Updates on DNO and Integration: Eswatini and Nigeria (and Lesotho)

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USAID/OHA/SCH
September 13, 2019

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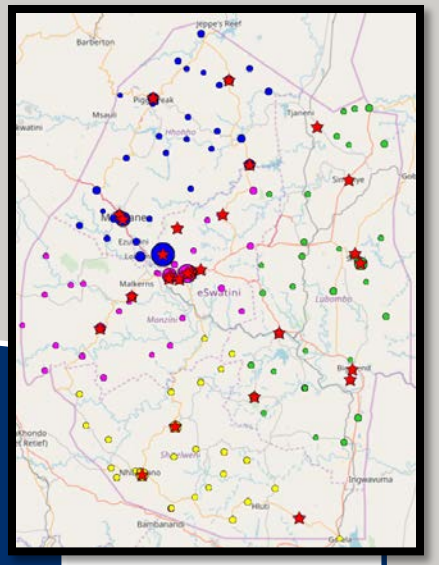
PEPFAR
U.S. President's Emergency Plan for AIDS Relief

Process of Diagnostic Optimization

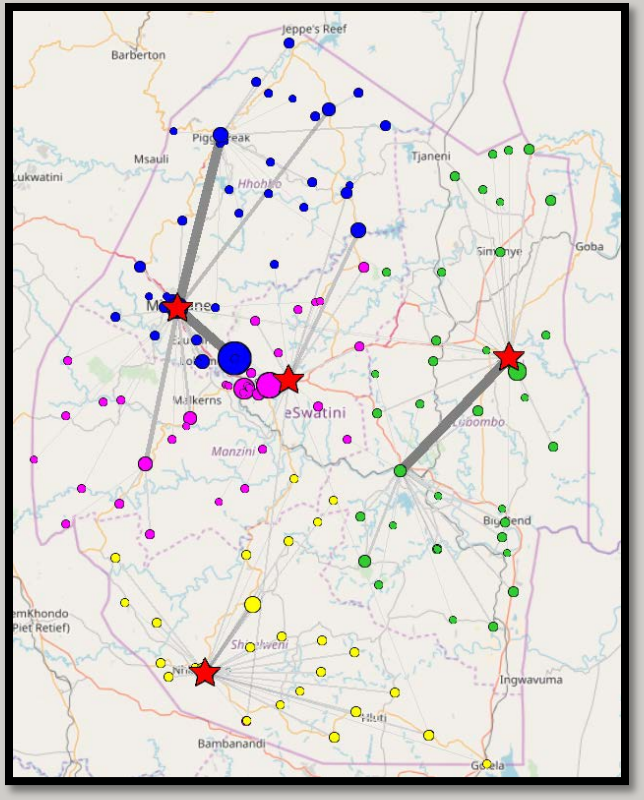
- Ensure complete national stakeholder **buy-in and political will**
- Clearly define the country **goal** for optimization (e.g. cost; TAT; access; testing priorities; integration; surveillance)
- **Data collection** – laboratories, instruments, testing volumes, sample collection sites, programmatic patient demands by site, existing referral linkages, HR
  - Use **GIS visualization** tool to present outputs, refine assumptions, and establish data gaps
- Establish a **stakeholder workshop** to present initial models and further refine models
- Inclusion of integrated approach in National Lab Strategic Plan and development of an **implementation** plan and timeline

Country Examples:



Eswatini

Eswatini: Lab Network – Capacity by Test Type



Test Type	Count of Test Locations/Equip	Annual Cap*	Equipment
CD4 - Conventional	21	790,800	FACS Calibur/Count/Presto
CD4 - POC	79	303,360	PIMA
EID - Conventional	1	36,960	CAPCTM96 EID
EID - POC	19	27,360	AlereQ
TB - Xpert	28	155,520	GeneXpert 4/8/16
Viral Load - Conventional	4	275,760	Biocentric, CAPCTM96 VL

*Assuming 12*20 = 240 testing days/yr

NOTE: GX Implementation Report suggests 180 testing days/yr

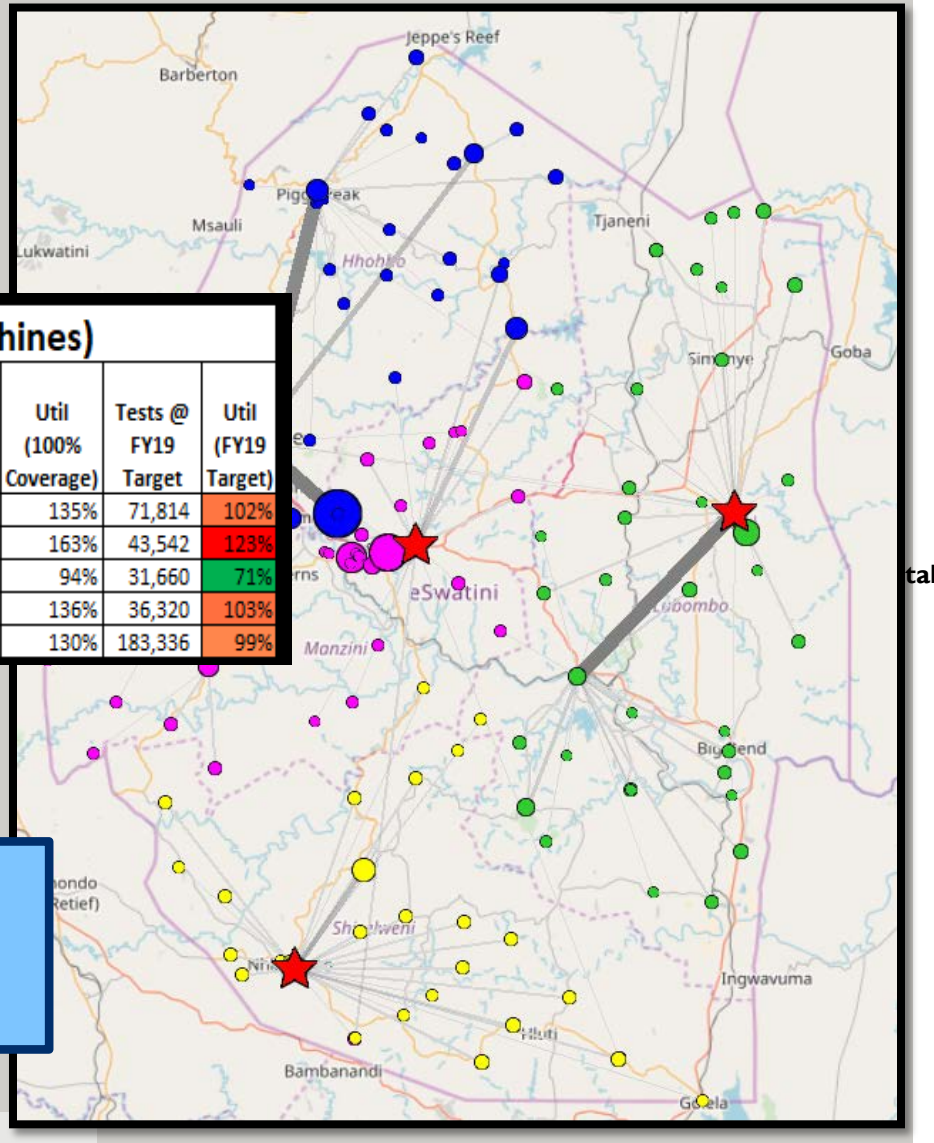
Eswatini: Viral Load Baseline Network

Assumptions:

- Capacity based on 8 hr work day;
- 100% capacity availability

VIRAL LOAD SCENARIO (Currently Utilized Machines)

Test Site	Equipment	Annual Capacity	Tests @ 100% Coverage	Util (100% Coverage)	Tests @ FY19 Target	Util (FY19 Target)
NMRL	2x CAPCTM96 VL	70,560	94,920	135%	71,814	102%
NATIONAL TB HOSPITAL	CAPCTM96 VL	35,280	57,552	163%	43,542	123%
NHLANGANO HEALTH CENTRE	Biocentric	44,640	41,847	94%	31,660	71%
LUBOMBO REFERRAL HOSPITAL	CAPCTM96 VL	35,280	48,006	136%	36,320	103%
TOTALS		185,760	242,325	130%	183,336	99%



