# evriMED and ETLs DHIS2 Integration

# TREATMENT ADHERENCE APP USER GUIDE.

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## 1. Introduction and background

The NTLP has been implementing DHIS2 since 2014 so as to strengthen the monitoring and evaluation of the program activities. The system was upgraded in 2017 to improve monitoring of the programme activities especially on case detection and treatment outcome. Hence, there was a need to strengthen the availability of treatment data from evriMED (SmartPill Box) system to DHIS2 through integration of the two systems for easy follow up on the patients' treatment intake.

KNCV together with NTLP is conducting a project on TB adherence for four regions in Tanzania, where TB notified cases can be tracked for treatment intake on a particular frequency (daily, weekly, monthly, etc) through the use of the system called evriMED (SmartPill Box). Through this system, case notifications are monitored for uptake of TB medicines for easy follow up. NTLP through HISP Tanzania worked on strengthening the availability of treatment data from the evriMED system to DHIS2 through integration of the two systems by developing a DHIS2 custom Application that directly interacts with the evriMED system.

This document provides in depth details on how to access and use the Treatment Adherence Custom Application in DHIS2.

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## 1.1 Features of Treatment Adherence Application

The Treatment Adherence App which interacts with evriMED (SmartPill Box) through a background script allows the exchange of defined data between the two systems for easy and better data reporting and management, monitoring, analysis, planning and decision making. System features can be summarized using the classical definition of the system which comprises input, process and output.

**Input:** The Treatment Adherence App provides a user-friendly interface for users to view data and assign devices to patients but also set alarms when necessary. Essentially, it should be noted that the app pulls most of the data including the patient details from mapped program(s) within the DHIS2 and some data come from the integrated evriMED system.

**Processes:** The Treatment Adherence App automatically computes percentage, averages, total etc. within automatically computed calculations, it also provides support to make sure that the captured details are valid and a user does not make a wrong operation while navigating through it.

**Output:** The custom app provides different tools for reporting with user flexibility to make and define their own reports. This includes:-

> o **Reports**; Provides access to three types of reports : TB Adherence, DAT Device Summary Report and patients who missed doses.

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o **The Dashboard & Visualizations;** Provides data summary overview for quick access. Data summaries are in different formats and visualizations.

## 2. Accessing the Treatment Adherence App

This section provides instructions and guidance on how to use the application within the DHIS2 system.

A user is required to have a user account in the DHIS2 Capture . This is where the Treatment Adherence Application is located.

To login to the DHIS2 follow the steps below.

*Step 1:* Enter the username

*Step 2:* Enter password

*Step 3:* Tap the login button

With correct credentials, users will be able to login to the DHIS2 and have access to the Treatment Adherence app

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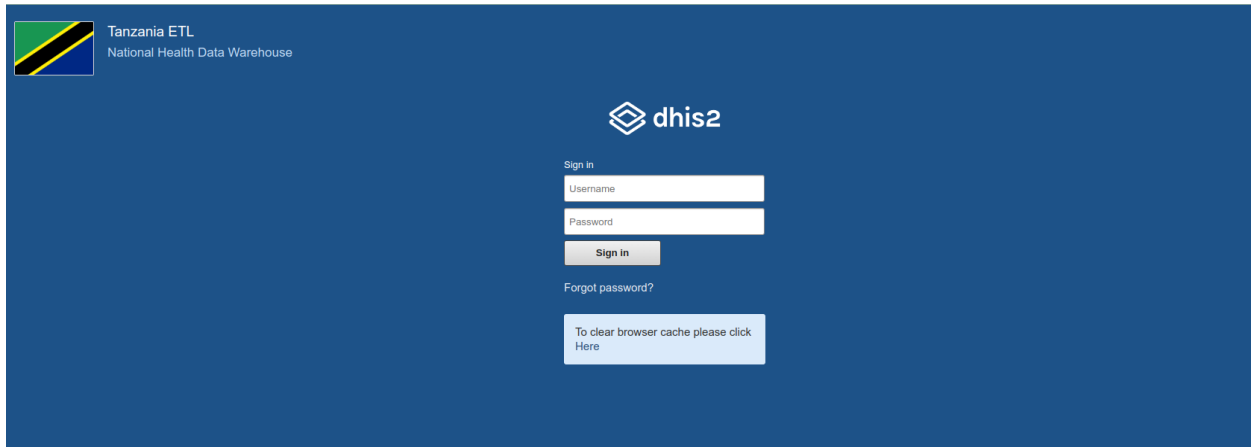Mikocheni B,
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*Figure 1: Login Screen*

In case the login is not successful, you will be notified immediately that the entered credentials are wrong.

