



College of American Pathologists  
**FOUNDATION**  

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**Connecting Communities Through Pathology**

## Building Global Pathology Capacity<sup>1</sup>

### Featured Projects:

- ❑ Enhancing Pathology Services for Improved Cancer Care (Uganda)
- ❑ Improving Quality Management Systems through External Quality Assessment (Nigeria)

**Webinar – Tuesday, September 1, 2026 8:00 – 9:00 am Central (US and Canada)**

# Mission & Vision of the CAP Foundation

Our **MISSION** is to improve people's health by:

- Developing tomorrow's pathology leaders through awards for advanced training, research and education.
- Mobilizing pathologists to expand health equity in medically underserved communities within the US and globally.

Our **VISION** is to

- Support all pathologists to be leaders in their communities and at the forefront of patient-centered care.



## Gail Vance, MD, FCAP



Indiana University School of Medicine

Professor in the Department of Medical & Molecular Genetics, and the Department of Pathology & Laboratory Medicine

Chair, CAP Foundation Global Pathology Committee

# CAP Foundation

## Global Pathology Committee

## Working to Expand Health Equity and Learning Globally



# Welcome to the GPC Development Grant Webinar

- Showcase the GPC Development Grant **Recipients** and their contributions to pathology and pathologists.
- Today's webinar will feature presentations by:

## Enhancing Pathology Services for Improved Cancer Care (Uganda)

Dr. Nixon Niyonzima

## Improving Quality Management Systems through External Quality Assessment (Nigeria)

Dr. Bruno Basil

# GPC Global Pathology Development Grant

- Launched in 2022
- Focus on providing support to organizations and individuals working with limited budgets
- Support active programs promoting pathology services/pathologists in under-resourced areas around the globe.
- Thirteen grants funded to date. Eleven \$10k awards and two \$5k awards.

# GPC Global Pathology Development Grant Projects 2022-2024

## •2022

- Diagnostic Comparison and Laboratory Characterization of Oral Isolates of Candida species (Ghana)
- Improving Breast Cancer Treatment thru Surgical Pathology education (Ethiopia/Kenya)
- OPEN Pathology Network-Bladder Cancer and Gyn Pathology Education (Vietnam)