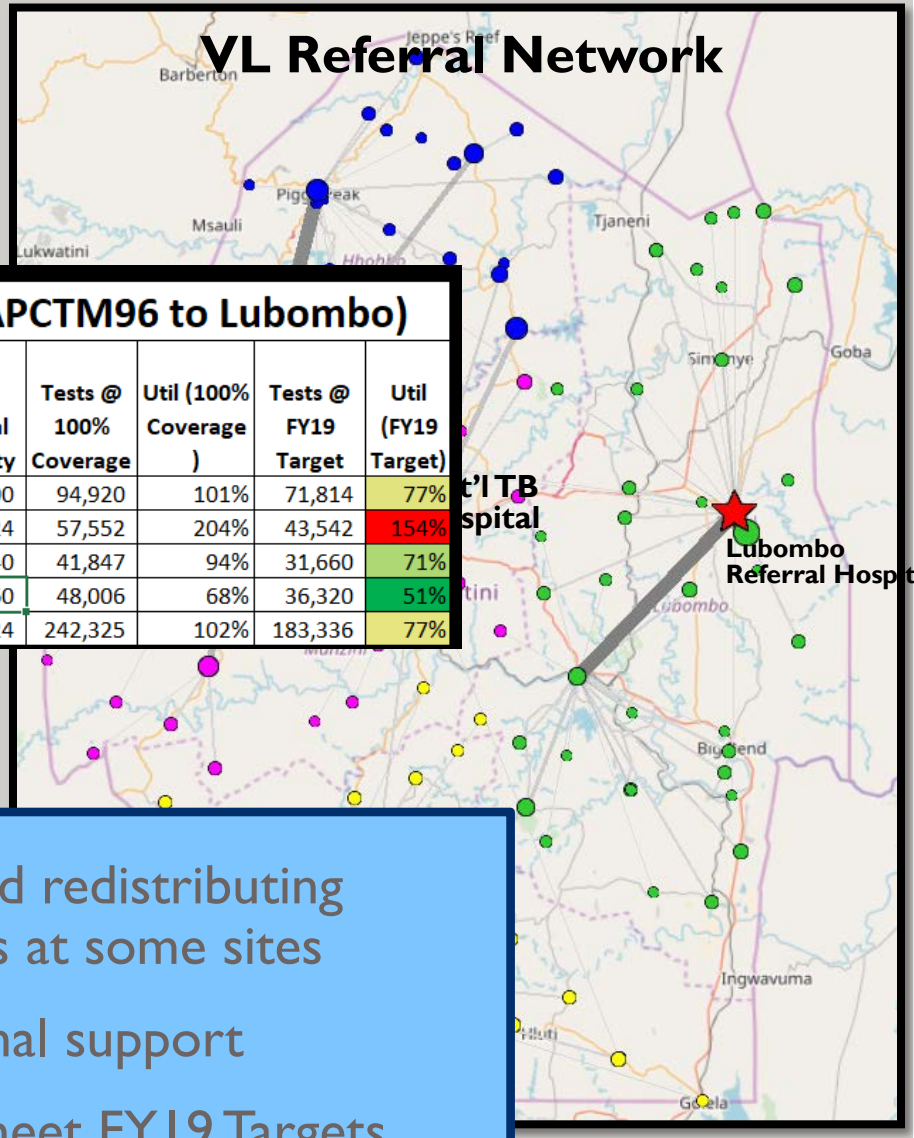
KEY TAKEAWAYS

- Capacity issues!
- Current targets cannot be met

Eswatini: HPV/HIV integration

Assumptions:

- Capacity based on 8 hr work day;
- 80% capacity availability at TB and Lumombo



VIRAL LOAD SCENARIO (c. Add Panther, Move CAPCTM96 to Lubombo)

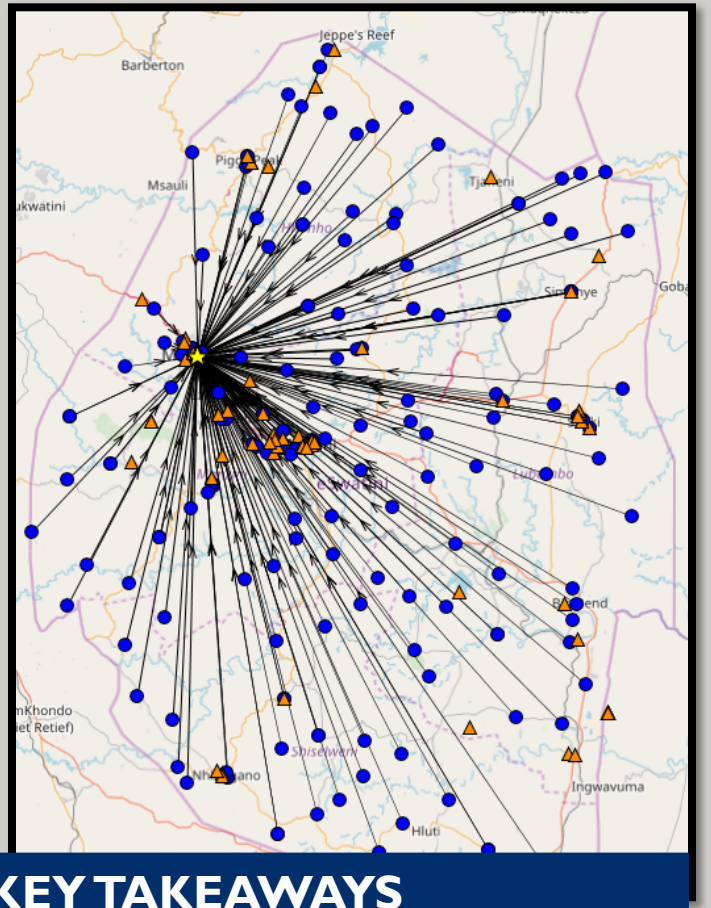
Test Site	Equipment	Annual Capacity	Tests @ 100% Coverage	Util (100% Coverage)	Tests @ FY19 Target	Util (FY19 Target)
NATIONAL MOLECULAR REFERENCE LABORATORY	50% CAPCTM96 + 0.9 Panther	93,600	94,920	101%	71,814	77%
NATIONAL TB HOSPITAL	CAPCTM96 VL	28,224	57,552	204%	43,542	154%
NHLANGANO HEALTH CENTRE	CAPCTM96 VL	44,640	41,847	94%	31,660	71%
LUBOMBO REFERRAL HOSPITAL	2x CAPCTM96 VL	70,560	48,006	68%	36,320	51%
TOTALS		237,024	242,325	102%	183,336	77%

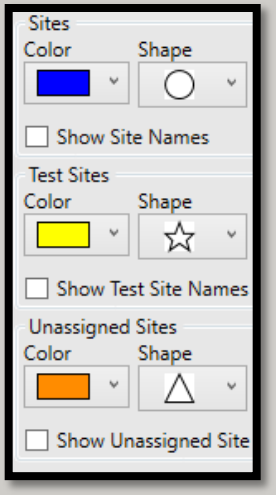
KEY TAKEAWAYS

- Utilizing existing capacity at NMRL and redistributing instruments can relieve capacity issues at some sites
- National TB Hospital requires additional support
- Hologic Panther capacity needed to meet FY19 Targets