The Treatment Adherence custom App can be accessed in the DHIS2 menu, users must search for the app or scroll down to locate it.
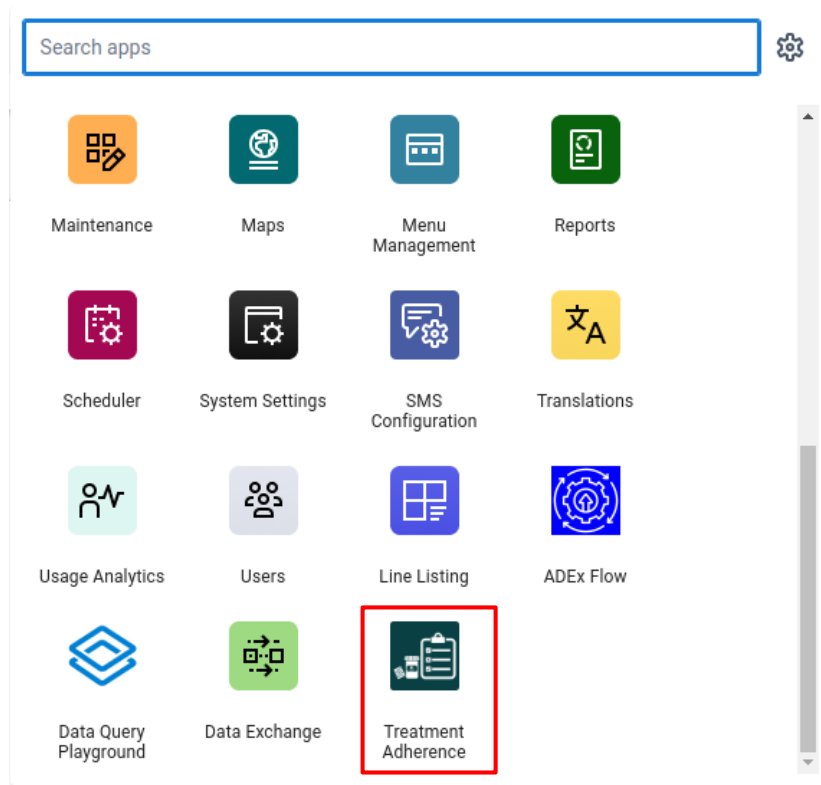
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*Figure 2: Accessing the app*

## 3. App Configuration

Once installed, the Treatment Adherence app, the administrator needs to do some setup for the app to operate accordingly.This is done in the configuration module of the app, where s/he will have to map the program (s), set regimens and add device IMEI numbers.

*Note:* Only users with authorities to the configuration module will be able to access and configure the application.

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## 3.1 Program Mapping

The treatment Adherence app is a generic app that uses an already existing program(s) in the DHIS2.In order for this to happen the specific program(s) must be mapped with the app by a system administrator. This is done in the Configuration module in the Program Mapping section as illustrated below.

*Step 1:* Click the **Add Mapping** button

*Step 2:* Select a program you want to map with the application

*Step 3:* Specify the program name of your choice which will be used to identify the mapped program in Treatment Adherence app

*Step 4:* Fill in all the required fields

*Note:* **Mediator Url** is the link that points to the server where the integration mediator between DHIS2 and evriMED system is hosted and **API key** is the configured secret phrase that is set up during the configuration of the integration mediator and acts as the password to access the mediator for integration.

*Step 5:*  Save the mapping

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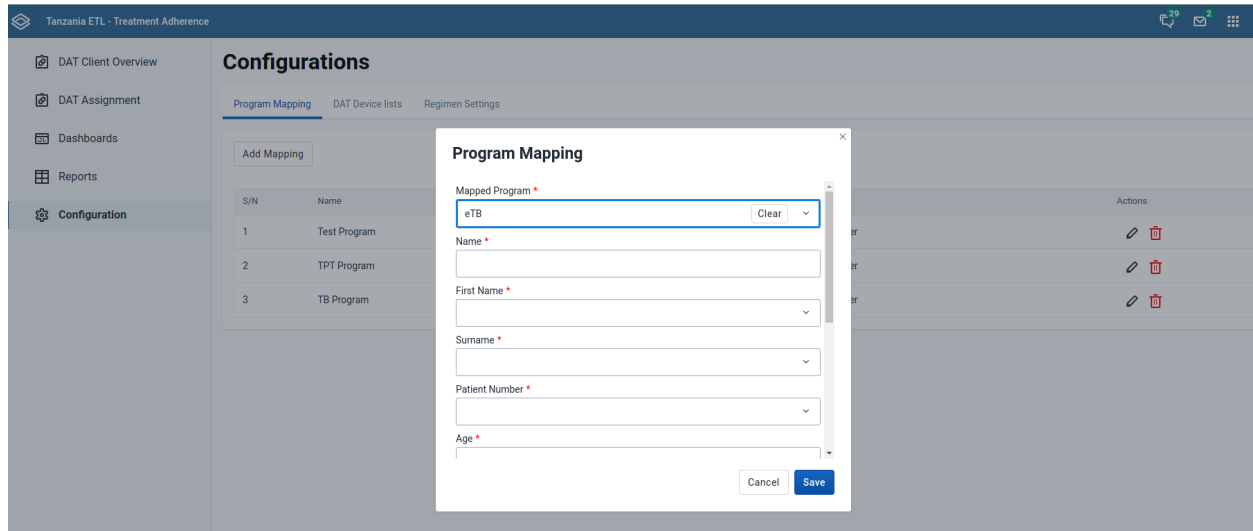Mikocheni B,
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*Figure 3: Program Mapping*

For the existing mappings, there are options to edit and delete a mapping.Delete option requires a user to confirm if they really want to delete the mapping.



