

SOP: Using KenyaEMR Machine Learning to Aid HTS Screening

Last update: July 2023

Objective: The machine learning algorithms for HTS is used to predict patient HIV status during HTS screening to support targeted case detection. This feature helps healthcare providers achieve targeted testing and case detection for timely intervention.

Tasks:

- Perform eligibility screening and use machine learning to predict HIV risk category and risk score.
- Complete evaluation on eligibility for HIV testing

Who: Clinician/HRIO/Data clerk/HTS providers/Care providers

Requirements: Working KenyaEMR instance (ver 18.6.X)

Introduction:

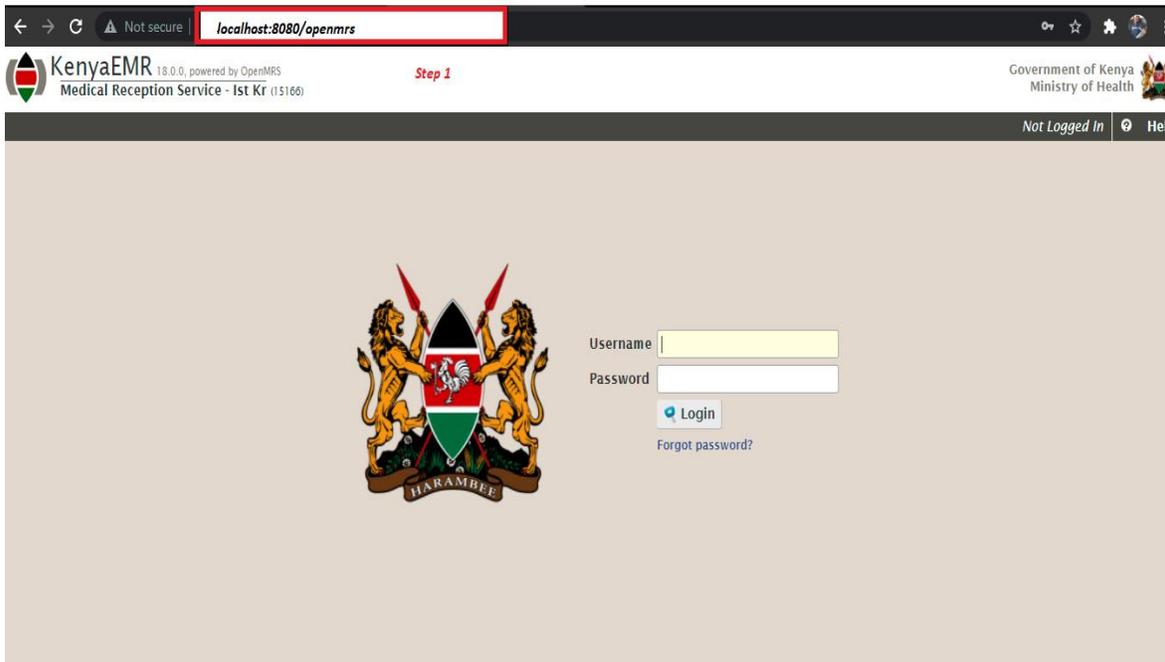
With the advancement of technology, KenyaEMR is evolving towards increased use of Artificial Intelligence (AI) and Machine Learning capabilities to improve care delivery and better patient management.

Currently, the machine learning algorithm is used in HIV Testing Services (HTS) screening to predict HIV status outcome. This brings in efficiencies in testing while increasing case detection rates. This job aid will outline how to use the Machine Learning (ML) features in the HTS screening use case.

1. Login to KenyaEMR

Enter the application server URL system “localhost:8080/openmrs” and click on the load button or Enter key from the keyboard. On successful loading, you should be navigated to the system login page.