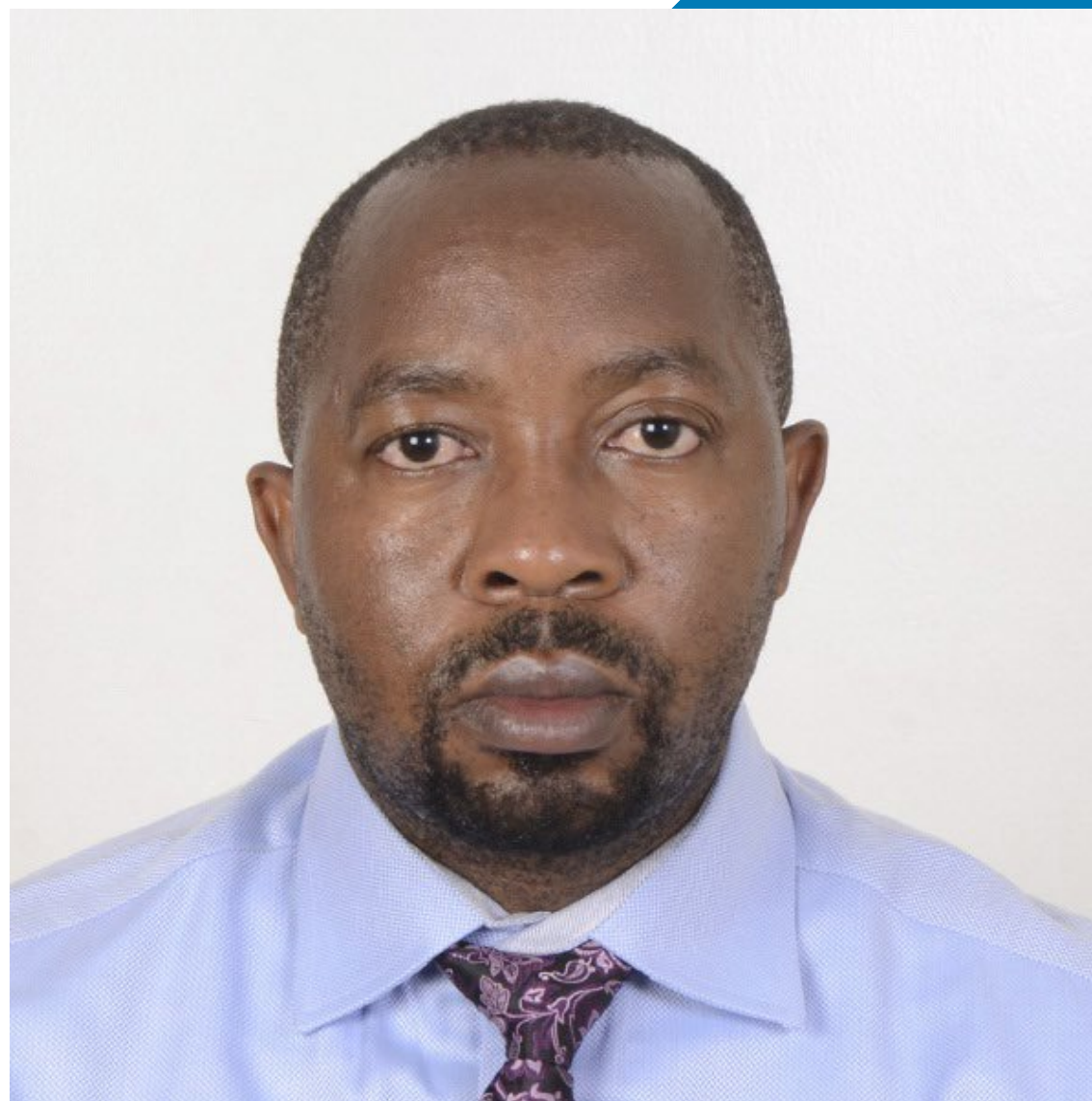
## 2023

- Installation of a computerized LIS at Federal Medical Centre Owo (Nigeria)
- Empowering healthcare thru low-cost 3D printed microscope-enabled diagnostics (Rwanda)
- Leveraging a national HIV/TB specimen transport network to increase access to anatomical pathology services (Uganda)

## 2024

- Building Capacity for Immunohistochemistry Pathology Services for breast cancer (Kenya)
- Improving Quality Management Systems thru External Quality Assessment (Nigeria)
- Introduction of Blood Culture Negative Endocarditis Diagnostic Panel (Pakistan)
- Enhancing Pathology Services for improved Cancer Care (Uganda)





# Nixon Niyonzima

## MBChB, MSc., PhD, MBA

Uganda Cancer Institute  
Kampala, Uganda

# **Enhancing Pathology Services and Public Engagement for Improved Cancer Care in Uganda**

**Global Pathology Development Grant Awardee 2024:**

Dr. Nixon Niyonzima

Uganda Cancer Institute

Kampala, Uganda



# Cancer & Pathology in Uganda

- Cancer burden increasing in Uganda
- Pathology critical for diagnosis and treatment
- Services largely centralized
- Growing demand vs limited capacity