*Figure 4: Actions*

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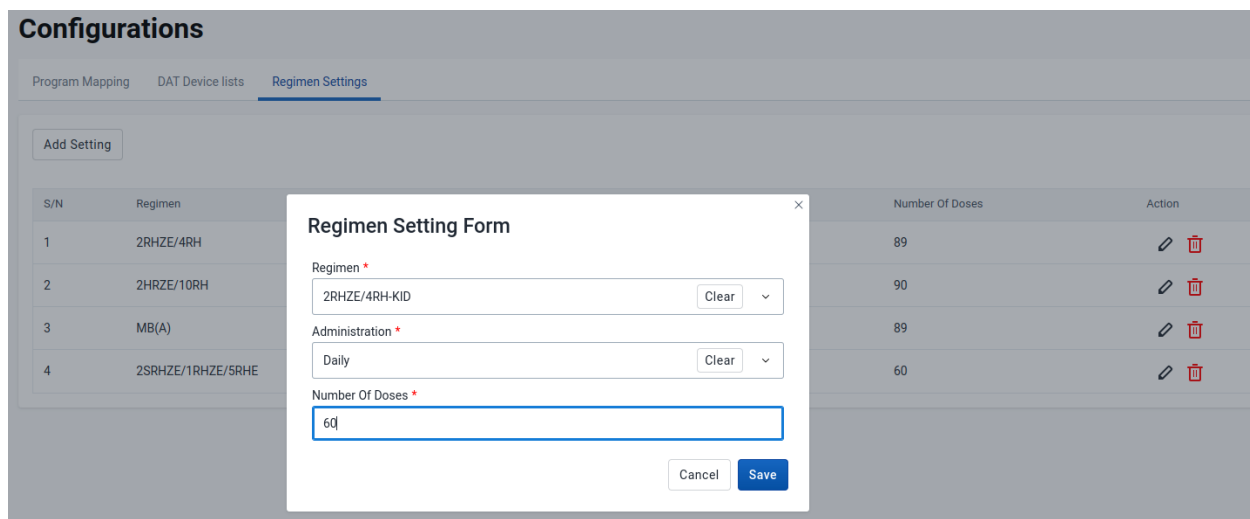Dar es salaam, Tanzania

## 3.2 Regimen Settings

In this section an administrator has to capture per each program all the different regimens, their intake frequency (daily, weekly or monthly) and required number of doses. This information is used to calculate the adherence frequency and provide meaningful reports at different levels. The followings are the steps for adding a regimen configuration.

*Step 1:* Click the **Add Setting** button

*Step 2:* Select a regimen type from a dropdown list

*Step 3:* Specify the intake frequency and the number of doses

*Step 4:* Save the configuration



*Figure 5: Regimen Settings*

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## 3.3 DAT Device lists

This section allows an administrator to define available devices or devices that can be given to patients in the system. This is simply done by adding a single device's IMEI number or uploading a list of IMEI numbers. It also allows him/her to edit and delete the IMEI number when out of use.The app is also flexible enough to have search functionality for easily finding a specific IMEI number.
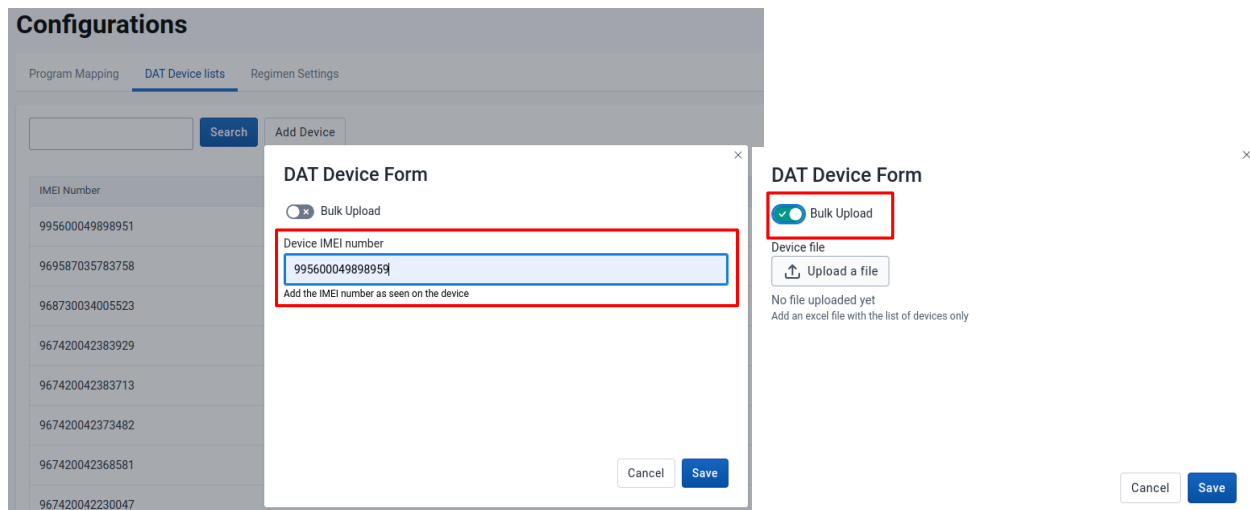


*Figure 6: Adding IMEI number(s)*

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## 4. DAT Client Overview

### 4.1 Navigating through the Client Overview  module

The DAT Client Overview section displays all the mapped programs, with the list of patients from the latest selected program. To be able to pull the patients from any other program, one has to select that particular program from the list on the top bar.

