Public Health Laboratory Workforce Development in Africa for Surveillance Laboratory Networks and Clinical Care

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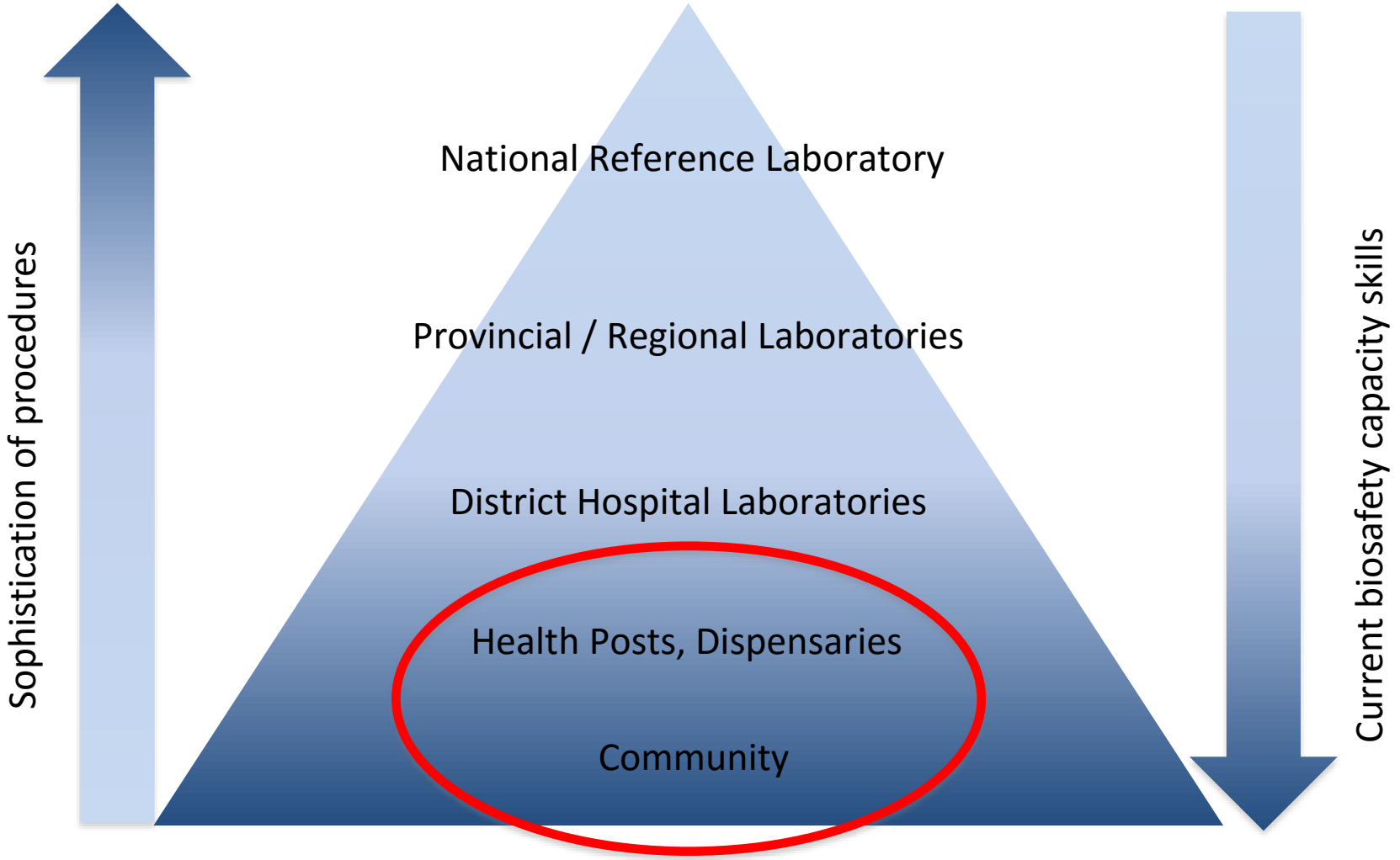
CLINTON HEALTH ACCESS INITIATIVE

Tiered Network of Diagnostic Capacity



Laboratory Workforce Development

- The laboratory workforce demands of surveillance and clinical care are significant
  - Essential clinical diagnostic testing skills
  - IDSR-based capacity for surveillance and outbreak investigation

- The diagnostic-related workforce: laboratory scientists and technicians, community health workers, pathologists, clinicians, etc

Surveillance

- Effective IDSR can save lives, reduce the intensity of outbreaks (Somda *et al*., 2010) and enable countries achieve IHR requirements
- Requires basic surveillance capacities at each level from community to national levels
- Ability to identify, collect and communicate and respond to the right samples and data is important, especially at community levels

Clinical diagnostics

"Time for an essential diagnostics list"

Schroeder et al., NEJM, 2016

Selected Laboratory Tests That Are Required for Use of Medicines on the WHO Model List of Essential Medicines (EML).