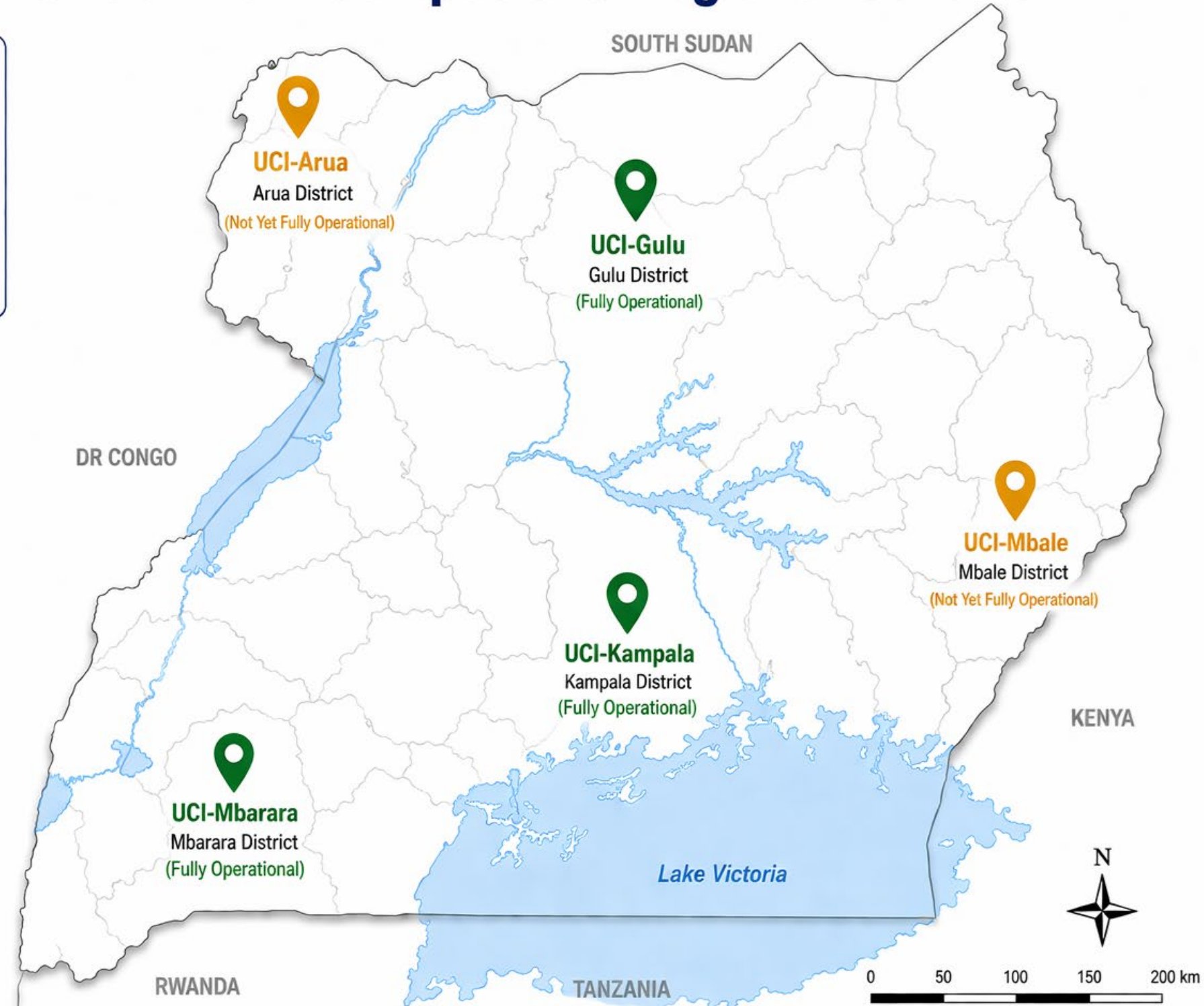
# Location of UCI Main Campus and Regional Centers

## LEGEND

-  **FULLY OPERATIONAL**  
Site is fully operational and delivering services.
-  **NOT YET FULLY OPERATIONAL**  
Site is in development and not yet fully operational.

## UCI SITES

-  **UCI-Kampala (Main Campus)**  
Kampala District  
Fully Operational
-  **UCI-Gulu (Regional Center)**  
Gulu District  
Fully Operational
-  **UCI-Mbarara (Regional Center)**  
Mbarara District  
Fully Operational
-  **UCI-Arua (Regional Center)**  
Arua District  
Not Yet Fully Operational
-  **UCI-Mbale (Regional Center)**  
Mbale District  
Not Yet Fully Operational



# Why Pathology Matters

- Accurate diagnosis depends on specimen quality
- Errors at collection → delays in diagnosis
- Poor samples → repeat procedures
- Direct impact on patient outcomes



# The Problem

- Poor sample quality from referring facilities
- Increased patient burden
- Limited training in specimen handling
- Poor labeling and documentation
- Inadequate packaging and transport
- High specimen rejection rates
- Weak coordination across teams
- Delays in diagnosis and treatment



# Project Aim

- To improve pathology services by strengthening specimen handling practices across the diagnostic pathway