Search as one of the app functionalities allows users to easily locate the patient by providing either the Patient number, first name, surname or device IMEI number. On top of that one can go further and pull patients from a specific location(s).

The patient table consists of a few columns (treatment start, patient number,name,organization unit,battery, device IMEI,adherence frequency,overall adherence and adherence streak) with data from different sources. Some details come from the program within DHIS2, other details such as battery come from the evriMED system and some are auto calculated by the app . For easy interpretation of the patients' list the app allows users to sort the list by treatment start or name or device IMEI number.

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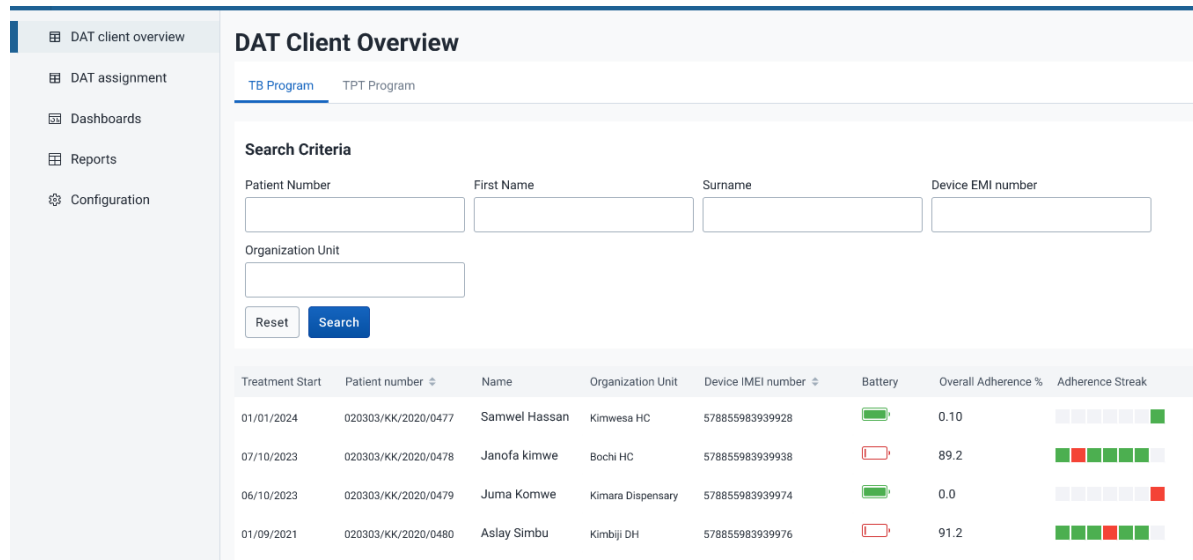
*Figure 7: DAT client overview*

The battery level is indicated by a colored battery icon, where on hovering, one is able to see the millivolts which the device's battery currently has. The colors indicate the battery level, green for high, yellow for medium and red for low.

Overall Adherence (%) is a percentage of the number of doses taken over the total number of doses a patient should take as per the adherence frequency.

The Adherence streak represents the status of medication intake of the patient for the last seven records according to their adherence frequency . For instance, If a patient takes medication on a weekly basis, their adherence streak will show the status of medication

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intake for the last seven weeks.On hovering any of the displayed boxes, one will see the date and status of medication intake.

| Treatment Start | Patient number | Name | Organization Unit | Device IMEI number | Battery | Overall Adherence % | Adherence Streak |
|---|---|---|---|---|---|---|---|
| 01/01/2024 | 020303/KK/2020/0477 | Samwel Hassan | Kimwesa HC | 578855983939928 | | 0.10 | |
| 07/10/2023 | 020303/KK/2020/0478 | Janofa kimwe | Bochi HC | 578855983939938 | | 89.2 | |
| 06/10/2023 | 020303/KK/2020/0479 | Juma Komwe | Kimara Dispensary | 578855983939974 | | 0.0 | |
| 01/09/2021 | 020303/KK/2020/0480 | Aslay Simbu | Kimbiji DH | 578855983939976 | | 91.2 | |
| 01/09/2021 | 020303/KK/2020/0481 | July Kimzani | Geza juu HC | 578855983939937 | | 18.1 | |

*Figure 8: Adherence streak*

The patients' table shows 10 records by default, but there is a room to go into another page to see other records. To do this users have to click on the next button on the bottom right of the table.

## 4.2 Patient Profile

On clicking a patient's row, a user will be able to see the patient's profile details, device information and their treatment adherence calendar according to the adherence frequency.