Test	No. of Medicines on EML	EML Categories
Complete blood count	136	Affecting blood; anesthetics; antidotes; antiepileptics; antihepatitis; antiinfectives; antimigraine; antiparkinsonism; blood products; cardiovascular; dermatologic; diuretics; gastrointestinal; hormones; immunologics; ophthalmic; oxytocics; palliative; psychiatric; rheumatologic
Liver enzymes	104	Anesthetics; antidotes; antiepileptics; antihepatitis; antiinfectives; antimigraine; antiparkinsonism; cardiovascular; diuretics; gastrointestinal; hormones; oxytocics; palliative; psychiatric; rheumatologic; vitamins
Renal function	92	Anesthetics; antiallergics; antidotes; antiepileptics; antihepatitis; antiinfectives; antimigraine; antiparkinsonism; blood products; cardiovascular; diagnostic agents; diuretics; ear, nose, and throat; gastrointestinal; hormones; immunologics; palliative; psychiatric; respiratory; rheumatologic
Microscopy	85	Antiinfectives; blood products; dermatologic; hormones
Urinalysis	64	Anesthetics; antidotes; antiepileptics; antihepatitis; antiinfectives; blood products; cardiovascular; electrolyte solutions; gastrointestinal; hormones; immunologics; oxytocics; psychiatric
Nucleic acid testing, microbiology	62	Antihepatitis; antiinfectives; hormones; immunologics; ophthalmic
Electrolytes	56	Anesthetics; antiallergics; antidotes; antiinfectives; cardiovascular; diuretics; electrolyte solutions; ear, nose, and throat; gastrointestinal; hormones; ophthalmic; palliative; psychiatric; respiratory
Microbiologic culture (includes drug sensitivities)	51	Antiinfectives; dermatologic; immunologics; ophthalmic
Glucose	42	Affecting blood; antiallergics; antidotes; antiinfectives; cardiovascular; electrolyte solutions; gastrointestinal; hormones; immunologics; neonatal; palliative; psychiatric
Antigen testing (microbiology)	42	Antihepatitis; antiinfectives; gastrointestinal; immunologics
Serology (microbiology)	41	Antihepatitis; antiinfectives; hormones; muscle relaxants; ophthalmic
Human chorionic gonadotropin	30	Affecting blood; antidotes; antihepatitis; antiinfectives; hormones; immunologics; psychiatric
Biochemical bacterial typing	27	Antiinfectives; immunologics; ophthalmic
Lipid panel	24	Antiinfectives; cardiovascular; hormones; psychiatric
Lymphocyte CD4	21	Antiinfectives; immunologics
Blood-gas testing	18	Affecting blood; anesthetics; antidotes; antiinfectives; electrolyte solutions; hormones; muscle relaxants; neonatal
Coagulation function	14	Affecting blood; antiepileptics; antiinfectives; blood products; hormones; immunologics; psychiatric
Glycated hemoglobin	11	Antiinfectives; cardiovascular; hormones; immunologics; neonatal; psychiatric
Calcium	10	Antiallergics; antidotes; cardiovascular; diuretics; ear, nose, and throat; gastrointestinal; palliative; respiratory; vitamins

POC diagnostics products: available and pipeline*

SAMBA VL
DDU/Cambridge

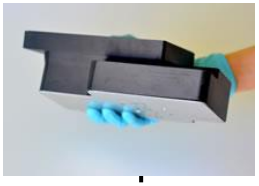
Alere q
Alere

GeneXpert
Cepheid

Truelab PCR
Molbio/bigTec

Savanna Viral Load Platform
NWGHF

EOSCAPE HIV™
Wave 80



RT CPA HIV-1 Viral Load Ustar

ZIVA™
Cavidi

Gene-RADAR
Nanobiosm

Daktari™ System

SAMBA EID
DDU/Cambridge

LYNX HIV p24 Antigen
NWGHF

Viral Load Assay with BART Lumora

COBAS® Liat™ Analyzer (Iquum)

2013 2014 2016 2018

*Estimated as of December 2014; timeline and sequence may change. ---· No market launch date set by company.
Platforms in red have specific EID assay.

Workforce development examples

- African Field Epidemiology Network (AFENET)
- Strengthening Laboratory Management Towards Accreditation (SLMTA)
- Community Quality Corps and Laboratory Corp Initiatives

AFENET
African Field Epidemiology Network
A healthier Africa

AFRICAN FIELD
EPIDEMIOLOGY NETWORK

Public Health Disease Surveillance and Effective Response Systems

- Field epidemiology and laboratory training programs in over 13 countries in Africa - over 10 years and hundreds trained
- Training public health personnel in Integrated Disease Surveillance & Response and data management.
- Joint training of epidemiologists, veterinarians, and laboratory technicians, in line with the “One Health” initiative.