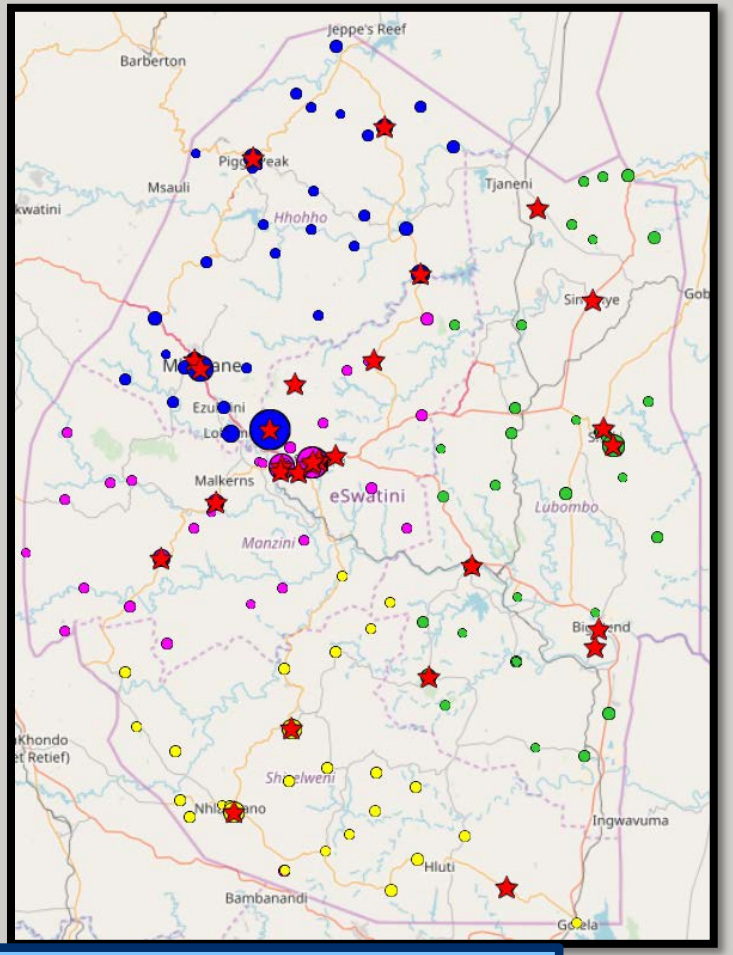
Eswatini: EID and TB Networks

EID - Conventional





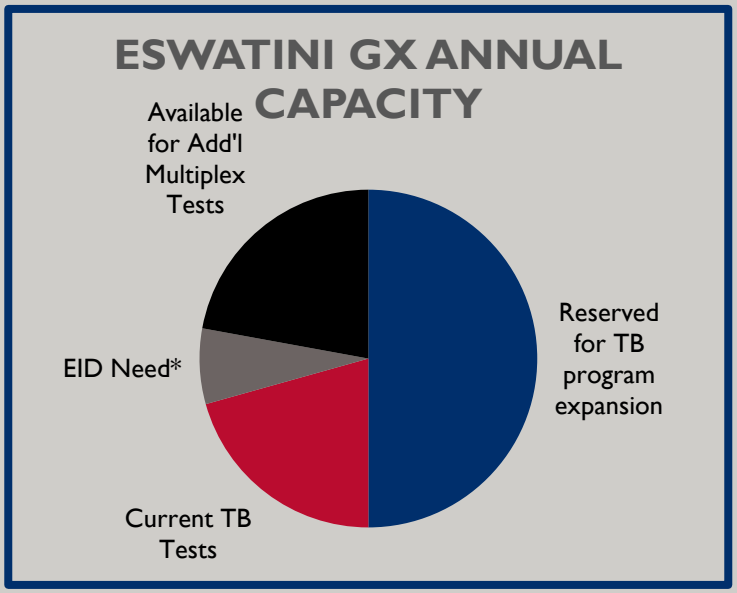
GeneXpert Capacity

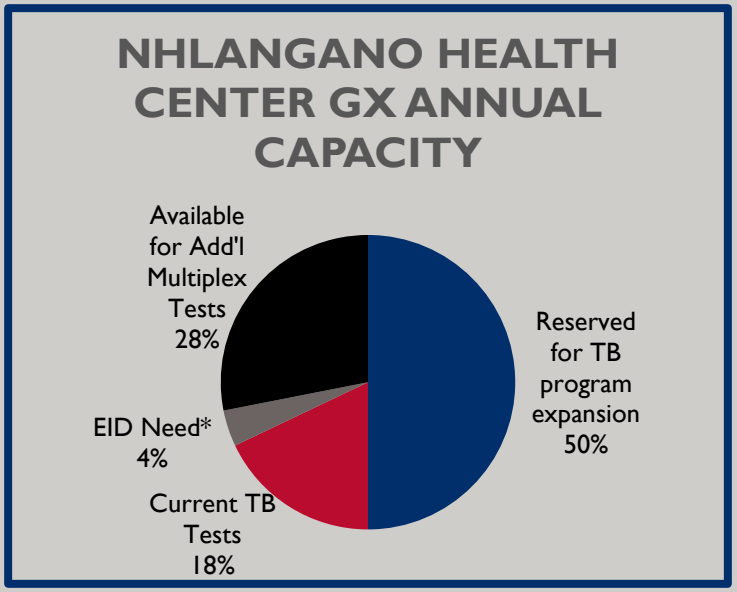


KEY TAKEAWAYS

- Centralized EID with 100% Coverage; TAT = 2 weeks
- Introduction of birth testing and focus on efficiencies
- Overlap of Genexpert footprint with HIV program sites = 100%

Eswatini: GeneXpert Capacity Assumptions



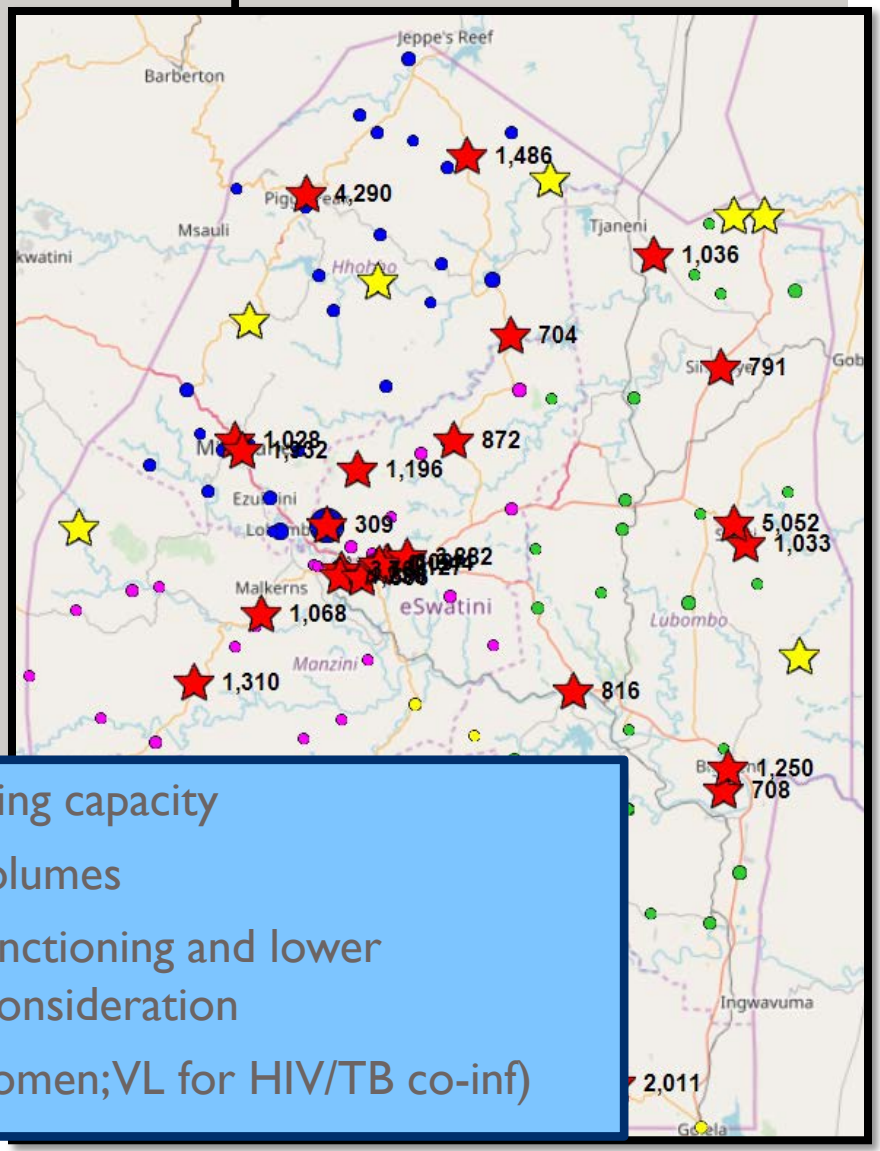


Annual Test units	eSwatini	NHLANGANO HEALTH CENTRE
Reserved for TB program expansion	77,760	5,760
Current TB Tests	32,114	2,065
EID Need*	11,235	459
VL for Pregnant Women	11,235	459
VL for HIV/TB Patients	22,479	1,445
Available for Add'l Multiplex Tests	34,411	3,236
TOTALS	155,520	1,332

eSwatini: GeneXpert Capacities

Site	Modules	Annual Cap	TB TESTS Aug '17 - July '18	Utilization	Total Available Cap	EID Available Cap	EID Need*	% EID Need
AHF LAMVELASE	4	2,880	1,131	39%	1,749	309	1,314	24%
BAYLOR C.O.E CLINIC	4	2,880	412	14%	2,468	1,028	268	100%
BHOLI CLINIC	4	2,880	732	25%	2,148	708	0	100%
DVOKOLWAKO HEALTH CENTER	4	2,880	736	26%	2,144	704	355	100%
EMKHUZWENI HEALTH CENTER	8	5,760	1,394	24%	4,366	1,486	272	100%
GOOD SHEPHERD HOSPITAL	8	5,760	1,847	32%	3,913	1,033	1044	99%
HLATHIKHULU GOVERNMENT HOSPITAL	16	11,520	3,168	28%	8,352	2,592	406	100%
LUBOMBO REFERRAL HOSPITAL	16	11,520	708	6%	10,812	5,052	155	100%
LUYENGO CLINIC	4	2,880	372	13%	2,508	1,068	285	100%
MANKAYANE GOVERNMENT HOSPITAL	8	5,760	1,570	27%	4,190	1,310	316	100%
MATSANJENI HEALTH CENTRE	8	5,760	869	15%	4,891	2,011	139	100%
AHF MATSAPHA COMPREHENSIVE HEALTH CARE	16	11,520	2,056	18%	9,464	3,704	627	100%
MATSAPHA CORRECTIONAL CLINIC	4	2,880	204	7%	2,676	1,236	12	100%
MBABANE GOVERNMENT HOSPITAL	16	11,520	3,828	33%	7,692	1,932	613	100%
NATIONAL TB HOSPITAL	16	11,520	1,878	16%	9,642	3,882	1384	100%
NHLANGANO HEALTH CENTRE	16	11,520	2,065	18%	9,455	3,695	459	100%
PHOCWENI MILITARY CLINIC	4	2,880	934	32%	1,946	506	227	100%
PIGGS PEAK GOVERNMENT HOSPITAL	16	11,520	1,470	13%	10,050	4,290	1020	100%
NATIONAL PSYCHIATRIC HOSPITAL	4	2,880	313	11%	2,567	1,127	32	100%
RFM HOSPITAL	4	2,880	2,220	77%	660	(780)	1016	0%
SIGOMBENI RED CROSS CLINIC	4	2,880	244	8%	2,636	1,196	100	100%
RSSC MHLUME	4	2,880	404	14%	2,476	1,036	102	100%
RSSC SIMUNYE	4	2,880	649	23%	2,231	791	76	100%
SIPHOFANENI CLINIC	4	2,880	624	22%	2,256	816	777	100%
SITHOBELA RURAL HEALTH CENTRE	4	2,880	292	10%	2,588	1,148	229	100%
N					,524	1,644	6	100%
T					,312	872	1	100%
U					,690	1,250	0	100%
					,406	45,646	11,235	100%