The first card on the top right provides in brief the profile details of a patient, including TB District Number, name, age, sex , adherence frequency and phone number.

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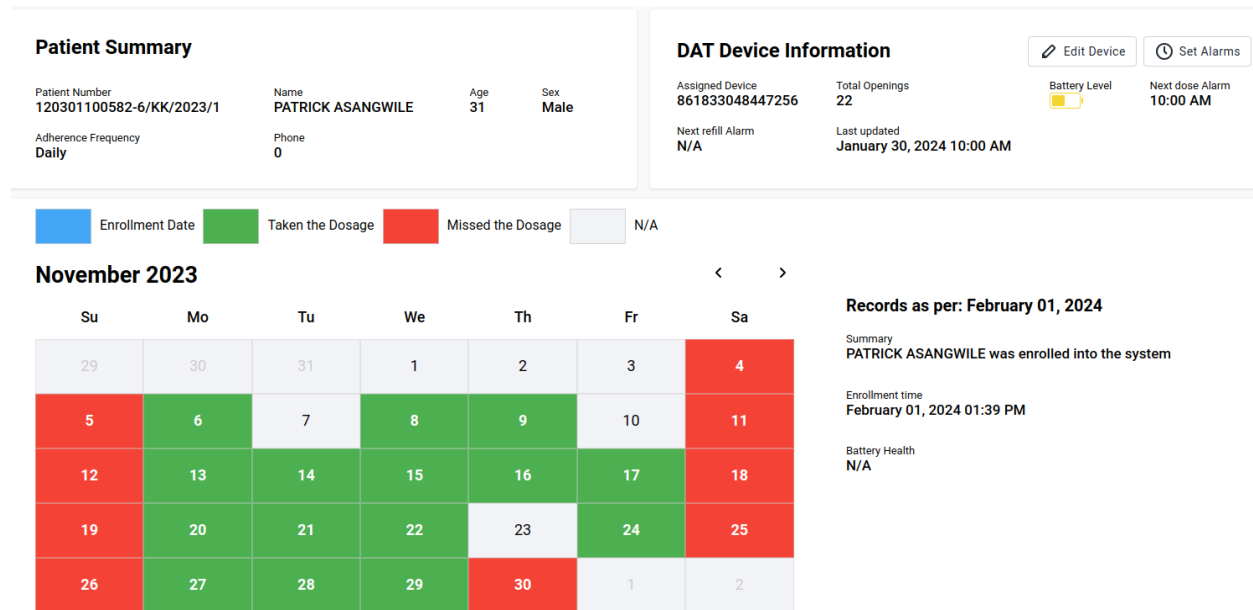P O Box 31775,
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*Figure 9: Patient's profile*

## 4.2.1 Changing the patient's device IMEI number

The DAT device information card shows a few details concerning the device that is given to the particular patient. If a patient is no longer using the device and is given a new one, the system user has to click the **edit device** button to change the device's IMEI number.

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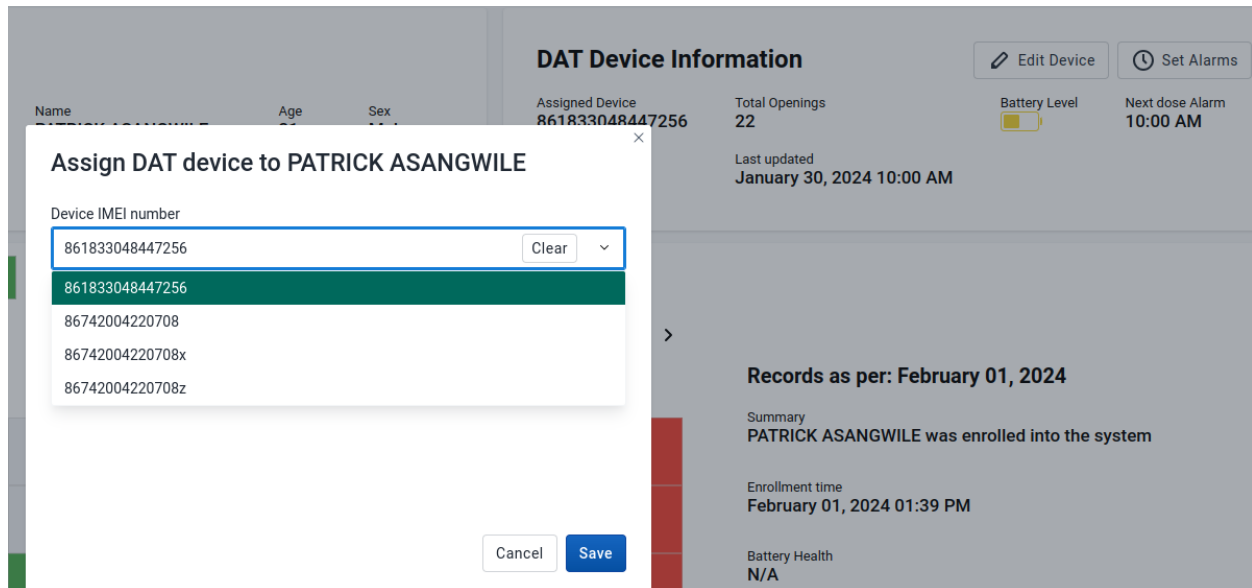Mikocheni B,
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*Figure 10: Assign device IMEI number*

## 4.2.2 Alarms settings

There is also an option to set daily or weekly alarms based on the appropriate treatment regimen and appointment reminder for an upcoming appointment or refill.