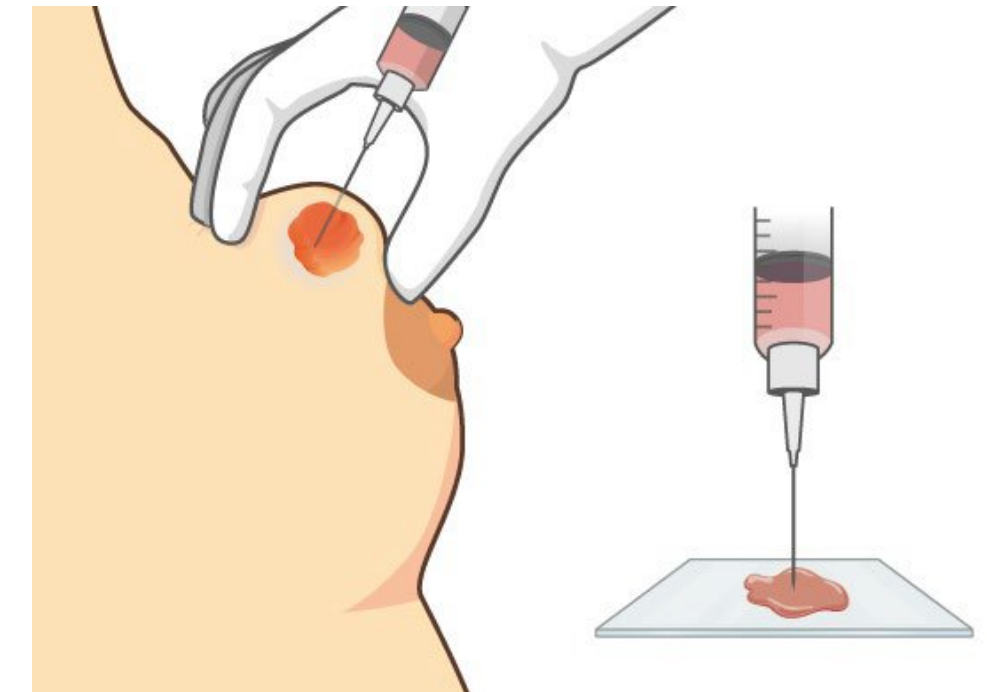
# Project Design

- Capacity-building intervention
- Hybrid model:
  - In-person training
  - Virtual webinars
- Focus on practical, real-world skills



# Training Content

- Specimen collection techniques
- Proper labeling and documentation
- Packaging and transportation
- Laboratory reception and processing



# Virtual Webinars

- 3 CME sessions delivered
- 300+ participants reached
- Hosted on Zoom





UCI CME /Virtual Lecture Series

# Enhancing Pathology Services for improved Cancer Care in Uganda.

## Part 1- **Sample Collection for Specimens**



**Dr Nixon Niyonzima**  
Head training and  
research, UCI



**Dr. Veronica Nyakato**  
Pathologist  
UCI Path lab



**Wasswa Hassan**  
Lab Technologist  
UCI Path lab



Wed 06th  
Aug 2025



8am - 9am  
EAT



Meeting ID: 929 1103 4849  
Passcode: 452603

Supported by CAP Foundation



UgandaCancerIns

[www.uci.or.ug](http://www.uci.or.ug)



Uganda Cancer Institute



Pathology Refresher training Series:

# Sample Reception and Processing



**Dr Nixon Niyonzima**  
Head training and  
research, UCI



**Dr. Veronica Nyakato**  
Pathologist  
UCI Path lab



**Wasswa Hassan**  
Lab Technologist  
UCI Path lab



Wed 27th  
Aug 2025



8am - 9am  
EAT



Meeting ID: 884 9107 0454  
Passcode: 452603

Supported by CAP Foundation



UgandaCancerIns

[www.uci.or.ug](http://www.uci.or.ug)



Uganda Cancer Institute



Pathology Refresher training Series:

# Sample Packaging and Transportation



**Dr. Nixon Niyonzima**  
Head training and  
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Pathologist  
UCI Path lab



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Lab Technologist  
UCI Path lab