AFENET
African Field Epidemiology Network
A healthier Africa

AFRICAN FIELD
EPIDEMIOLOGY NETWORK

AFRICAN
One Health e-Surveillance Initiative (OHSI)

- The One Health e-Surveillance Initiative develops strategic plans for implementing One Health electronic surveillance within the context of Integrated Disease Surveillance and Response (IDSR) and the International Health Regulations (IHR) 2005.
- The project is implemented in five pilot countries; Burkina Faso, Cameroon, Kenya, Nigeria and Uganda

Strengthening Laboratory Management Toward Accreditation

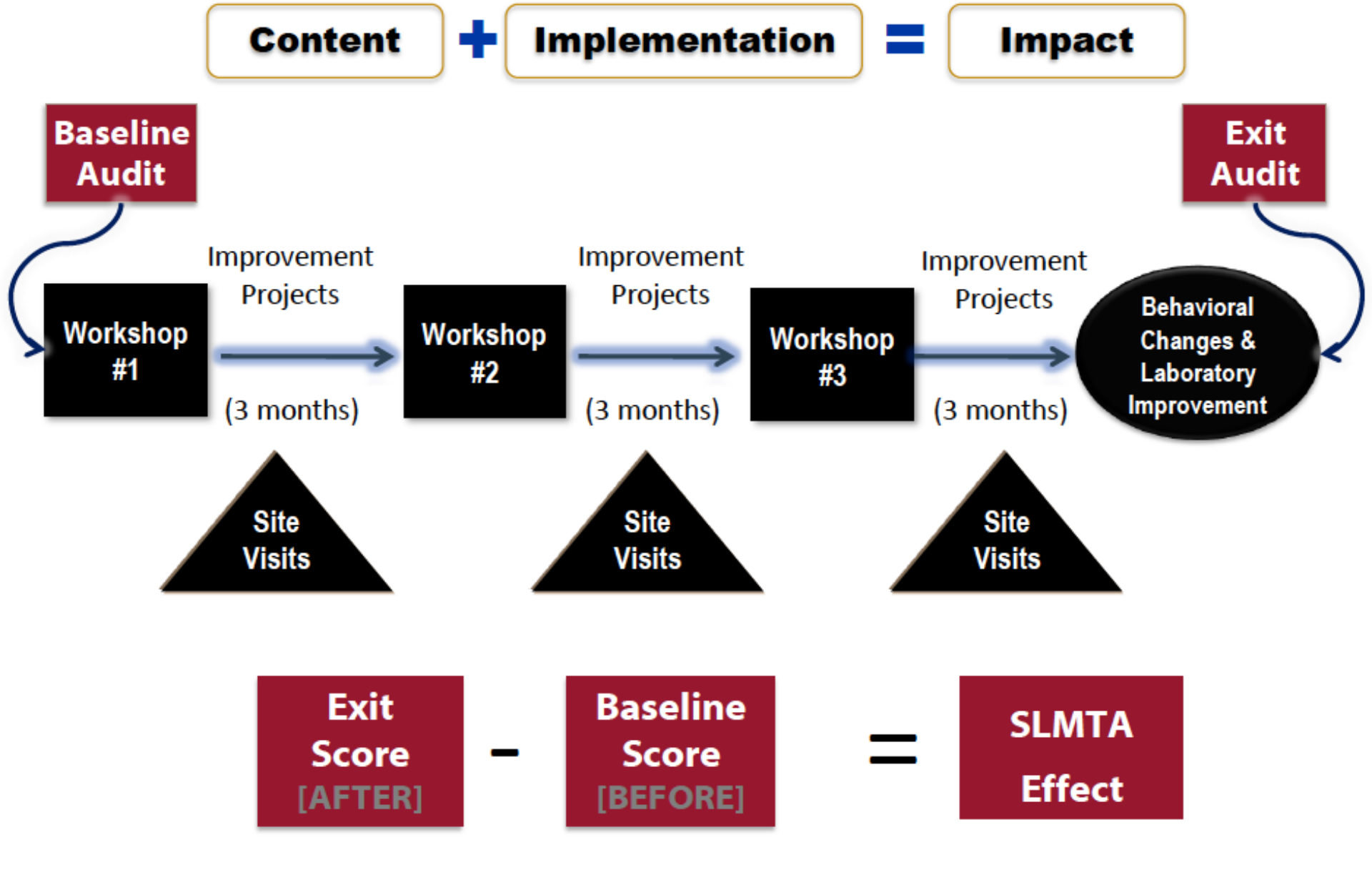
An Innovative Tool for Quality Improvement

A *structured* quality improvement program that teaches laboratory managers *how to* implement *practical* Quality Management Systems using *available resources*

Designed to achieve *immediate, measurable* results

Launched in 2009 by WHO AFRO concurrently with the stepwise laboratory accreditation preparation scheme (branded SLIPTA in 2011)