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*Figure 10: Alarm settings*

## 4.2.3 Patient's Adherence Calendar

The adherence calendar provides the status of medication intake as per regimen or adherence frequency and keeps record of all the intakes from when the patient started taking medication.

The calendar layout depends on the adherence frequency.If it is daly then the calendar is displayed in days of a month and if it is weekly then the calendar will have for weeks displayed per each month.

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On the right hand side of a calendar, the details of a single event are displayed, by default the current event.It can be this week or this day and once a user clicks on any box, that is where its details are displayed.
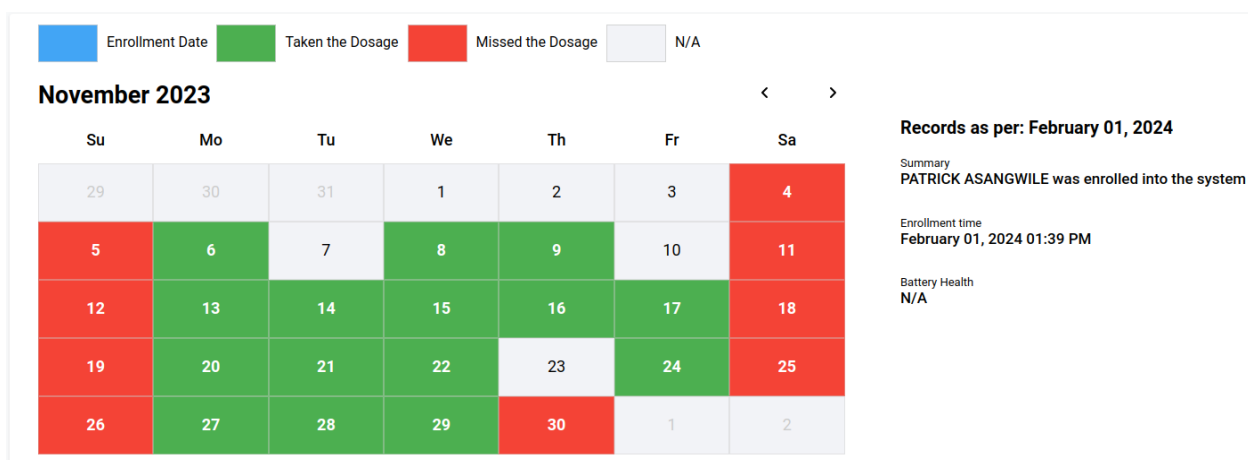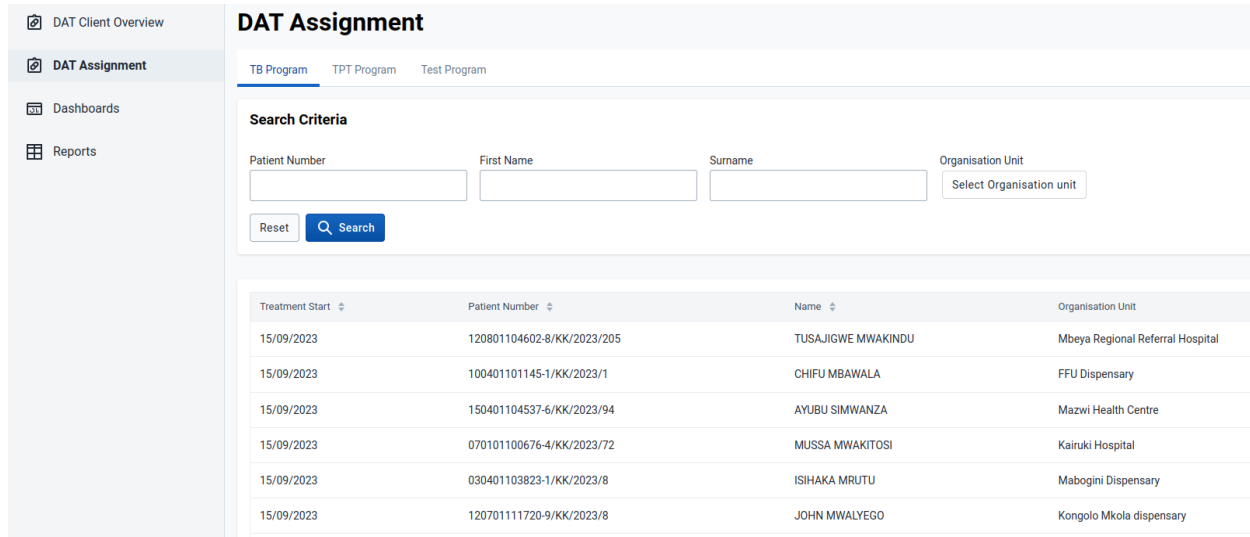


*Figure 11: Adherence calendar*

## 5. DAT Assignment module

### 5.1  Assignment module overview

The DAT assignment module displays a list of patients who have not yet been given the DAT devices or have not yet been assigned the device's IMEI number.The lists are presented per selected program, if there are more than one mapped program (s). The layout of this page is similar to that of DAT client overview, except that it has fewer columns in the table which are relevant in this case.