Authenticate entry by providing username and password on the fields, and click

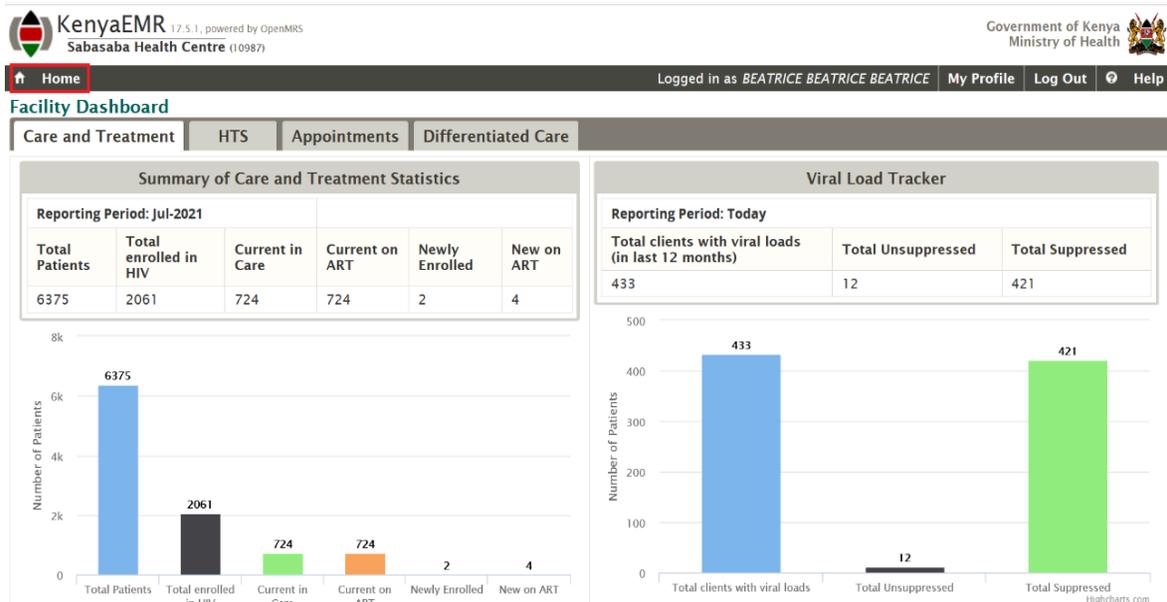


The screenshot shows a web browser window with the address bar containing "localhost:8080/openmrs". The page header includes the KenyaEMR logo, version 1.8.0.0, powered by OpenMRS, and the text "Medical Reception Service - Ist Kfr (15168)". The page is labeled "Step 1" and "Government of Kenya Ministry of Health". The main content area features the Kenyan coat of arms and a login form with the following elements:

- Username input field
- Password input field
- Login button
- Forgot password? link

“Login” Upon successful login, you shall be navigated to KenyaEMR Home Page

2. KenyaEMR Home page



Once logged-in click on the home tab to access the home page.

3. Register Client in KenyaEMR

- On the home page, click on patient registration, select and click Create New Patient
- On the next screen click Register New patient
- Fill in the registration form correctly with patient details. See sample registration screen below.

[Visit Summary](#) | [Check out of visit](#)

Available Visit Forms

-  [Triage](#)

-  [HTS Initial Form](#)

-  [HTS Retest Form](#)

-  [Depression Screening PHQ-9](#)

-  [Cervical Cancer Screening Form](#)

-  [Cervical Cancer Assessment Form](#)

-  [HIV Self Test Form](#)

-  [HTS Eligibility Screening Form](#)

← Click to open this form.

Completed Visit Forms

None miro

5. Performing HTS eligibility screening

Home | Registration Logg

GRACE MARY, GRACE MARY GRACE MARY OpenMRS ID **MGM3AR**

Female, 37 year(s) (06-Jul-1985)

Due for CACX Screening

Editing Outpatient visit, 08-Feb-2023 09:15

HTS Eligibility Screening Form

Screening date: 08-Feb-2023 09:15:00 | HTS Provider: NJUNGE, NJUNGE NJUNGE

Population Type

Population type: General Population Key Population Priority Population

HTS Entry Point

Indicate HTS entry point:

Department/Coverage

Department:

Patient Type: HP:Hospital Patient NP:Non-Hospital Patient

Client a health care worker? Yes No

Client has any relationship with an index client? Sexual Contact Social Contact Needle Sharing None

HTS Strategy

Indicate HTS strategy used: Specify:

Fill in every variable accordingly on the sections.