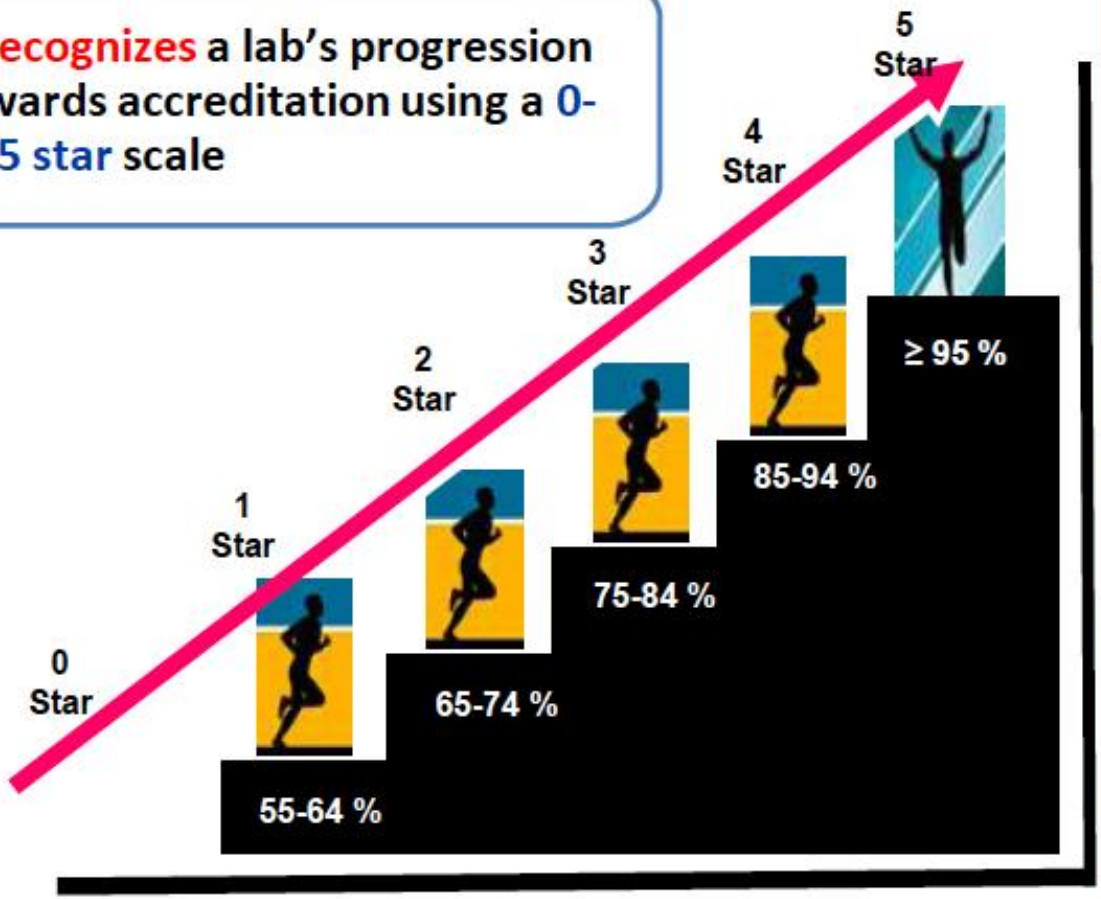
The SLMTA Process



Stepwise Laboratory Quality Improvement Process Towards Accreditation

It measures the level of quality using an ISO 15189-based audit checklist with 111 items totaling 258 points