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| | DAT Client Overview |
|---|---|
| | **DAT Assignment** |
| | Dashboards |
| | Reports |

**DAT Assignment**

TB Program    TPT Program    Test Program

**Search Criteria**

| Patient Number | First Name | Surname | Organisation Unit |
|---|---|---|---|
| | | | Select Organisation unit |

Reset    🔍 Search

| Treatment Start ⇕ | Patient Number ⇕ | Name ⇕ | Organisation Unit |
|---|---|---|---|
| 15/09/2023 | 120801104602-8/KK/2023/205 | TUSAJIGWE MWAKINDU | Mbeya Regional Referral Hospital |
| 15/09/2023 | 100401101145-1/KK/2023/1 | CHIFU MBAWALA | FFU Dispensary |
| 15/09/2023 | 150401104537-6/KK/2023/94 | AYUBU SIMWANZA | Mazwi Health Centre |
| 15/09/2023 | 070101100676-4/KK/2023/72 | MUSSA MWAKITOSI | Kairuki Hospital |
| 15/09/2023 | 030401103823-1/KK/2023/8 | ISIHAKA MRUTU | Mabogini Dispensary |
| 15/09/2023 | 120701111720-9/KK/2023/8 | JOHN MWALYEGO | Kongolo Mkola dispensary |

*Figure 12: Patients without DAT devices*

This module is there for easily locating patients without devices and gives a room for users to assign device IMEI numbers to those patients.

To locate a particular patient, a user can search by providing a treatment start date, patient number, name or organization unit.

## 5.2  Assigning device IMEI numbers to patients

Once a user clicks on a patient row, they will be able to see the patient's profile. This includes the patient summary, DAT Device Information with a message "Missing device Information. [Patient name] has not linked DAT device" and an empty adherence calendar because of the missing device.

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**Patient Summary**

| Patient Number | Name | Age | Sex |
|---|---|---|---|
| 120701111720-9/KK/2023/8 | JOHN MWALYEGO | 42 | Male |

| Adherence Frequency | Phone |
|---|---|
| Daily | 0 |

**DAT Device Information**                    ✎ Edit Device

⚠ **Missing Device Information**

JOHN MWALYEGO has no linked DAT Device

■ Enrollment Date   ■ Taken the Dosage   ■ Missed the Dosage   ■ N/A

**January 2024**                    ‹   ›

| Su | Mo | Tu | We | Th | Fr | Sa |
|---|---|---|---|---|---|---|
| 31 | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | 31 | 1 | 2 | 3 |

⚠ **Missing Dose Data**

JOHN MWALYEGO has no dose data recorded

*Figure 13: Profile of a patient without DAT device*

For a user to assign a device to a patient, has to click on the **edit device** button and select a device IMEI number from a drop down list or search from the list by starting tying the IMEI number so as unrelated numbers can be filtered out.After selection, click the save button.

**Assign DAT device to JOHN MWALYEGO**

Device IMEI number

[                                        ⌄ ]

86742004220708

86742004220708x

86742004220708z

[ Cancel ]  [ Save ]

*Figure 14: Assigning DAT devices IMEI number*

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## 6. Dashboard and Reports

### 6.1 Reports

The treatment adherence app provides three types of reports (TB Adherence Report,DAT device summary report and patients who missed doses) per each mapped program. These reports give a quick summary of the patient's details and device information that can be downloaded in Excel,csv and json formats.



*Figure 15: DAT Reports*

For a user to interact with these reports, has to follow the following steps.

*Step 1:* Click the **Reports** module

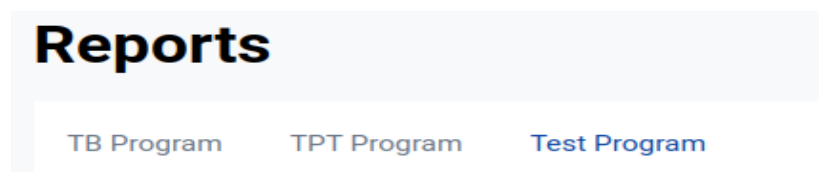*Step 2:* Select a program where you want to pull a report from



*Figure 16: Program selection*

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*Step 3:* Select the type of report, TB Adherence Report, DAT device summary report or patients who missed doses.

