Ghana has a network of laboratories with varying diagnostic capacities from sub-district to national levels across both public and private facilities. However, these laboratories operate a siloed, vertical testing and referral system for HIV Viral Load (VL), Early Infant Diagnosis (EID) and Tuberculosis (TB).

**Background**

The Global Fund Laboratory Activity (GFLA) supported by USAID aims at using Diagnostic Network Optimization (DNO) Analysis to address the challenges of siloed, vertical testing and referral systems for each disease burden and improve TB case detection, early infant diagnosis (EID) and viral load (VL) coverage.

**Approach**

- Initial stakeholder engagement and defining the scope of analysis in terms of diseases, tests and geographies.
- Data collection, detailed geospatial and graphical analysis of the baseline diagnostic network.
- Scenario design and mathematical optimization using the OptiDx tool.
- Analysis reporting, stakeholder validation and development of a strategy and implementation plan.

**Scenarios for DNO Analysis**

**HIV: PCR Placement**

Based on the anticipated procurement of new Abbott and Roche devices to replace expiring CAP/CTMs, what would be the ideal regional placements to minimize referral distances for the most patients? How does this compare to the expected placements?

**TB: GeneXpert Placement**

How many new GeneXpert (GX) laboratories would be needed for all referral distances to be under 50km? Which districts would need laboratories to allow this distance-based access goal to be achieved?

**Multiplexing: Using GeneXpert Network to Fill HIV Access Gaps**

Given an expected placement of conventional PCR instruments, how many (and which) existing GeneXpert laboratories would need to incorporate HIV testing to enable all referral distances in the HIV network to be under 200 km?"