GeneXpert Current Locations

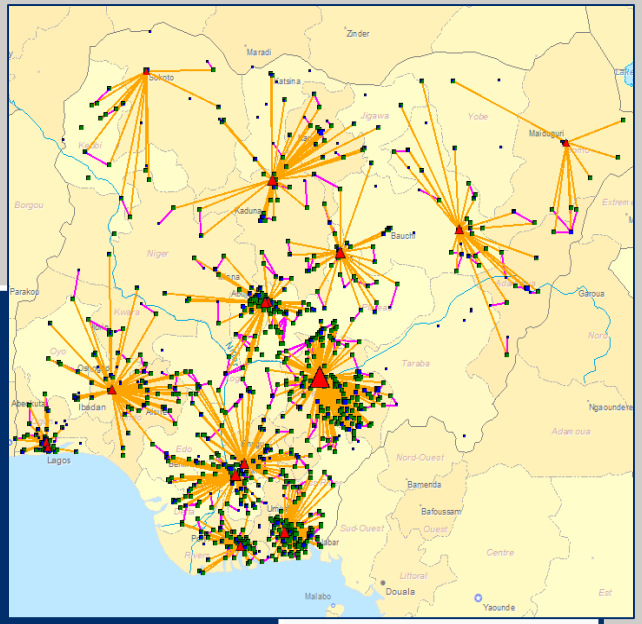


KEY TAKEAWAYS

- EID volumes are small in comparison to remaining capacity
- Placing new instruments at sites with high TB volumes
- A pilot for feasibility is recommended at high functioning and lower functioning sites: HR requirements are critical consideration
- Layering additional tests (e.g. VL for Pregnant women; VL for HIV/TB co-inf)

Country Examples:

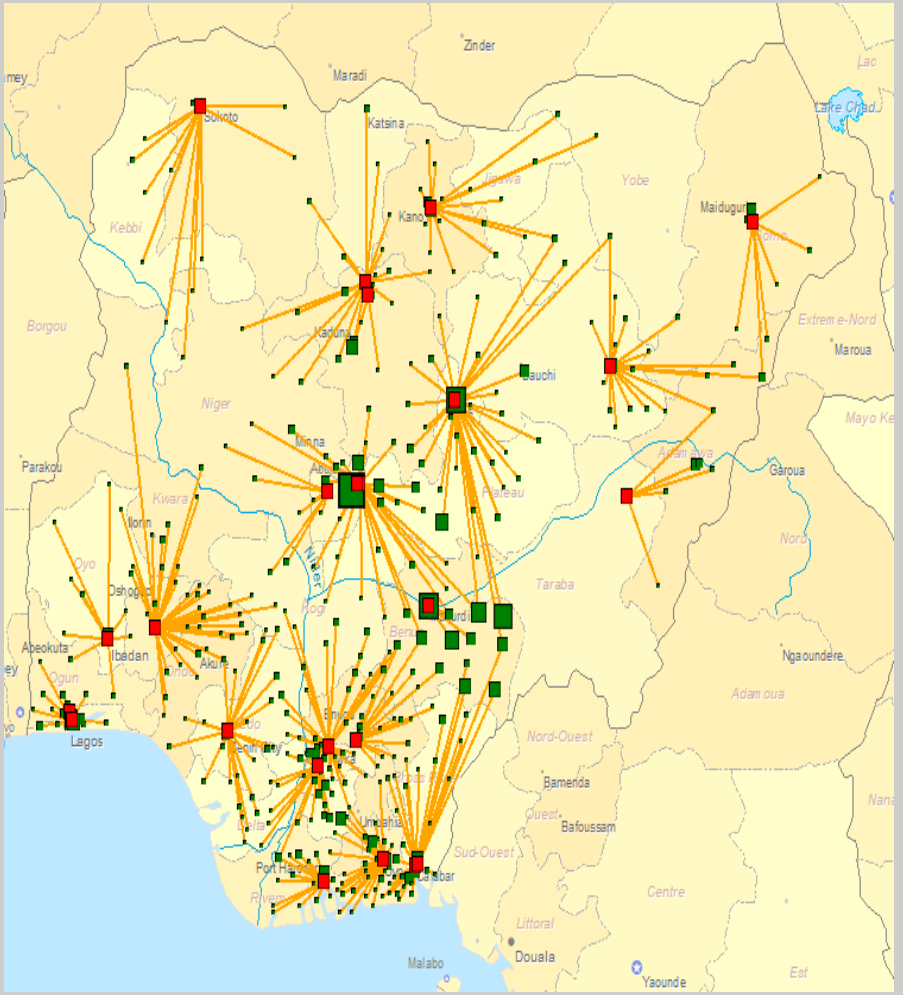
Nigeria



Nigeria: Optimizing referral linkages with existing instruments

- Not all clinic volumes assigned to the nearest lab due to capacity constraints
- 19 of 27 labs would be at full capacity
- Some clinics sending to multiple labs due to full lab capacities

Instruments placement and capacity are not aligned with the geographic distribution of patients