The HTS eligibility screening form comprises of various questions that the client would need to respond to in order for the Machine learning algorithm to correctly calculate their HIV risk score. It is important that the client responses are documented on the form correctly. The first part of the form asks about Population type, HTS entry point, Department and HTS strategy as shown in the form.

6. Risk Assessment

The next section for the HTS legibility screening focuses on the client’s risk assessment. Again, it is imperative to select the correct options as provided by the client. This is important for the algorithm to generate accurate prediction. Wrong documentation at this point may potentially lead to misleading predictions.

Risk Assessment
Client Sexual Behaviour Assessment:

Has the client ever had sex? * Yes No

Is the client sexually active? Yes No

Has the client had a new sexual partner in the last 3 months? Yes No

Partner HIV status HIV Positive HIV Negative Unknown

Discordant Couple Yes No

Have you engaged in unprotected sex with more than one sexual partner in the last 12 months? Yes No

How many sexual partners?

Does the client engage in sex under the influence of alcohol/drugs? Not at all Sometimes Always

Have you ever had unprotected sex in exchange of money or other material gains? Yes No

Have you recently had any incident of condom burst? Yes No

Have you engaged in unprotected sex with someone you don't know their HIV status in the last 12 months? Yes No

Have you had unprotected sex with someone who has known HIV positive status?? Yes No

Has the client recently experienced CBV? * Yes No

Has the client received any of the following services recently?

<input type="checkbox"/> PrEP	Is the client currently on PrEP? <input type="radio"/> Yes <input type="radio"/> No
<input type="checkbox"/> PEP	Has the client used PEP in the last 3 months? <input type="radio"/> Yes <input type="radio"/> No
<input type="checkbox"/> STI	Has the client had an STI in the last 3 months? <input type="radio"/> Yes <input type="radio"/> No
<input type="checkbox"/> TB	Has the client been screened for TB? <input type="radio"/> Yes <input type="radio"/> No

Traditional /non-medical procedures e.g. scarification, plastic tooth extraction, Circumcision, uvulectomy etc * Yes No

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Pregnancy Assessment

Client currently pregnant? * Yes No

Breastfeeding mother Yes No

HIV Prediction

Get risk category **High Risk Client** *This client has a high probability of a HIV positive test result. Testing is strongly recommended*

Eligible for Testing

Client eligible for testing : * Yes No

Why was testing recommended? Computed risk score Eligibility screening outcome Both

Client referred for testing : * Yes No

Click to save the form **Enter Form** miro

Fill the Pregnancy Assessment if the client is a female otherwise the pregnancy assessment section will not be available. Click on the **Get Risk category** button shown below to generate the HIV status prediction.

7. Probability prediction HIV score and risk category

The machine learning algorithm can predict the probability of positive HIV result. This entirely depends on responses provided under the **Risk Assessment** section.

Pregnancy Assessment	
Client currently pregnant? *	<input type="radio"/> Yes <input checked="" type="radio"/> No
Breastfeeding mother	<input type="radio"/> Yes <input checked="" type="radio"/> No

HIV Prediction	
<input style="background-color: #0056b3; color: white; padding: 5px; border: none;" type="button" value="Get risk category"/> *	<div style="background-color: #008000; color: white; padding: 5px; display: inline-block; font-weight: bold;">Low Risk Client</div> <i>This client has a low probability of a HIV positive test result. Testing may not be recommended</i>

Eligible for Testing	
Client eligible for testing : *	<input checked="" type="radio"/> Yes <input type="radio"/> No
Why was testing recommended?:	<input checked="" type="radio"/> Computed risk score <input type="radio"/> Eligibility screening outcome <input type="radio"/> Both
Client referred for testing : *	<input checked="" type="radio"/> Yes <input type="radio"/> No

8. Confirmation of eligibility for testing decision

The decision on whether the client can be tested for HIV or not is still at the discretion of the healthcare provider. Provider is first prompted to confirm if client is eligible from their personal assessment. Next, the user generates HIV Prediction from the machine learning algorithm. The algorithm provides risk category and risk score (stored in background)

Finally, the user confirms decision to test or not is based personal assessment, machine learning algorithm or both assessments and then saves the form.

THE END