Global Health

THE CQUIN NETWORK

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Machine Learning for Identification of High Risk Negatives for Prevention Services - Kenya

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Background


Annex 1: HTS screening Tool

MINISTRY OF HEALTH
NATIONAL AIDS & STI CONTROL PROGRAM

HTS Screening Tool

- Kenya has made great strides towards achievement of 1^{st} 95
  - Gaps remain among children, AYP and men
- Resources for TB/HIV are steadily decreasing
- Use of HTS screening tools recommended for identification of persons at risk of HIV infection[1,2]
  - Machine Learning is a key screening tool in HTS for case finding and for identification of high risk HIV negative persons
- eHTS system used in provision of services and data submitted to the national data warehouse (NDWH)

1. Kenya HIV prevention and Treatment guidelines, 2022
2. The Kenya HIV Testing Services Operational Manual, 2022

NDW Data Flow, Use & Coverage

Data sources | **Data repository** | **Data use cases and applications**

Implements the concept of collect once use multiple times

Data capture / integration

EMR
- HIV Testing
- Care
- Laboratory
- Pharmacy
- Viral load
- EID
- Other*

*Other data, e.g., MCH, Chronic illness, NCDs

mHealth systems
- Patient Surveys
- Referrals
- Non-EMR sites
  - Clinical, Labs, etc

Aggregate Data Sources
- KHIS
- DATIM

National Data Warehouse (NDW)

Encrypted and secure HIV clinical data

Extraction Transformation Loading

- Hosts longitudinal data for **91%** (1,228,320) of **Active ART** patients in Kenya (Jan 2024)

Data use cases and applications

Program monitoring

Program monitoring and evaluation (M&E)
1. The 95-95-95 cascade
2. Monitor program priorities
3. Longitudinal tracking
4. **Self-service**

Surveillance

Case Surveillance
1. Case-level outputs
2. Dynamic dashboards/reports
3. Cohort studies

Advanced analytics

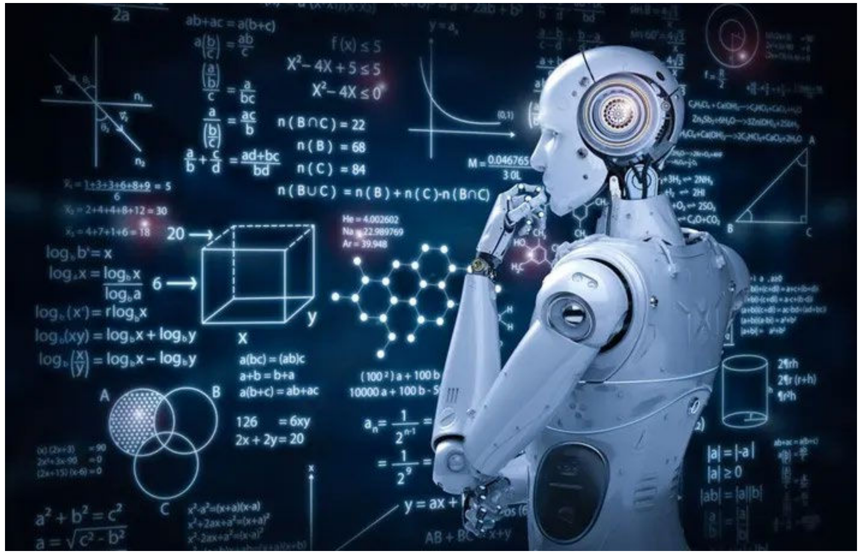
Machine learning (ML)
1. Target HIV case identification
2. Referral for prevention services
3. Predicting interruption in treatment (IIT) risk of PLHIV