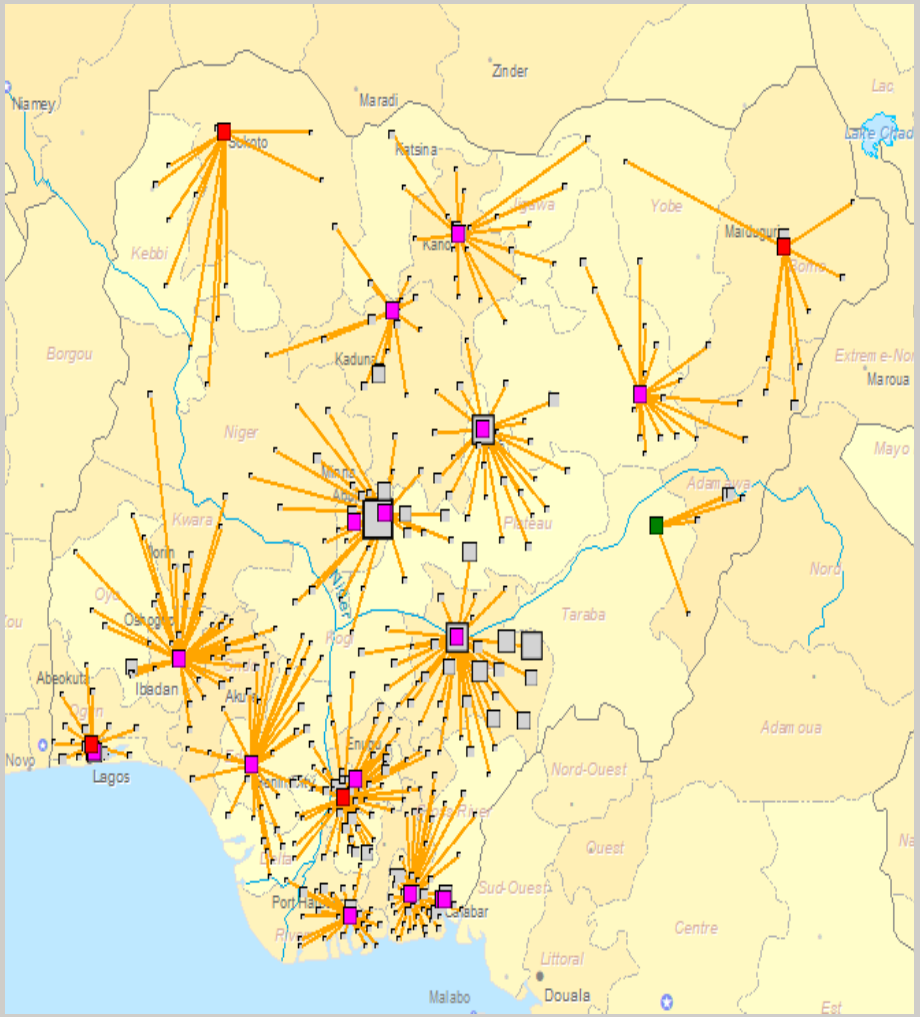


PCR Labs

ART Patient Volume

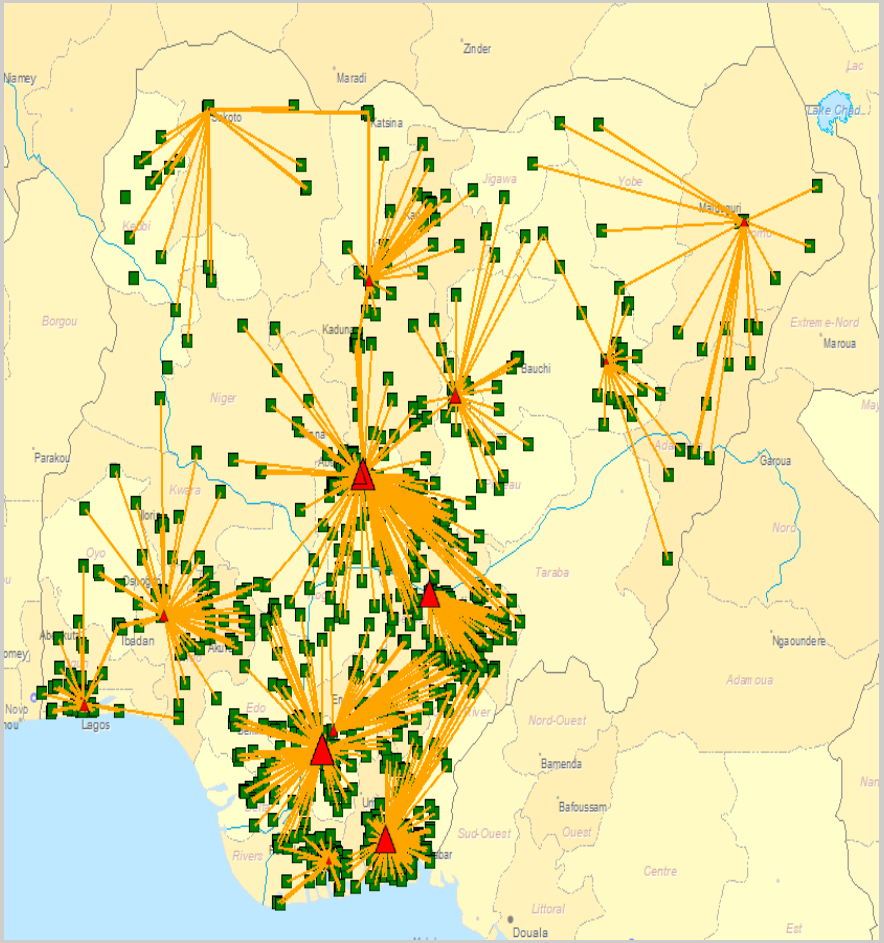
Nigeria: Selection of 11 PEPFAR Sites from Existing (GF and FGoN Locked)

- Leaving FGoN and GF Sites in place
- Removing Planned Discontinuation sites
- Selecting best 11 locations from remaining existing lab locations
- No capacity constraints (currently not enough capacity within the 16 sites)

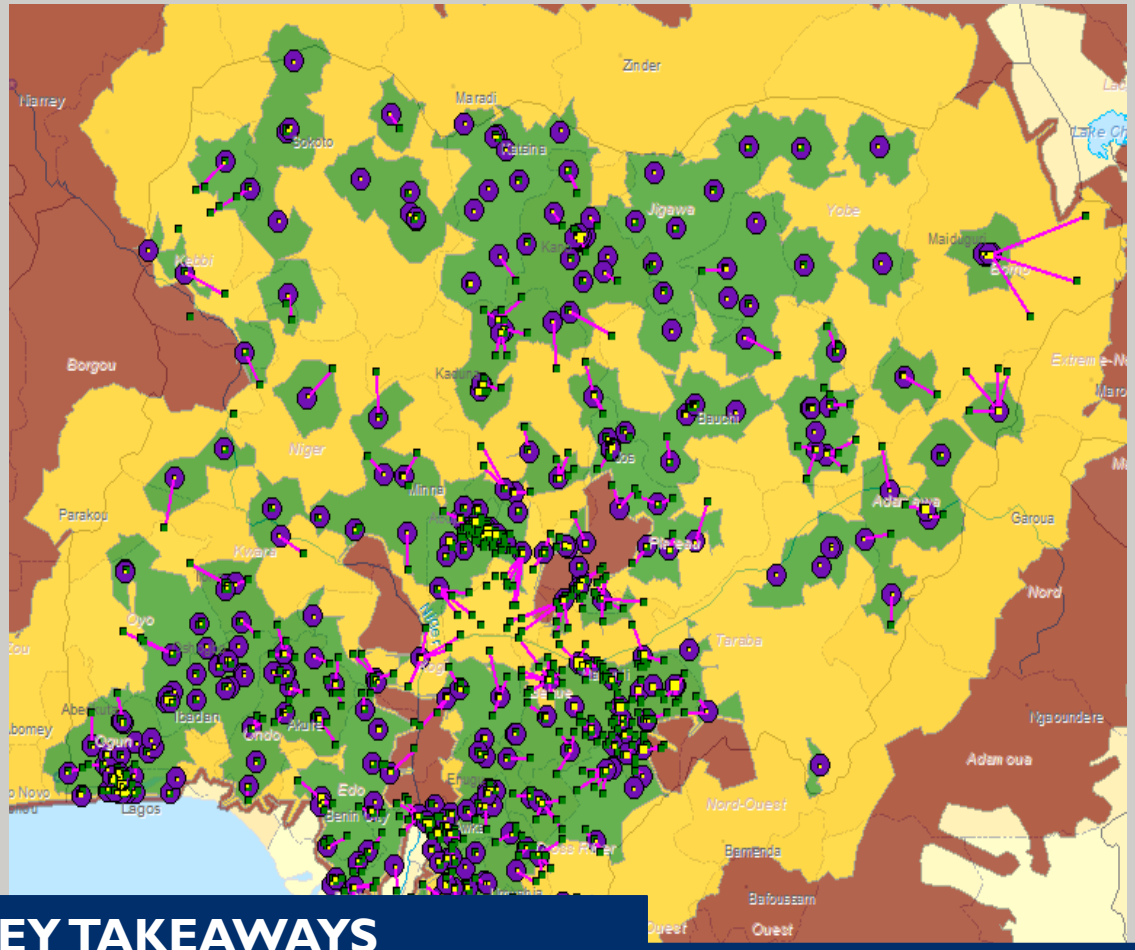


Nigeria: Updated Instrument Capacity

- Updated the capacity to expected volumes
  - Adding high-throughput machines in 6 locations
- Changes to the "optimal" referral assignments
  - Most significant changes to Benue
  - Tests get re-routed to Abuja area when realistic future capacities are included
- Average Distance and Ranges stay the same



Nigeria: TB Expert Site Coverage (over HIV site footprint)



