). The main area is titled "App Hub" and contains a grid of app cards. The first card is "Android Settings App By UIO", which is described as allowing admins to configure sync parameters, customize appearance for programs, data sets and home, and create TEI analytics items. It has two installation options: "INSTALL V2.0.0" and "INSTALL V1.0.1". The second card is "Custom Js Css By MSF OCBA", described as a custom JS/CSS app for creating and maintaining custom Javascript and CSS content. It has one installation option: "INSTALL V29.0.9". The third card is "Dashboard Classic By HISP", described as the legacy dashboard of DHIS2, with one installation option: "INSTALL V29.0.9". The fourth card is "Data Import Wizard By HISP Uganda", described as an app to import data from Excel, CSV, or API into DHIS2, with three installation options: "INSTALL V1.0.9", "INSTALL V1.0.8", and "INSTALL V1.0.2". The fifth card is "Data Query Playground By DHIS2", described as a playground for exploring the DHIS2 API and debugging Data Engine queries and mutations, with one installation option: "INSTALL V1.0.0". The sixth card is "Functions Maintenance By HISP Tanzania", described as creating analytics functions using javascript for analytics not supported by dhis2 (e.g. involving decision logic), with two installation options: "INSTALL V1.0" and "INSTALL V2.0-ALPHA10".

## Log in and first time setup

After a user installs and launches the Android Settings Web App for the first time, the web app will require setting and saving the default values of the configuration. This will apply default settings to all android devices connected to the instance.



### First time setup

Using the Android Settings app will apply default settings to all Android devices connected to this instance.

**Any settings or configuration on a user's device will be overwritten by settings applied here.**

You don't have the authority to set up the android settings to this instance

[Exit, do not apply settings](#) [Set defaults and save](#)

## Enter and save configuration parameters

### Datastore

Internally all settings are stored in [Datastore](#) in JSON format.

Datastore structure:

Item	Description	Data type
Namespace	Namespace for organization of entries	String
Key	Key for identification of values	String
Value	Value holding the information for the entry	JSON

### Save configuration parameters

At the form footer of all settings sections, admin users can find a Save button.



Only when an admin user clicks on this button, all changes made on the current section are saved on the Datastore. These changes will apply to the Android Capture Apps when they synchronize their configuration.

**Unsaved changes :** In case an admin user wants to go to another section when there are still some unsaved changes, an alert will be displayed before navigating away from the current section. In case the user accepts leaving the page, the unsaved changes will be lost.

### play.dhis2.org says

You have unsaved changes, if you leave you will lose your changes. Are you sure you want to leave?



### Reset all values to default

An admin user can restore the settings at any time. There is a *Reset all values to default* button at the form footer of all settings sections.



The default values will be only restored on Datastore and applied after clicking on Save.