

ScanForm + HIV CBS

Background

Case-Based Surveillance (CBS) is a passive HIV surveillance system that collects longitudinal data from people living with HIV, from diagnosis until death. As national HIV programs shift to a more human-centered approach, strengthening individual-monitoring systems like CBS are essential for epidemic control.

ScanForm is a technology that extracts handwriting on paper into digital data to auto-calculate summary statistics, saving time and eliminating human errors. In Sub-Saharan Africa, ScanForm has been successfully used for: epidemiological surveillance (HIV/AIDS, malaria, COVID-19), clinical trials, routine health reporting, vaccine delivery, agricultural data collection, and refugees and human rights.

For facilities unable to implement electronic medical record systems (EMRs), ScanForm is a smart and sustainable solution for paper-based reporting. As a data system, ScanForm can function independently or as a stop-gap/transition platform for countries scaling up their information technology (IT) infrastructure. Once the IT infrastructure is ready, ScanForm data can integrate harmoniously with EMRs to achieve a holistic national digital health data system.

Migori was the first county in Kenya to achieve 100% HIV CBS in 2021, with 70% of the data collected with ScanForm and the remaining 30% with EMR.

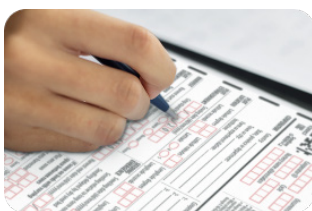
How it works

One ScanForm HIV CBS tool captures a client's clinical history with HIV/AIDS:

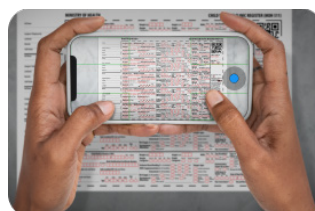
(a copy of the tool is shown on the next page)

- **Prospective** (newly diagnosed with HIV): Complete left column (Sections A-C) on the same day of diagnosis. Update Sections D-F as client continues treatment.
- **Retrospective** (previously diagnosed with HIV): Back-fill left column (Sections A-C) with data abstracted from the registers from Section G, and include Sections D-F depending on client's status. Case-Based Reporting (CBR) only collects the first year of care.

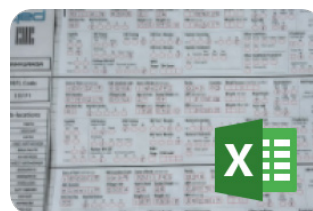
The HIV CBS tool is updated from eight Ministry of Health (MOH) registers (section G) as the client continues along the HIV care cascade, including the green card. ScanForm auto-extracts the new information by retaking a photo of the page using a smartphone.



1. Write on paper



2. Take a picture




3. Data is digitized



4. Export and analyze data

HIV CASE - BASED SURVEILLANCE

CASE REPORT FORM



Book No.


Page No.

Discard Record

Photo Taken Photo Taken By

INSTRUCTIONS

- Ovals**
 - Cross ovals with an "X", like this:
 - When you make a mistake in an oval, shade it completely like this:
 - Write only one symbol in each box.
 - Write legibly and completely inside the boxes.
 - Always use BLOCK CAPITAL LETTERS for boxes requiring letters.
 - When you make a mistake in a box, shade the box completely like this:
 - When data is unknown, just leave the boxes blank.
- Boxes**
 - When writing numbers, only use Arabic numerals 0 through 9. No Roman numerals!
 - If the number of boxes for a numerical field is more than the number of digits you have, zero-pad the number from the left side: 015310
- Photography**
 - Lay the page flat for photography. Please do NOT bend or wrinkle the paper!
 - To discard a patient record, just mark the Discard Record field. DON'T cross out the entire record or page! And never rip out pages!
 - Questions marked with an asterisk * are mandatory - make sure they were all done.



ScanForm HIV-CBS 2.4

A. REGISTRATION

Reporting Date (dd/mm/yyyy)*

County

Sub-County

Facility Name

Reporting Facility KMHFL Code*

Report type* New case Update of existing case (new sentinel event) Transfer In Correction of previous case report Transit

B. PATIENT PROFILE/DEMOGRAPHICS

Date of Birth* (dd/mm/yyyy) Sex* M F

CCC No.* - None

National ID No. None

County

Sub-County

Sub-Location

Village/Estate

Phone No. Self Next of Kin None

Age as documented on MOH257 (yrs + mos) +

Age as documented on HTS register (yrs + mos) +

Gen Pop Key Pop If Key Pop, tick one MSM FSW PWID

Population Type* If Key Pop, tick one MSM FSW PWID

If patient is a child, please fill the information below, if known:

HEI number None

Mother's CCC number -

C. HIV DIAGNOSIS AND LINKAGE TO CARE/ANTIRETROVIRAL TREATMENT

Date of HIV Diagnosis (dd/mm/yyyy) Diagnosis by PCR Rapid Antibody test

Date enrolled in HIV care (dd/mm/yyyy) WHO stage at enrollment to care*

Date of ART initiation (dd/mm/yyyy) History of ART at enrollment PEP PEP PMTCT None

Recency HIV infection test conducted? Yes No If yes, HIV infection recent? Yes No

ARV Regimen Line* First line Second line Third line Start Regimen

Referred from (Place of 1st diagnosis) HBTC IPD-Adult VCT Self-test MCH TB Clinic OPD IPD-Child CCC Other (eg STI)

Client tested through Partner Notification Services (PNS)? Yes No

D. CLINICAL EVENTS

ARV REGIMEN CHANGES

Date changed to 2nd line (dd/mm/yyyy) 2nd line Regimen

Date changed to 3rd line (dd/mm/yyyy) 3rd line Regimen

TB TREATMENT

Date of start of TB treat. (dd/mm/yyyy)

TB infected at enrollment Yes No Pregnant at enrollment Yes No Breastfeeding at enrollment Yes No

E. LABORATORY INVESTIGATION: VIRAL LOAD, CD4

Baseline CD4 sample collection date (dd/mm/yyyy) Baseline CD4 count cells/mm³ Baseline CD4 %

Additional CD4 sample collection date (dd/mm/yyyy) Additional CD4 count cells/mm³ Additional CD4 %

Viral load sample collection date (dd/mm/yyyy) Viral load results (c/ml) <LDL: Lower limit is (c/ml)

F. CURRENT STATUS

Date (dd/mm/yy) Status Change LTFU (28 days) Transfer out LTFU returned to care Death

G. DATA SOURCE USED* (Select all applicable)

HTS Register HEI register Treatment Preparation Register

ANC register TB Register Individual Clinic Record (e.g. MOH257)

ART Register Viral Load Register Other

PEPFAR MER 2.6 Indicators that can be auto-generated:

- Section C: Diagnosis and Linkage**
- HTS_TST_POS
 - PMTCT_HEI_POS
 - HTS_RECENT
 - TX_NEW
 - TB_STAT
 - PMTCT_STAT
 - PMTCT_FO
 - HTS_INDEX

Section D: Regimens and Treatments

- TX_CURR
- TX_TB

Section E: Lab

- TX_PVLS

Section F: Patient Status

- TX_ML
- TX_RTT

Other sections:


- Section A: Facility information
- Section B: Patient profile, without PII
- Section G: MOH data sources used

6 Sentinel Events Captured with ScanForm

- HIV diagnosis (section C)
- 1st CD4 test (section E)
- Initiation of ART (section C)
- 1st VL test (section E)
- VL suppression (section E)
- Death (section F)

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PATIENT

First Name*

Last Name*

IF PATIENT IS A CHILD, FILL MOTHER'S PROFILE

Mother's First Name*

Mother's Last Name*

REGIMEN CODES

Regimen Code	ARV Combination
01	(AF1A)
02	(AF1B)
03	(AF1D)
04	(AF1E)
05	(AF1F)
06	(AF2A)
07	(AF2B)
08	(AF2D)
09	(AF2E)
10	(AF2F)
11	(AF4A)
12	(AF4B)

Space to support more data elements, such as additional sentinel events, and capture of related issues such as TB, Hepatitis, and COVID-19.

Unique Identifier

Backside

ScanForm can generate or capture any unique identifier. In Kenya, it computes the same Personal Key Verifier (PKV) used by KenyaEMR, based on personal identifiable information (PII) collected on the backside of the form. This allows paper and electronic records to be linked and deduplicated. PII is stored in a separate repository for additional security.

Advantages



Compliance and security

- Data and servers are *only* in Kenya. Compliance with Kenya's Data Protection Act, NASCOP, and GDPR.
- Auto-deletion of images after upload.



Interoperability

- Generates same patient identifier as KenyaEMR.
- Data is synced with NASCOP data warehouse and dashboards.



Simplicity saves money

- Easy to use. No need to hire auxiliary data clerks.
- No need for stable electricity, network, scanners, computers, or tablets. Works offline and uploads when network is available.
- Extremely low paper costs — a single sheet for the client's life.



Saves time

- 3x faster data entry compared to tablets.
- Scanned source documents are remotely available for verification, backed by physical records stored in the facility.
- Auto-generates monthly summary statistics by the 2nd of the month.



Improves data quality

- OCR > 98%, calibrated to local handwriting and self-learning.
- Compiles facility data quality reports for continuous quality improvement.
- Imputation corrects logic errors and missing data.

Data Flow Diagram