Publications

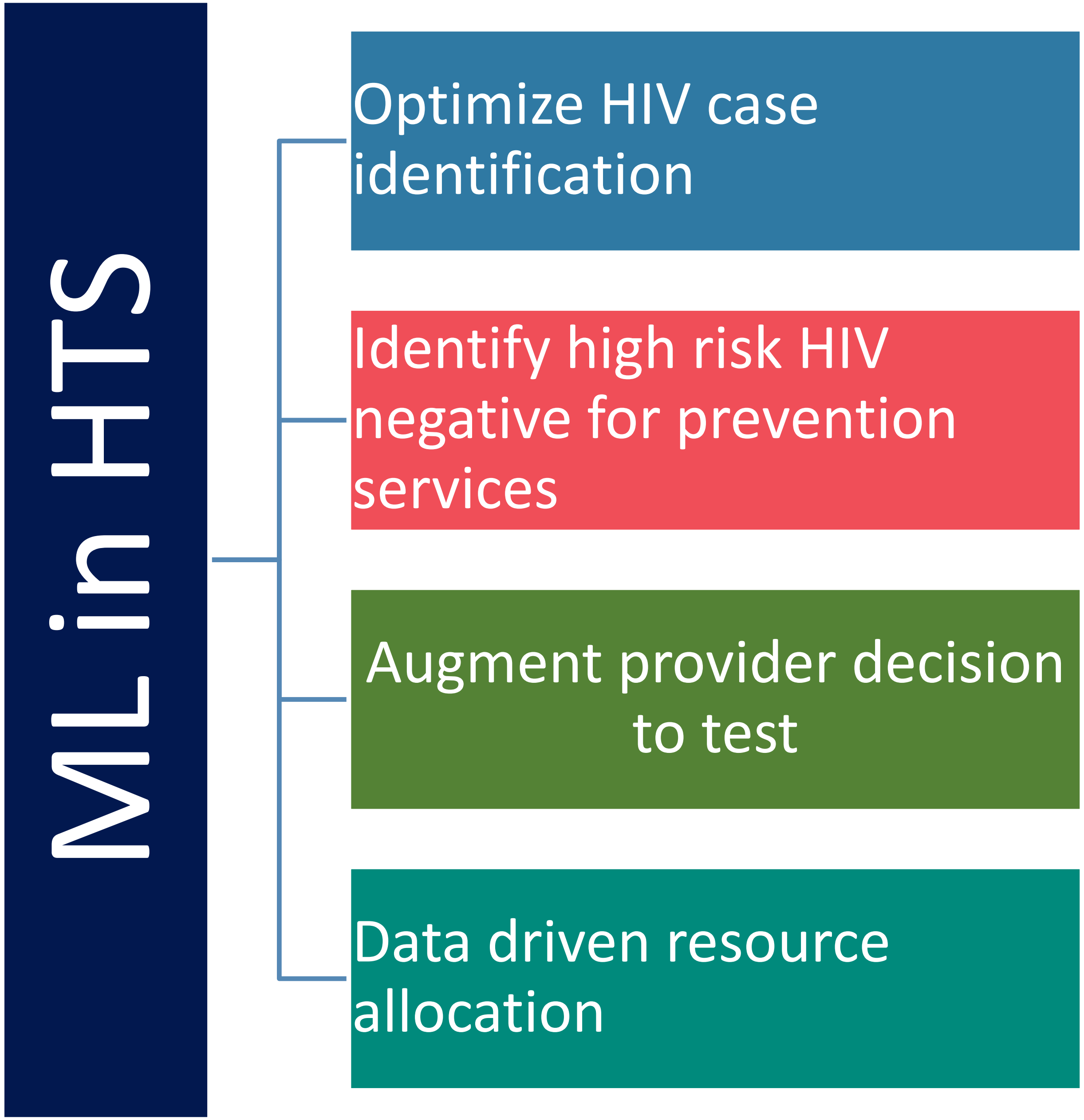
Implementation and Program
- Abstracts and Manuscripts
- Program reports, bulletins and briefs
- Slide decks and Newsletters

Feedback Loop to facilities

Leveraging on Machine Learning for Risk Assessment



- The **risk profiling machine learning (ML) model** leverages patterns in existing data to better predict clients likely to be HIV positive
- During eligibility screening, providers **generate the risk** of positive results (low, medium, high, very high), and **recommend testing** if risk generated falls within the higher risk categories (medium, high, and very high)
- ML can assist providers to identify and SCREEN IN high-risk patients for HTS who could have been missed by manual screening **and recommend HIV prevention services** like PrEP for **high-risk clients that turn HIV negative**



ML in HTS
Optimize HIV case identification
Identify high risk HIV negative for prevention services
Augment provider decision to test
Data driven resource allocation


DEMO

Outcomes of the ML Model (Apr 2023 - Mar 2024)

	Highest Risk	High Risk	Medium Risk	Low Risk
No. of Tests	103,573	241,879	663,094	904,147
No. of Negatives	94,031	231,881	649,283	896,532
No. Enrolled in Prevention Services (PrEP)	6,263	13,115	29,809	26,227
% Enrolled (PrEP)	**6.66%**	**5.66%**	**4.59%**	**2.93%**

- Data captures linkage to PrEP
- Ongoing efforts to improve linkage as well as documentation of other combination prevention strategies from HTS

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- CQUIN