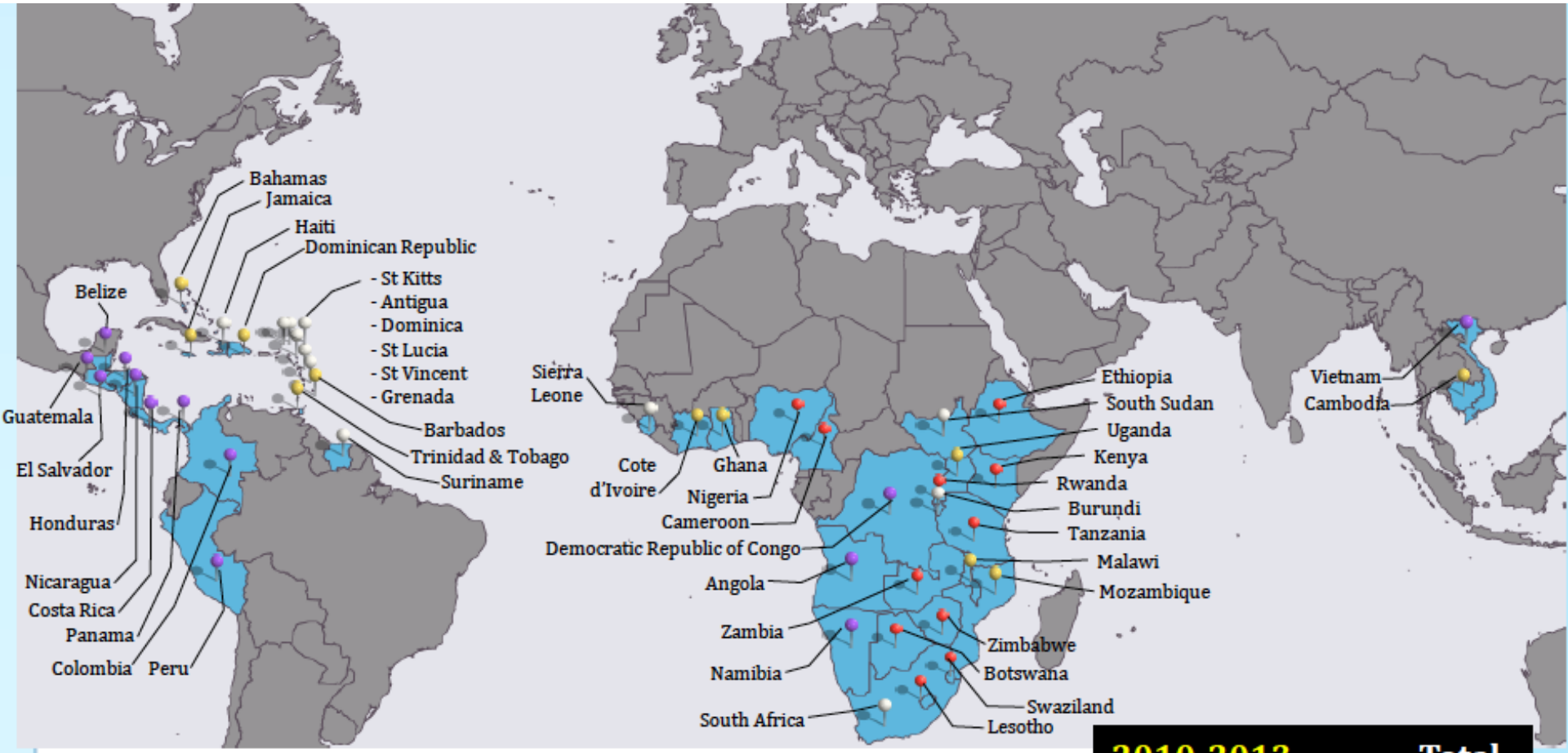
It recognizes a lab's progression towards accreditation using a 0-to-5 star scale



World Health Organization
REGIONAL OFFICE FOR Africa

Stepwise Laboratory Quality Improvement Process Towards Accreditation (SLIPTA) Checklist

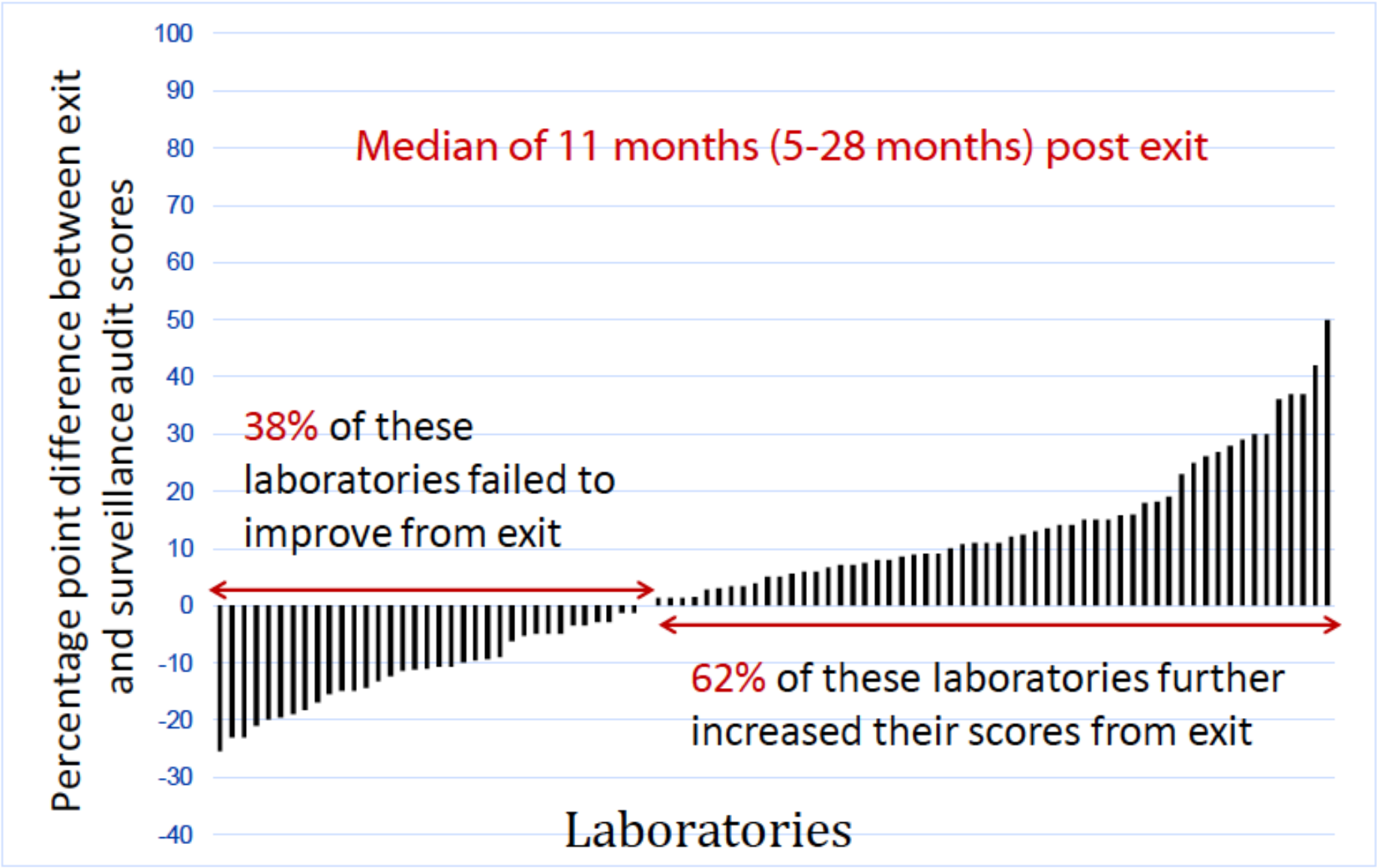
Audit Sections	Score
Section 1: Documents and Records	25
Section 2: Management Reviews	17
Section 3: Organization & Personnel	20
Section 4: Client Management & Customer Service	8
Section 5: Equipment	30
Section 6: Internal Audit	10
Section 7: Purchasing & Inventory	30
Section 8: Process Control and Internal & External Quality Assessment	33
Section 9: Information Management	18
Section 10: Corrective Action	12
Section 11: Occurrence Management & Process Improvement	12
Section 12: Facilities and Safety	43
TOTAL SCORE	258