**If the selected report is not a DAT device summary report.**

*Step 4:* Select location/organization unit



*Figure 17: PSelecting organization unit*

*Step 5:* Select the period and update



*Figure 18: Selecting the period*

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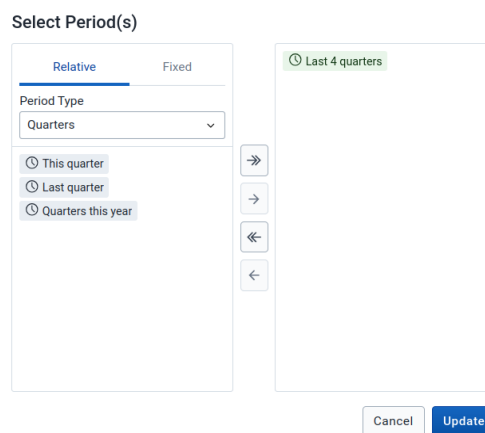
To download a report click the download button and select the format from the dropdown list.



*Figure 19: Report download options*

## 6.2 Dashboard

The Dashboard module makes it possible to present a high-level overview of data, including displaying analytical objects such as generic charts and device usage summary.
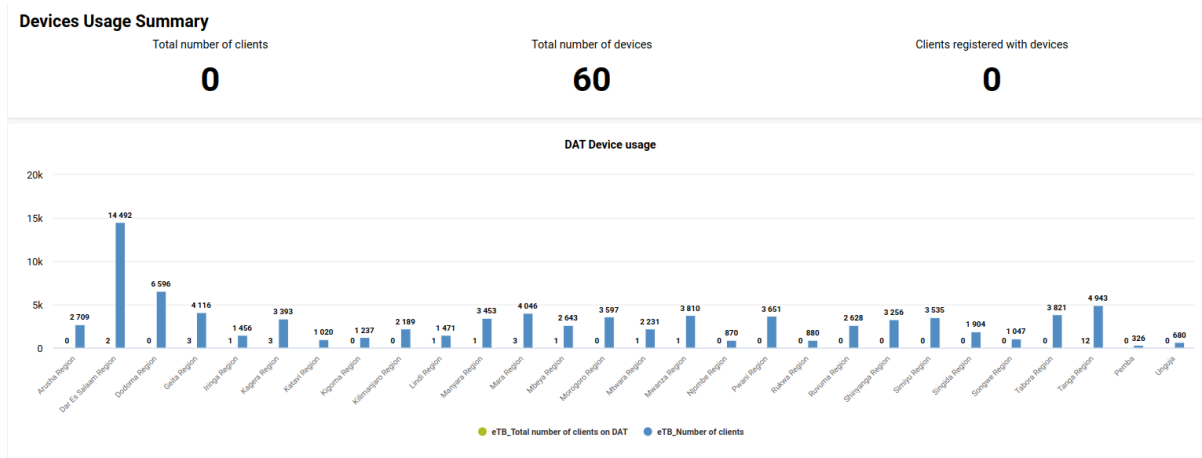


*Figure 20: DAT dashboard*

Each mapped program(s) in the Treatment Adherence App will have their own dashboard. The Top bar shows a list of mapped programs for users to select one and view their dashboard.
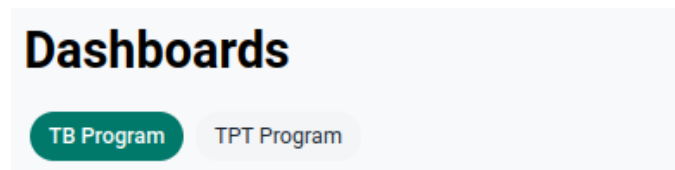


*Figure 21: Dashboard for selected program*

Users with admin roles are able to edit the dashboard, by adding items (visualizations) to it.To do so, one has to click the **Edit Dashboard** button on the top left and select the dashboard item from the already existing visualizations in DHIS2 and save the configuration.
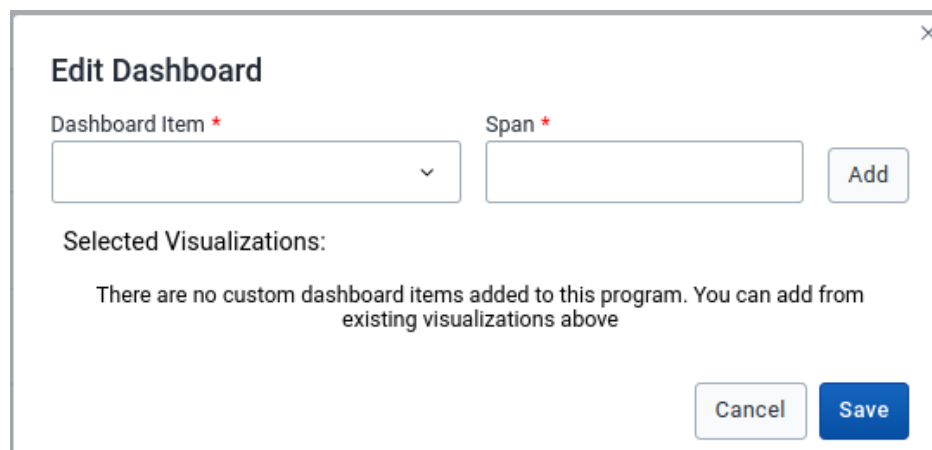


*Figure 22: Adding a dashboard item*