Wed 20th  
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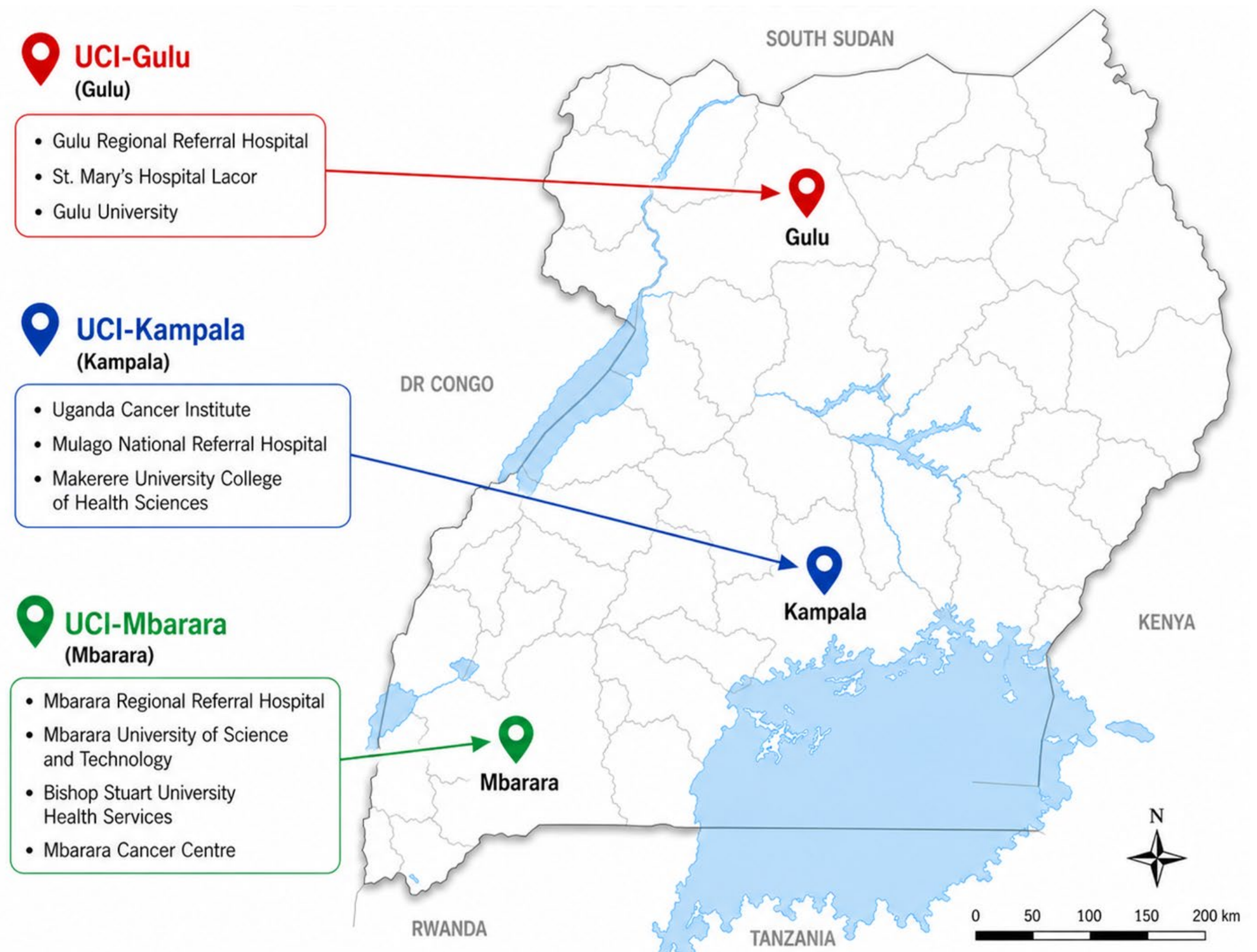
[www.uci.or.ug](http://www.uci.or.ug)



Uganda Cancer Institute

## Training Sites

- Kampala (UCI): 50 participants
- Gulu: 35 participants
- Mbarara: 30 participants
- Total trained: 115



# Key Outcomes

## Reach

- 115 healthcare workers trained in-person
- 300+ participants via webinars
- Multidisciplinary engagement achieved

## Knowledge gains

- Improved understanding of specimen handling
- Increased awareness of pathology requirements (like request forms and types of samples)
- Increased confidence in practice
  - Improved specimen labeling
  - Better packaging techniques
  - Reduced handling errors
  - More standardized practices



# What We Encountered

## Challenges

- Variable baseline knowledge
- Limited resources and capacity for pathology diagnostics in some facilities
- Inconsistent practices across facilities

## Positive Findings

- High engagement from participants
- High demand for training
- Active participation and discussions
- National reach via webinars



# Key Lessons

- Practical training is critical
- Using a multidisciplinary approach is key
- Context matters
- Hybrid training increases reach



# Next Steps

- Expand training to more regions
- Institutionalize refresher trainings
- Strengthen monitoring systems
- Improve coordination across facilities





# Bruno Basil, MBBS, FMCPath., IFCAP

International Institute for Pathology and Forensic  
Science Research, DUFUHS

Uburu, Nigeria



INTERNATIONAL INSTITUTE FOR  
PATHOLOGY AND FORENSIC  
SCIENCE RESEARCH



**DAVID UMAHI**  
FEDERAL UNIVERSITY OF  
HEALTH SCIENCES  
UBURU, EBONYI STATE.

# Improving Quality Management Systems Through External Quality Assessment: Strengthening Clinical Pathology Laboratories in Enugu, Nigeria

**Bruno Basil, MBBS, FMCPath., IFCAP.**

International Institute for Pathology and Forensic Science Research,  
DUFUHS, Uburu, Nigeria