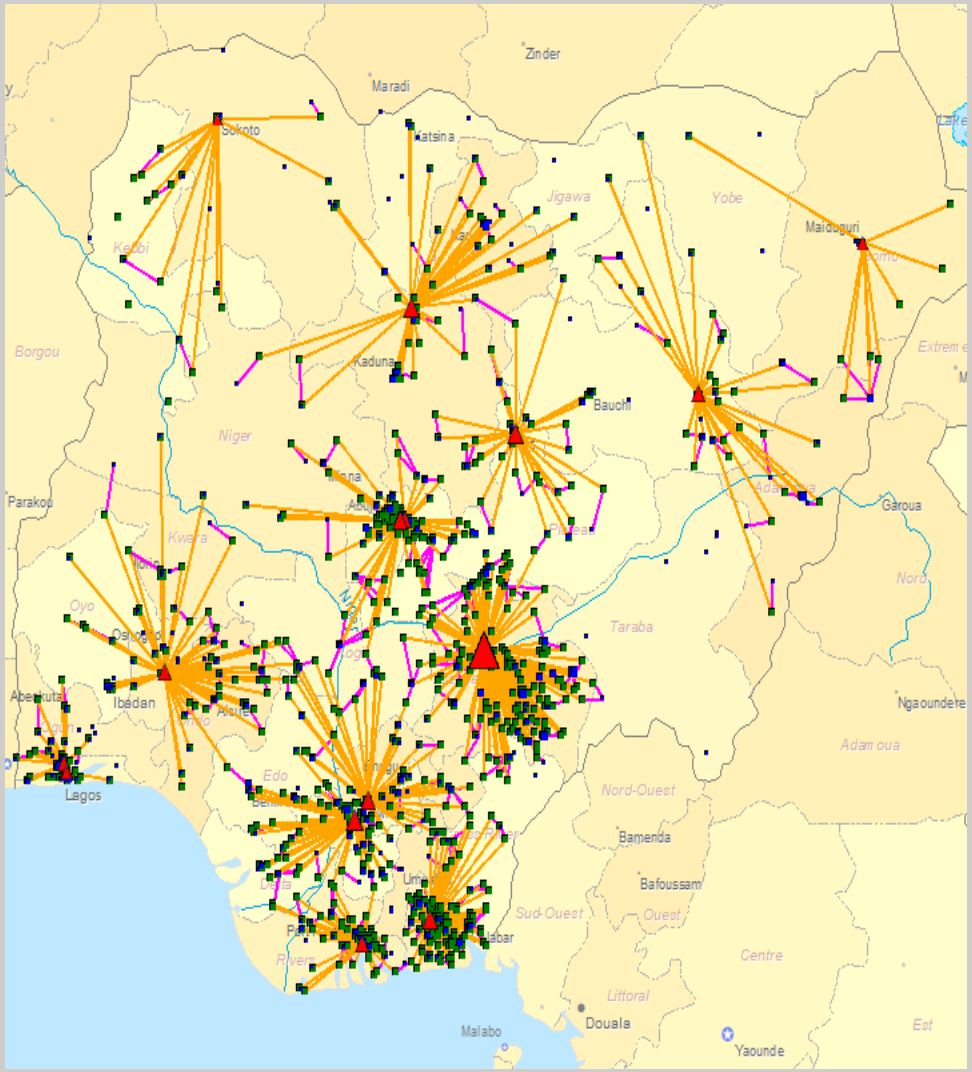
Key

- Green: within 50 kms
- Yellow: Between 50 and 200 kms
- Red: Beyond 200 km

KEY TAKEAWAYS

- TB and HIV sample collection sites overlapped by over 85%
- Heavy concentration of Genexpert instruments in urban areas with low utilization

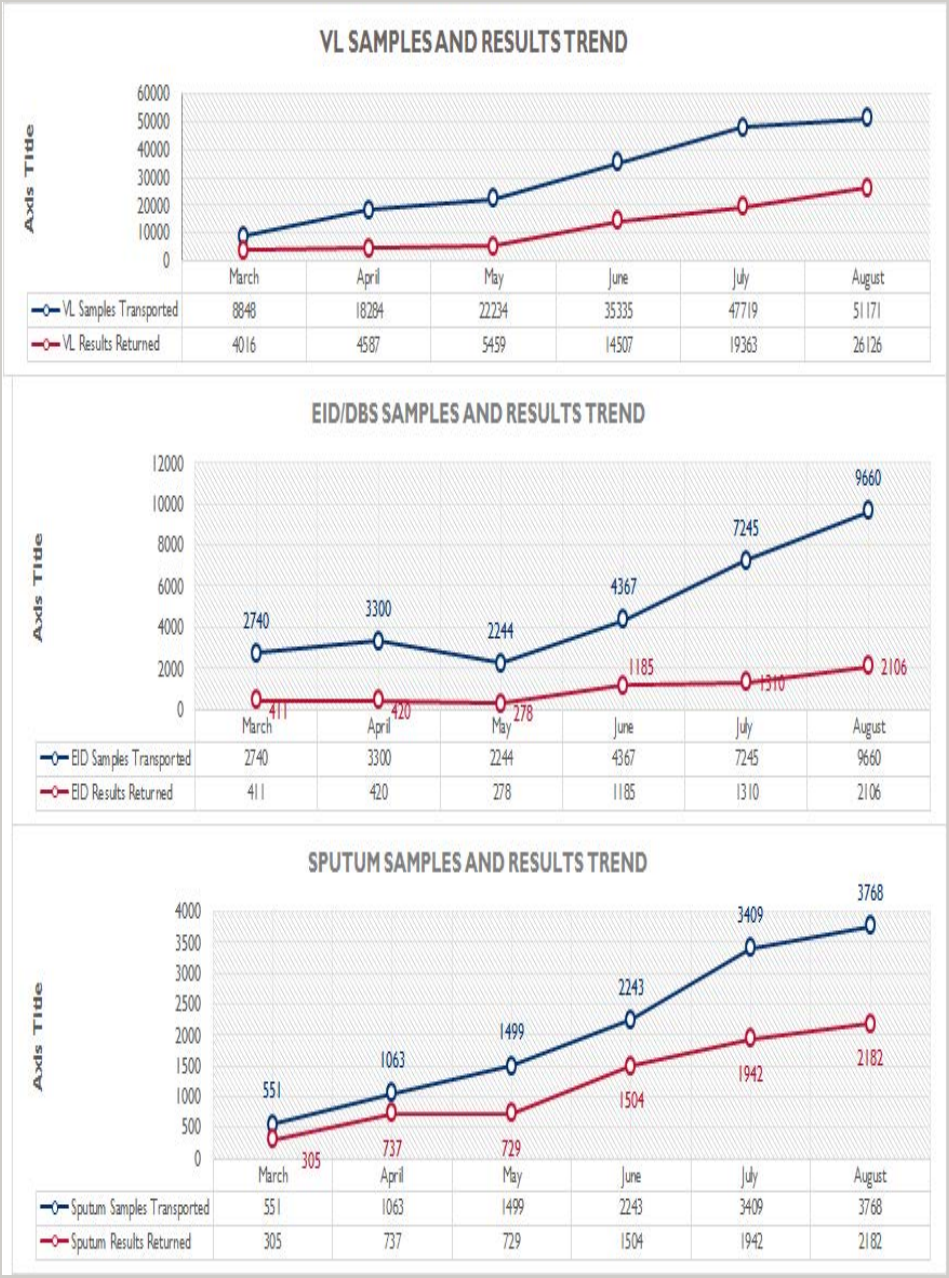
Nigeria: Integrated PCR and TB Sample Referral Network



Nigeria Laboratory Optimization

Network Efficiencies Gained:

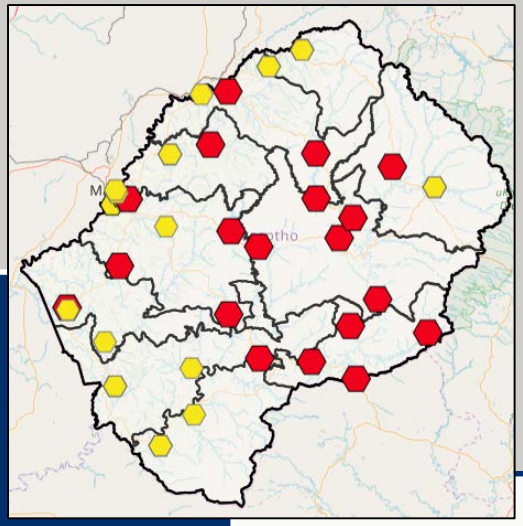
- Reduction in footprint from 27 to 16 labs
  - 11 PEPFAR-supported sites
- Cost reduction due to optimized network footprint and integrated SR estimated at 40%
- Testing volumes increased by 1,001%
- 7-fold increase in specimens (sputum, DBS, VL, CD4) transported
- Health facility coverage increased from 1,700 to 2,969 (+75%)
- Sample rejection rates were reduced from 36% to 8%



Publication: Faruna, T., Akintunde, E. Odelola, B., Leveraging private sector transportation/logistics services to improve the National Integrated Specimen Referral Network in Nigeria, Business Management Dynamics, Vol 8, No.7, Jan 2019, pp.08-20

Country Examples:

