USAID GLOBAL HEALTH
SUPPLY CHAIN PROGRAM
Procurement and Supply Management

Integrating Multi-disease Testing for HIV Viral Load and Early Infant Diagnosis on GeneXpert Devices in Northern Ghana: Results of a Diagnostic Network Optimization

Background

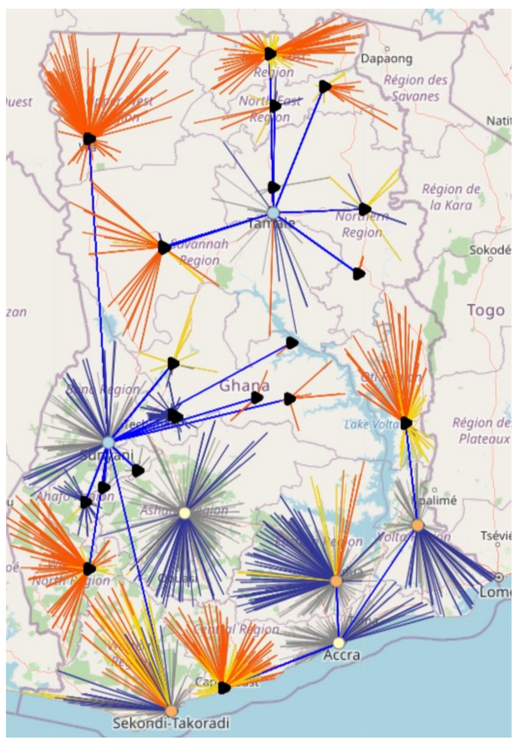
The 2023 WHO resolution for strengthening diagnostic capacity lists the establishment of integrated, non-siloed national diagnostic strategies as its top recommendation to increase efficiency and resilience of diagnostics.

Problem Statement

How can we improve access to testing for HIV viral load and early infant diagnosis (VL/EID) in Northern Ghana by leveraging existing GeneXpert laboratories used primarily for TB testing?

Challenge

HIV testing in Ghana is largely conducted at seven centralized labs with large conventional PCR devices. This model has efficiencies in terms of costs and volumes of tests that can be processed but for much of the country, this leads to long sample referral distances which can impact access to fast test results. This is particularly true in the 5 northern regions – North East, Northern, Savannah, Upper East, and Upper West – where 67% of health facilities are more than 200 km from a conventional lab, including 100% in Upper West region.



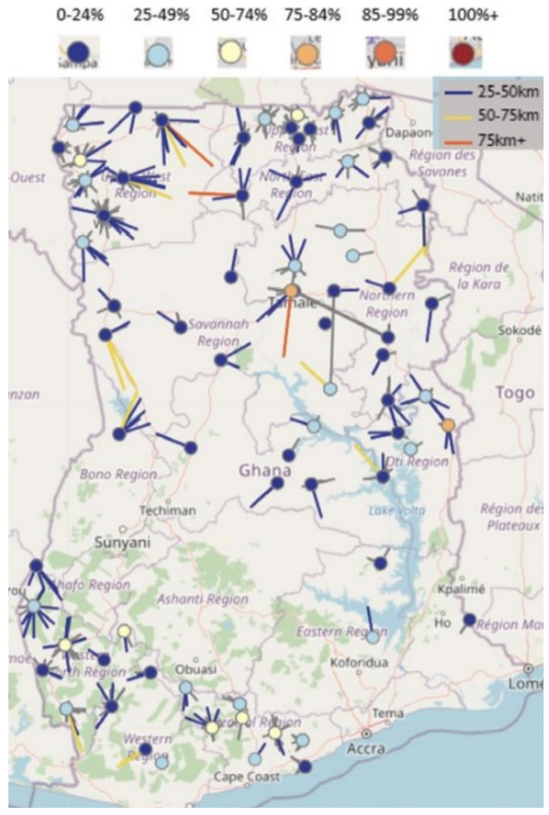
At the same time, the central lab in Tamale is only utilized at an estimated 45% of its capacity today and would drop to 26% if all low-access facilities were reassigned to GeneXpert labs.

DNO Analysis

The DNO model shows a vision for what the network for GeneXpert devices would look like if all HIV tests in the five northern regions, as well as all other facilities with a >200 km referral distance, were assigned to a GeneXpert lab instead of a central HIV lab. This can also demonstrate how testing in the northern regions would work without a central lab in Tamale.

Key Results

- No GeneXpert device over 75% utilization, even with new tests.
- 28% of HIV facilitiesusing GeneXpert labs.
- HIV tests are moreexpensive on GeneXpertbut costs offset by savings in transportation.
- Annual costs savings are estimated to be over $218,000 with more savings if TB and HIVintegrated sample collection.
- Reduce average referraldistances from 264 km to 16km and reduce annual sample transportation costsby an estimated $382,000.



Note: Analysis includes 29 new lab locations recommended by the TB DNO analysis.

Impact on Average Referral Distances

Before	264km
After	16km

Data-Driven Decision Making

DNO is a decision support tool that uses mathematical optimization and geospatial analysis to present visuals and summary statistics of the network. In this way, using DNO allows stakeholders to gain insights into current network design and test scenarios to determine actions most likely to strengthen performance and resilience. The analysis was conducted using OptiDx, a web-based, open-access network analytics tool.

Next Steps

Implementation efforts based on the analysis are underway in Northern Ghana and elsewhere.

1. GHS is leading efforts to launch multiplexing in the northern regions and plans to forgo the conventional PCR at Tamale Public Health Laboratory.
2. Oti region started multi-disease integrated testing for all HIV tests in May 2023 and have run over 1000 HIV tests on GeneXpert as of September 2023.
3. PSM is helping GHS to pilot integrated testing in Western North region.

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