01 September//8:00 am//2026

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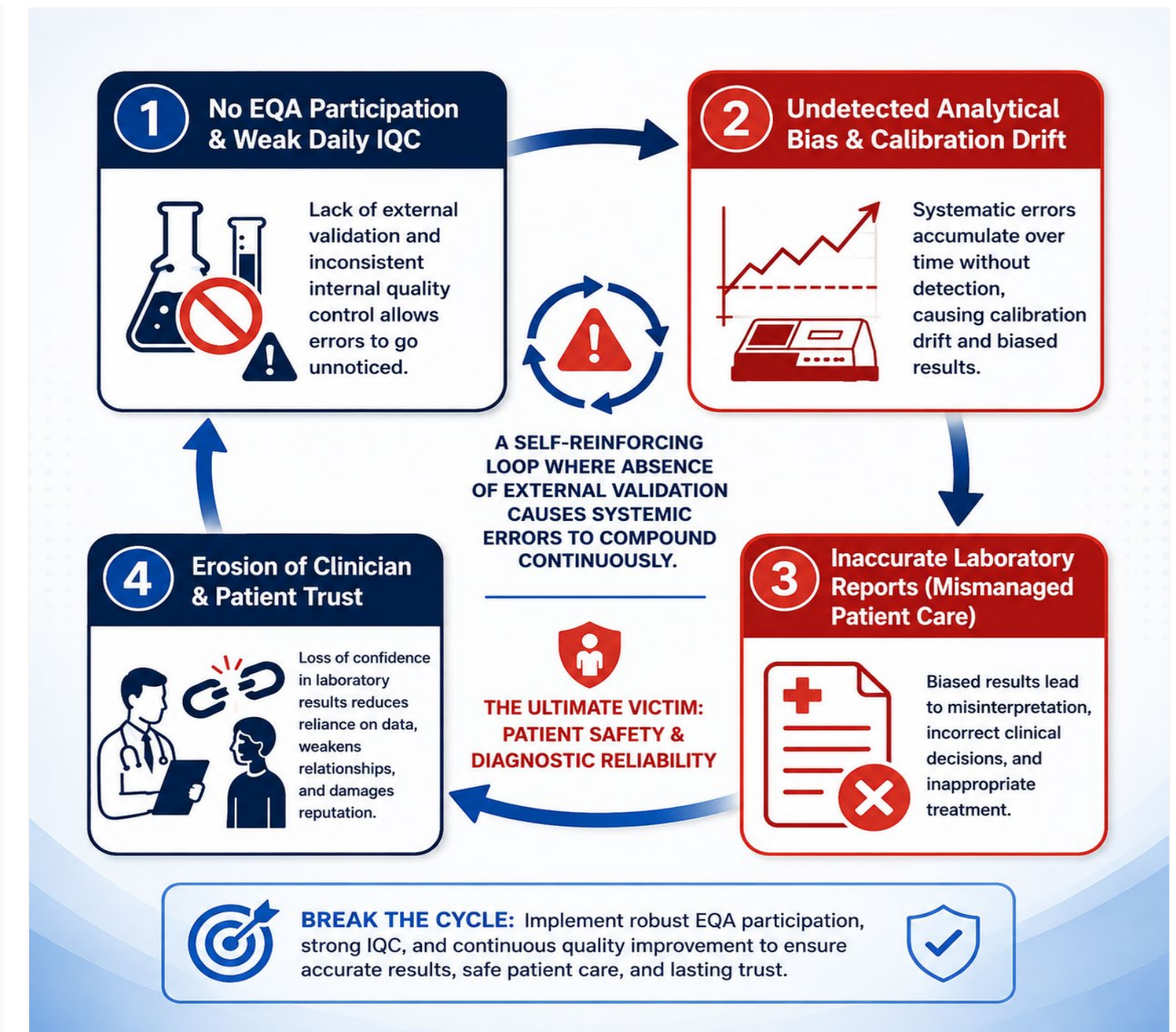
<https://www.youtube.com/@PathologyAndForensicInstitute>

Zoom

Insert Webinar Link Here...

# What problem were we trying to solve?

- **The Diagnostic Reality in Sub-Saharan Africa:**
  - 70% of clinical management decisions rely on laboratory data.
  - Systemic lack of formal Quality Management Systems (QMS).
  - High commercial costs and logistical cold-chain barriers isolate labs from international EQA programs.
- **The Clinical Risk:**
  - Undetected analytical bias, calibration drift, and unstandardized reagents.
  - Diagnostic misclassification, incorrect therapeutic interventions, and erosion of clinician and patient trust.
- **Regulatory Fragmentation:**
  - Dual regulatory landscapes (MLSCN for technical scientists vs. MDCN for medical pathologists) creating oversight and fragmented operation.



## How did we identify the problem?

- **Pre-Grant Situational Analysis:**
  - Review of laboratory practices in southeastern Nigeria revealed non-standardized calibrations and irregular IQC tracking.
  - Laboratory professionals lacked access to structured continuing professional development on the updated **ISO 15189:2022** standard.
- **Key Drivers Identified:**
  - *Resource Constraints:* High costs of international proficiency testing materials.
  - *Educational Gaps:* Need for training in practical root-cause analysis (RCA) and occurrence management.
  - *Equipment & Reagent Instability:* Frequent electrical power fluctuations and variable water purification quality affecting instruments like ISE analyzers.