Lesotho



Lesotho: HIV VL, EID, and TB Instruments

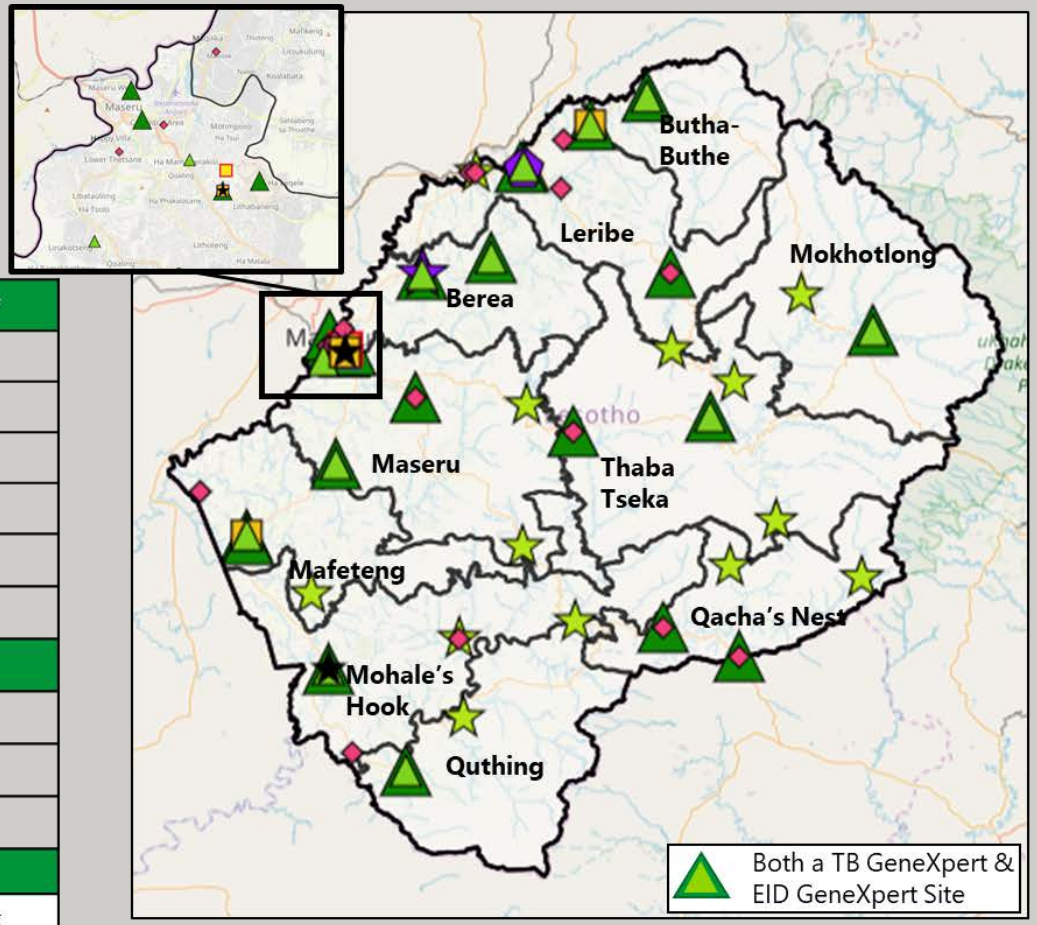
Instrument Overview: ALL

Current: 35 Test Sites & 72 Machines

Projected: 46 Test Sites & 87 Machines

Marker	Equipment Type	Total #
◆	Alere-Q	15
▲	GeneXpert	50
■	Roche CAP/CTM48	1
■	Roche CAP/CTM96	3
⬟	Roche 4800	2
★	Hologic Panther	1
Current State: Grand Total		**72**
☆	GeneXpert (Mini-Labs)	13
☆	Roche 4800	1
★	Hologic Panther	1
Projected: Grand Total		**87**

*Roche CAP/CTM96 @ NRL does both EID & VL testing

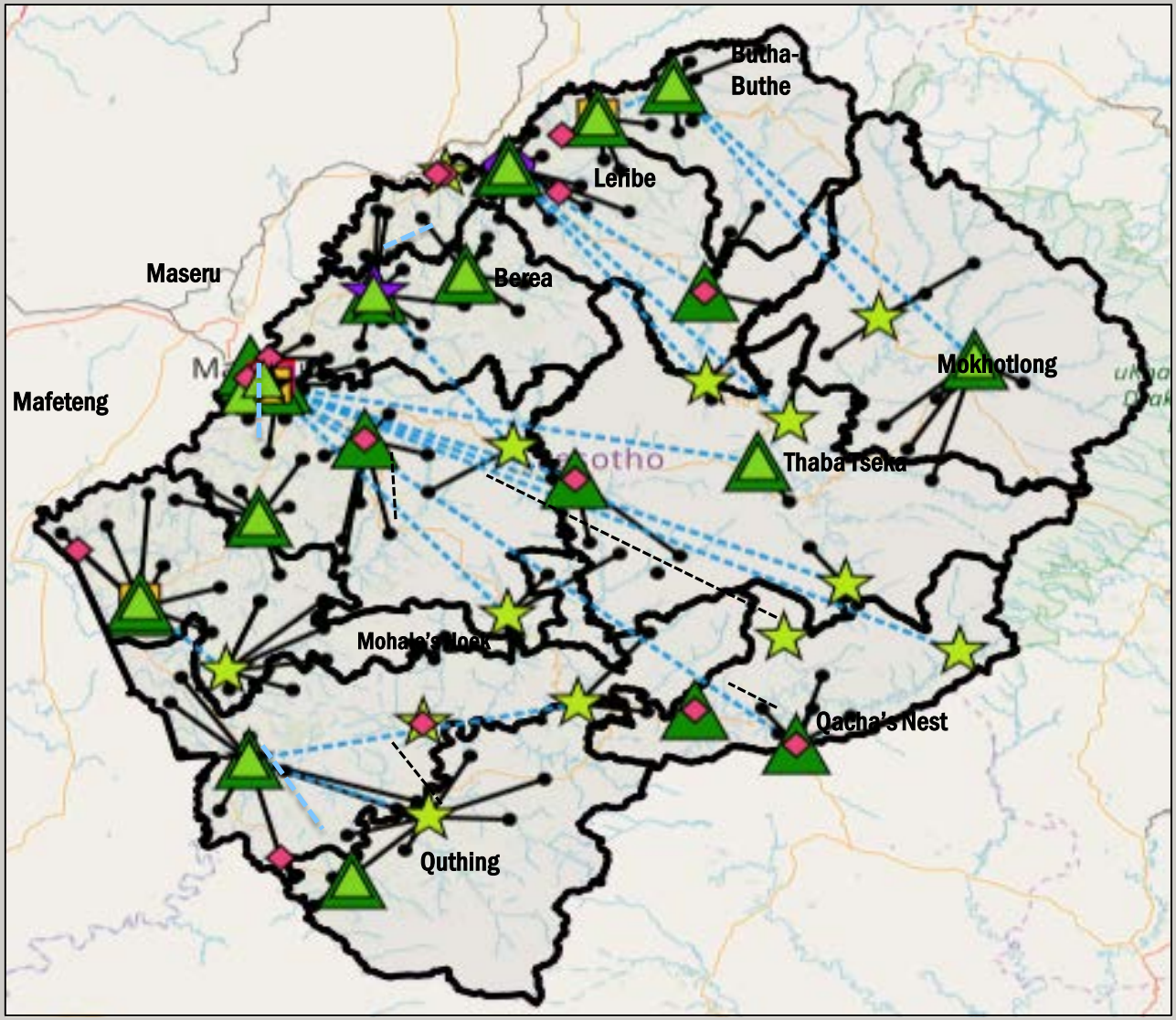


Data Source: Lesotho_LabEQIP Template (VL) & GeneXpert Directory – 2019 (MOH) & URC Comments

Viral Load Utilization

Facility Name	Machine(s)	Annual Site Testing Capacity	FY2020 Baseline Utilization	FY2020 Finalized Current State 70% Coverage	FY2020 Finalized Targets Achieved
B1011: Botha-Bothe HOSP	Roche CAP/CTM 96 (1) Roche C4800 (1)	34,560 44,640	116% 39,925	86% 29,687	95% 42,410
C1011: Motebang HOSP	Roche C4800 (1) Hologic Panther (1)	46,080 76,800	135% 62,354	109% 50,040	93% 71,485
D1011: Berea HOSP	Roche C4800 (1)	46,080	94% 43,444	66% 30,282	94% 43,260
NRL	Roche CAP/CTM 96 (1) Roche C4800 (1) Roche C4800 (1) Hologic Panther (1)	156,000 166,080	108% 168,227	65% 100,633	87% 143,761
A4021: Bots-abelo Leprosy HOSP (PIH)	Roche CAP/CTM 48 (1)	20,160	41% 8,282	63% 12,722	90% 18,174
E1011: Mafeteng HOSP	Roche CAP/CTM 96 (1) Roche C4800 (1)	34,560 44,640	306% 105,641	83% 28,824	92% 41,177
F1011: Nts'ekhe HOSP	Hologic Panther (1)	76,800		62% 47,324	88% 67,606
		414,240 475,200	427,873	299,511	427,873