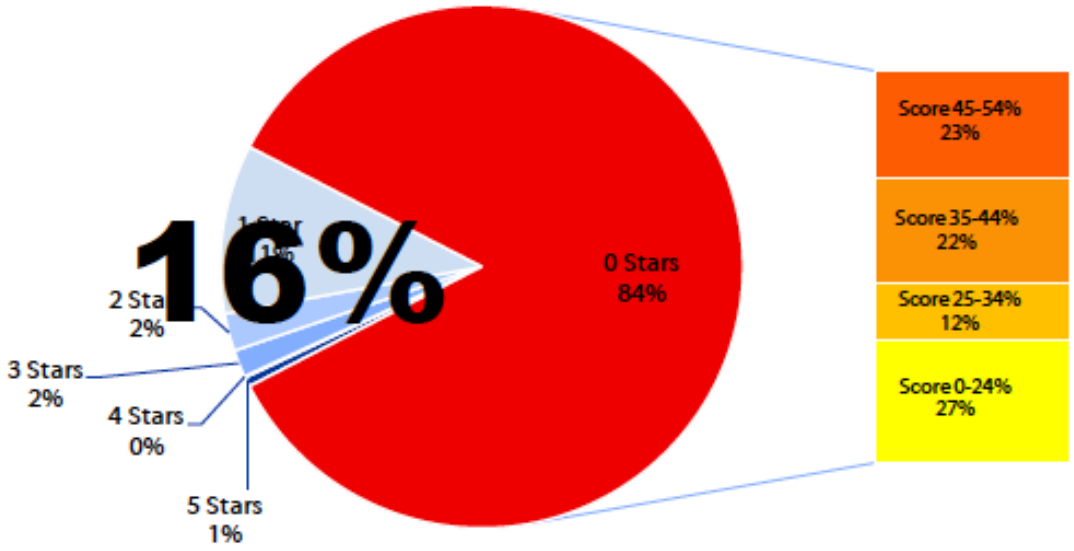
Year when SLMTA was initiated: 2010 2011 2012 2013