# Project Design & Securing Resources

## Approved Project Budget:

- **\$5,000 USD** (CAP Foundation Grant ID: GPDG24-0000000033).

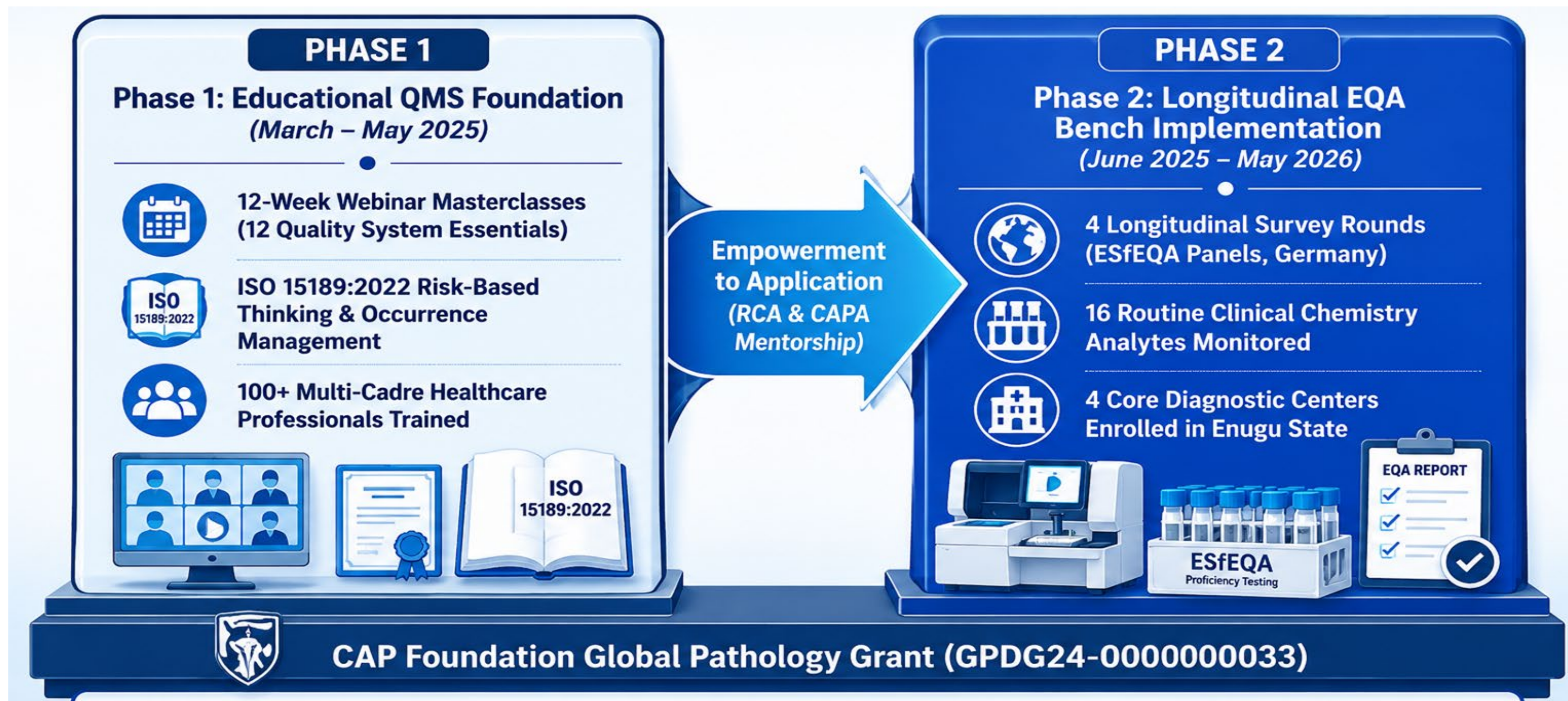
## Project Architecture:

- **Phase 1 (Education):** 12-Week Interactive QMS Webinar Series (March – May 2025).
- **Phase 2 (Implementation):** 4 Longitudinal EQA Rounds of Clinical Chemistry (June 2025 – May 2026).

## Resource Securitization & Collaborations:

- **Academic Host:** David Umahi Federal University of Health Sciences (DUFUHS).
- **Execution & Dissemination:** International Institute for Pathology and Forensic Science Research (IIPFSR).
  - **International PT Provider:** European Society for External Quality Assessment (ESfEQA, Heidelberg, Germany) through Spectrum Biomedical Laboratory, Enugu, Nigeria.