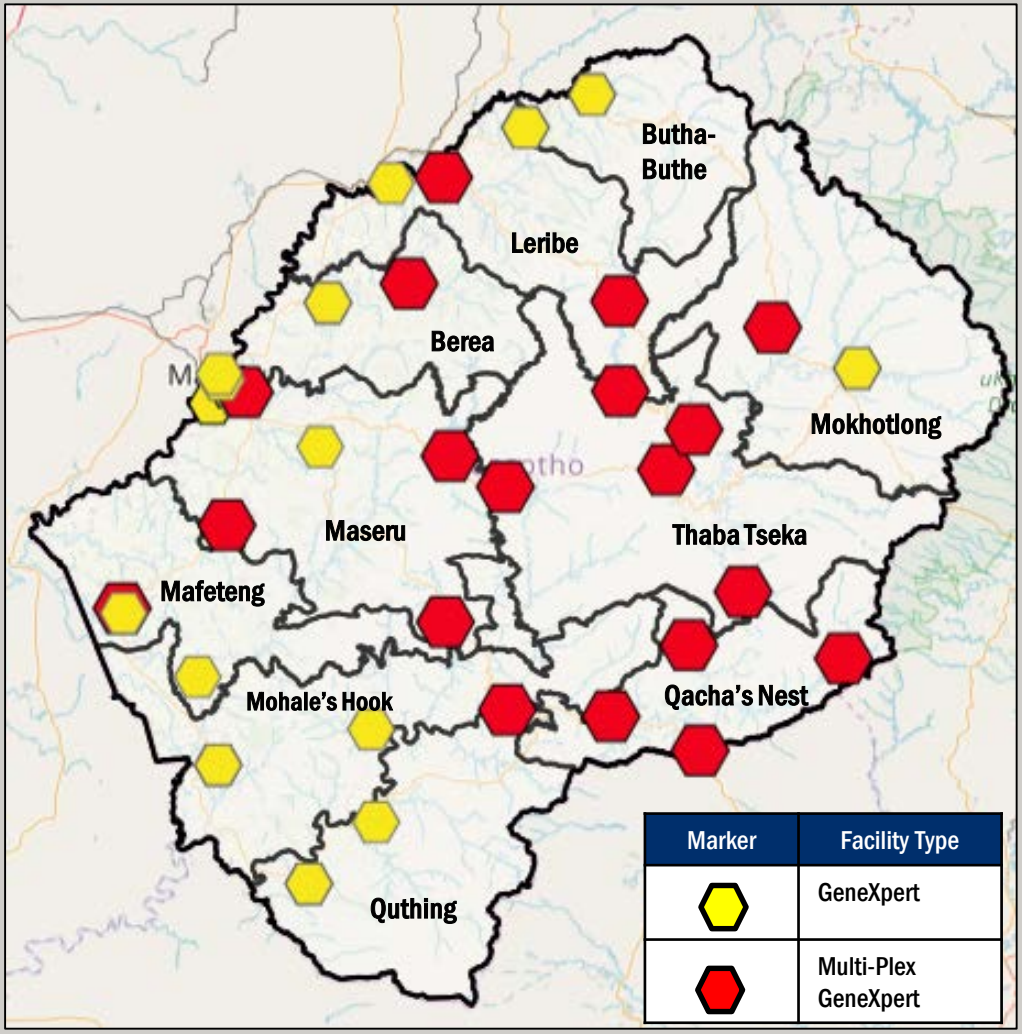
Lesotho: FY2020 Optimized Integrated Sample Transport Network



Indicator	Route Type
———	Health Facility to Hub
- - - -	Hub to Lab

Marker	Equipment Type
◆	Alere-Q
▲	GeneXpert
□	Roche CAP/CTM48
■	Roche CAP/CTM96
⬟	Roche 4800
★	Hologic Panther
Current State: Grand Total	
★	GeneXpert (Mini-Labs)
★	Roche 4800
★	Hologic Panther
Projected: Grand Total	
*Roche CAP/CTM96 @ NRL does both EID & VL testing	

Multiplexing Opportunities



- 70% of the GeneXpert capacity dedicated for TB Testing
- Reviewed TB & EID combined capacities to assess VL opportunity
- BFPW prioritized
- 19 potential mulitplexed sites

Thank you

For additional information, please contact **Jason Williams** (jwilliams@usaid.gov) and/or **Dianna Edgil** (dedgil@usaid.gov) for additional information

PEPFAR

U.S. President's Emergency Plan for AIDS Relief

PEPFAR's Approach for Diagnostic Network Optimization

September 12, 2019

Understanding Diagnostic Networks

- Diagnostic Network Challenges
- The Network Approach
- What is Diagnostic Network Optimization
- PEPFAR's STTT Process for Network Optimization
- Challenges
- Specific Considerations/Assumptions

Diagnostic Network Challenges

- ***Areas of focus:*** *Instrument placement, sample transport, patient access to appropriate testing services to derive a complete* ***diagnostic network approach***
- ***Challenges***
  - Resource limitations for continued expansion of testing services
  - Fragmented and parallel sample transport networks
  - Suboptimal instrument placement and utilization
  - Insufficient patient access to appropriate testing services
  - Limited visibility into complete diagnostic capabilities
  - Diverse strategies and implementation approaches across donors, implementing partners and laboratory stakeholders

Benefits and Efficiency Gains

- **Increased testing coverage, reduced testing turnaround times and improved patient care**
- Elimination of duplicative referral lanes (HIV CD4/ VL/ IVT, HPV, HCV and TB GeneXpert/ Culture/ LPA)
  - Leverage overall investment in sample transport
  - Ensure standardization – reporting and oversight
- Evidence based instrument placement for improved patient access and/ or increased utilization
- Reduced commodity distribution burden and needs
- Reduced instrument maintenance obligations
- Forward looking strategy to increase negotiation leverage with manufacturers and vendors

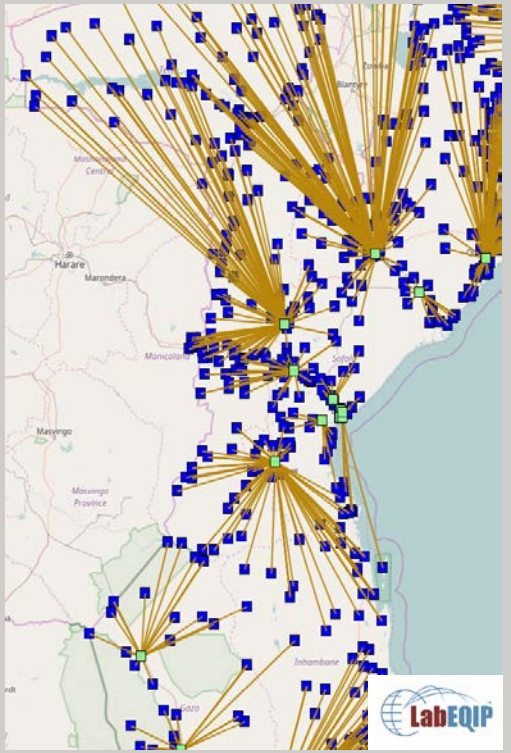
What is Network Optimization?

Areas of focus: *Instrument placement, integrated sample transport, improved patient access to appropriate testing services to derive a complete diagnostic network approach*

Equipment Name	Test Type	Daily Max Throughput

Optimization

- The action of making the best or most effective use of a situation or resources



Network Optimization and Modeling

- Use of data in decision-making tools
- Explore various what-if scenarios
- "Virtual Piloting"
- Not a one-time action or the final answer

PEPFAR's Short Term Task Team: A Two-Step Approach to Network Optimization

Step 1

- Ensure complete national stakeholder **buy-in and political will**
- Work with country teams to **collect data** from MOH and PEPFAR (Datim) data sources to complete a modified LabEQIP template
- **Data to include** – existing testing sites, instruments, testing volumes, sample collection sites, programmatic patient demands by site, existing referral area, and turnaround times.
- **Desktop-assessment** of the existing HIV diagnostic network to calculate testing site capacity versus testing need and turnaround times.
  - Identification of geographically-localized gaps for rapid corrective action
  - Prioritization of countries with insufficient or excess (>150%) HIV molecular testing capacity and/ or VL/ IVT turnaround times that exceed targets for expanded (**Step 2**) optimization exercises

→ **Repeat Step 1** routinely for continuous quality improvement

PEPFAR's Short Term Task Team: A Two-Step Approach to Network Optimization

Step 2

- Clearly **define the country goal** – priorities for expanded optimization
- **Collect additional data** for geospatial analysis and modeling assumptions
- Import data into a **GIS visualization** tool
- **Present outputs** to refine assumptions, establish data gaps and further refine expectations for the optimization
- Establish a **stakeholder workshop** - present initial models
- **Complete full data review with stakeholders** – testing sites, instruments, testing volumes, sample collection sites, programmatic patient demands by site, existing referral linkages and further refine models
- Develop a prioritized, time-bound **implementation** plan

Challenges to Network Optimization

- Demand is high! High LOE
- Quality of exercises depends on high quality data
  - Testing site, clinical site and linkage data requirements
- Clearly defining the core questions of optimization
  - Disease Integration: Efficiency that considers centralized and de-centralized strategies to improve patient access to testing
- Political boundaries versus proximity-driven placement
- Sample referral optimization vs. molecular network optimization (right sizing vs. expansion)
- Investment in sample referral networks
- Ensuring ***political will*** and coordination with implementation
- Lab infrastructure and capacity

Thank You