2010-2013	Total
# countries	47
# labs enrolled	617
# people trained	1,923

Lab performance improvement after SLMTA



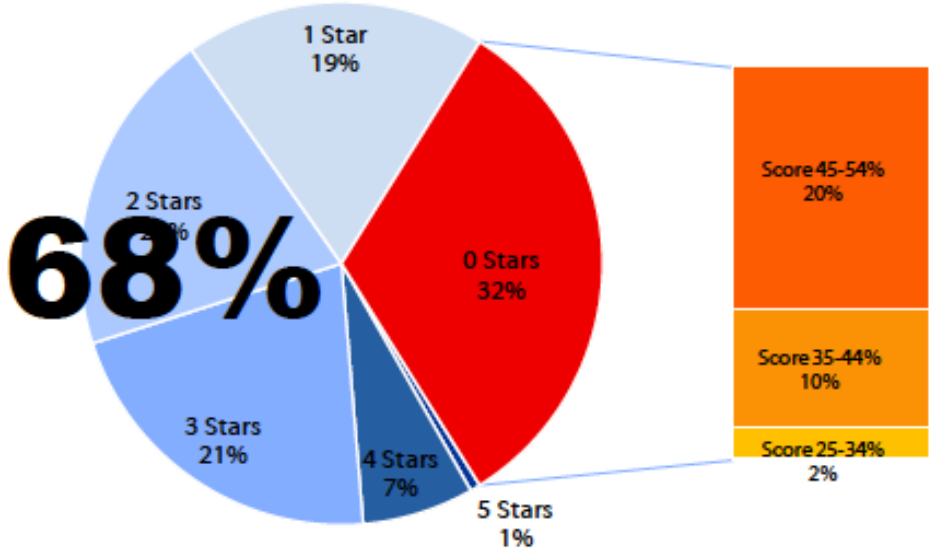
Estimated proportion of 43.5 million laboratory tests performed by star level before and after SLMTA implementation (*n*=302)



Before SLMTA

16% of tests done in laboratories with at least 1 star

23 million tests were done by labs
0 stars before → 1 or ↑ stars



After SLMTA

68% of tests done in laboratories with at least 1 star

Community Lab Corps and Q-Corps

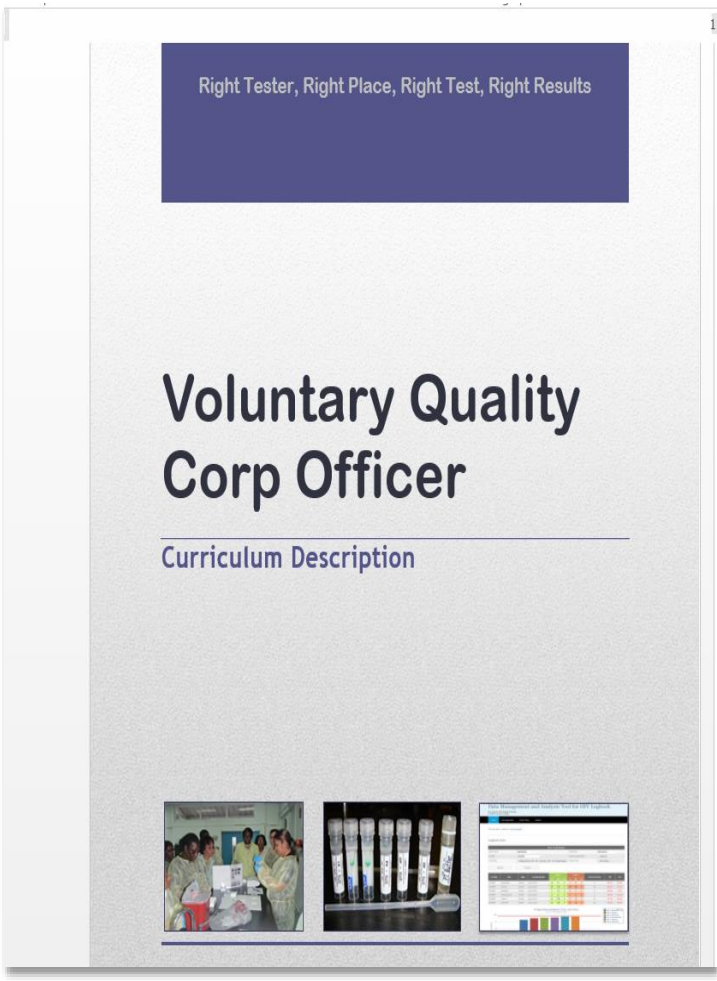
- Auxiliary health workers
- Health extension workers
- Volunteer community health workers

Community lab worker training

- Simple essential diagnostics, e.g. malaria, HIV, Syphilis, Tuberculosis, reproductive health, anaemia, high blood pressure, and diabetes
- Testing quality oversight and supervision
- IDSR-related surveillance and disease outbreak support
- Safe collection packaging, and shipping of specimens for referral testing for clinical, surveillance or outbreak response, safe waste disposal

Quality Corps Volunteer Program

- Innovative approach to assist strengthen Community POCT QA network by
- Helping ensure national coverage of HIV Testing Services
- Increasing the uptake of quality assurance activities in HTC settings.
- Intended to give the opportunity to new graduates or community volunteers to address issues around workforce while gaining invaluable experience.
- Partnership between ASLM and CDC to develop training program



Responsibilities of Q-Corps

Q-Corps Level I

- Deliver logbooks/DTS panels to testing sites
- Collect logbook data from site to district
- DTS panels data from sites to NRL
- Ensure delivery of supplies to the sites

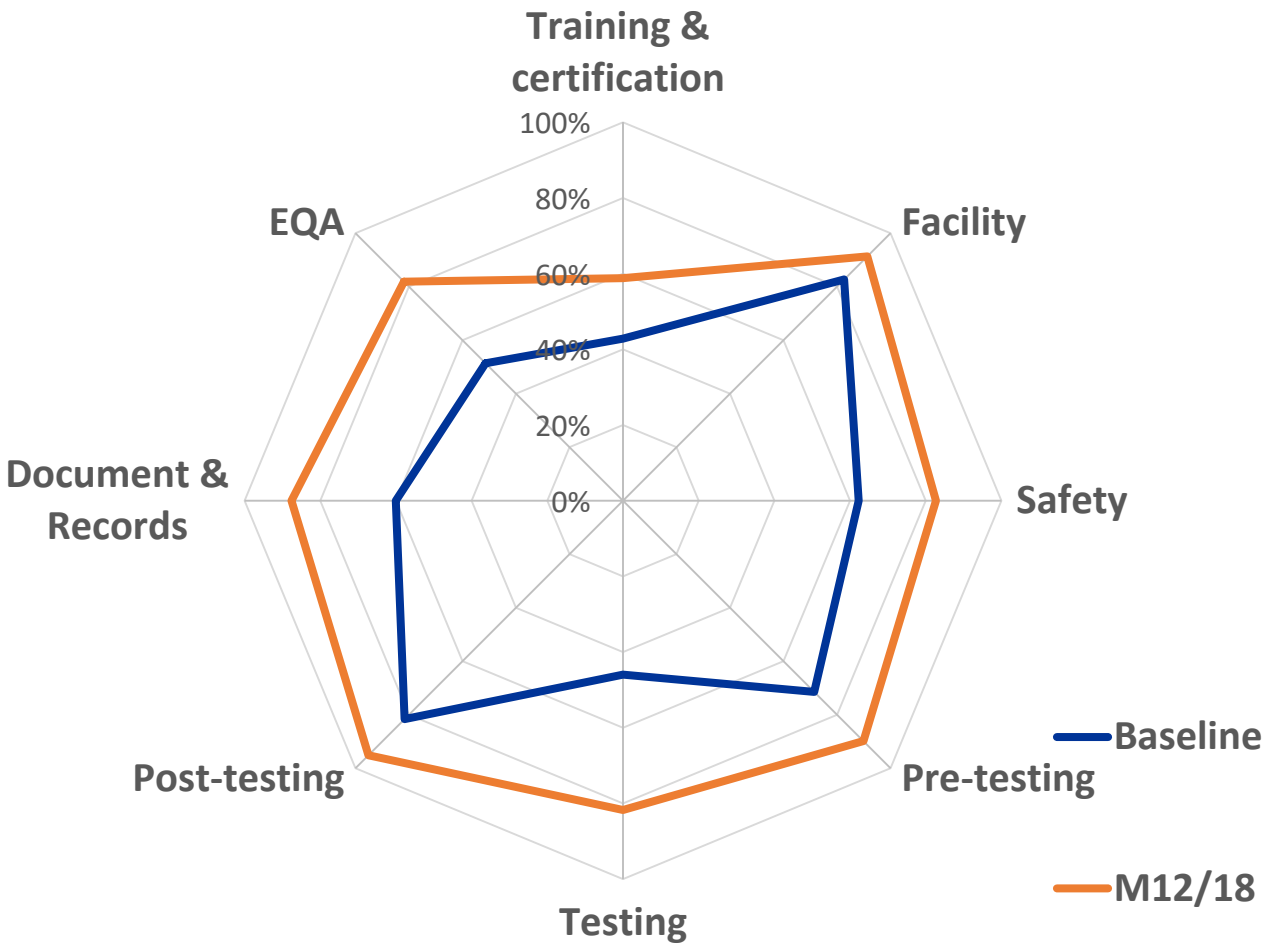
Q-Corps Level II

- Assist with training
- Analyze logbook and assessment data
- Track and implement corrective actions
- Conduct site assessments using SPI- RT checklist
- Conduct site level assessment using RTQII M&E tool
- Maintain a functional databases
- Report to regional/national level

Empowering the Q-Corps Volunteers

Country	Target sites	Master trainers trained	Q-Corps trained	# Quarterly site audits
Cameroon	200	7	31	7
Ethiopia	200	26	14	2
Kenya	200	18	8	4
Malawi	200	15	17	7
Tanzania	200	19	32	7
Uganda	200	15	16	5
Zambia	200	15	15	5
Total	**1400**	**115**	**133**	**39**

Average Site Performance by QSEs across 5 countries (n=830)



Conclusions

- Existing successful models for traditional laboratory workforce development have been in place and scaled up over the past 10 years
- AFENET surveillance training programs have established a strong backbone for surveillance skills-building and can be extended to additional countries
- The SLMTA model is widely established and can be used for other training initiatives

Conclusions

- Community-based workforce development is a major gap and should be prioritized by expanding existing initiatives like Q-Corp and the ASLM Community Laboratory Framework and developing new approaches
- Training on new diagnostic platforms and mHealth systems that reach lower in the health system is a major opportunity to improve both clinical capacity and surveillance