# Project Design & Securing Resources – Two Phase Transformation Model



# Phase 1 Execution: Curriculum – The 12 Quality System Essentials

- **Curriculum Mapped Directly to ISO 15189:2022 & CLSI Guidelines:**
  - *Module 1:* Foundations of LQMS & ISO 15189 Updates (Dr. B. Basil)
  - *Module 2:* Sample Management & Pre-analytical Quality Control (Dr. B. Myke-Mbata)
  - *Module 3:* Strategies for Quantitative and Qualitative QC (Dr. E. Ojo)
  - *Module 4:* Laboratory Assessments & Audits (Dr. I. Meka)
  - *Module 5:* Process Improvement & Risk Management (Dr. O. Eze)
  - *Module 6:* Customer Service Delivery & Communication (Dr. I. Mba)
  - *Module 7:* Occurrence Mgt & Nonconformance Handling (Dr. B. Myke-Mbata)
  - *Module 8:* Digital Transformation & Laboratory Information Systems (Dr. I. Mba)
  - *Module 9:* Personnel Competency & Workforce Crisis Management (Dr. I. Aliu)
  - *Module 10:* Equipment Management, Biosafety, and Facilities (Dr. I. Meka)
  - *Module 11:* Supply Chain, Inventory, and Procurement (Dr. O. Eze)
  - *Module 12:* Leadership, Governance & Quality Documentation (Dr. E. Ojo)

## Audience

**Over 100  
Laboratorians  
including  
Pathologists,  
Laboratory  
Scientists,  
Technicians,  
etc.**

## Phase 2 Execution – The 4-Round EQA Clinical Chemistry Program

### Participating Laboratories in Southeast Nigeria

- **DUFUTH Chemical Pathology Laboratory** (Tertiary Academic Center)
- **Lifeway Diagnostic Hub** (High-Volume Urban Private Facility)
- **NEOMED Diagnostic Clinic** (Urban Private Diagnostic Center)
- **Health Focus Diagnostics Nigeria** (Independent Diagnostic Laboratory)

### EQA Protocol & Panel Scope

- **Provider:** ESfEQA (Heidelberg, Germany) through Spectrum Biomedical Laboratories, Enugu.
- **Scope:** 16 routine clinical chemistry analytes per sample (ALT, AST, ALP, Total/Direct Bilirubin, Albumin, Total Protein, Urea, Creatinine, Uric Acid, Glucose, Total/HDL/LDL Cholesterol, Triglycerides, Electrolytes).
- **Volume:** 4 consecutive rounds yielding 64 matched laboratory-analyte observations per facility.

## Phase 2 Execution – The 4-Round EQA Clinical Chemistry Program

- **Operational Challenges Encountered:**

- *Logistics & Cold Chain:* Customs clearance timelines and managing ambient temperature stability across regional courier routes.
- *Internet Connectivity Gaps:* Live attendance disruptions for participants in remote areas.
- *Initial Quality Shock:* Significant baseline error discoveries during Round 1 causing initial anxiety for laboratory staff.

- **Strategic Solutions Implemented:**

- Temperature-controlled cold packs with verified transport logistics.
- Full digital open-access recording repository on YouTube and the IIPFSR website.
- Non-punitive, supportive technical feedback and remote troubleshooting mentorship.



# Phase 1 Outcomes – Educational Reach, Assessment & Certification

## Enrollment & Completion Metrics

- **Total Registered Participants:** 138 laboratory professionals from public, private, and academic institutions across Nigeria. These included Consultant & Resident Pathologists, Medical Laboratory Scientists, Laboratory Managers, and Quality Assurance Officers, Bench Laboratory Technicians etc.
- **Program Completion & Certification:** 98 participants completed the 12-week curriculum, met attendance benchmarks, passed the comprehensive post-course assessment ( $\geq 75\%$ ), and were awarded formal certification.
- **Certification Rate:** 71.0% completion rate sustained across an intensive, three-month virtual quality curriculum.



## Knowledge Translation & Digital Legacy

- 100% of masterclass slide decks and session recordings archived on <https://www.iipfsr.com> and YouTube (@PathologyAndForensicInstitute) for asynchronous learning.
- Standardized templates for SOPs, root-cause analysis (5 Whys), and internal audits deployed directly to participants' benches.

## Phase 2 Outcomes: Baseline EQA Findings – The Round 1 Discovery

### Widespread Baseline Analytical Bias

- **Severe positive bias across key enzymes and metabolites.**
- **Standard Deviation Index (SDI) / Z-score Extremes:**
  - Aspartate Aminotransferase (AST): SDI up to +48.69
  - Creatinine: SDI up to +43.96
  - Alkaline Phosphatase (ALP): SDI up to + 35.52
  - Significant variance across Electrolytes (Sodium, Potassium, Chloride).



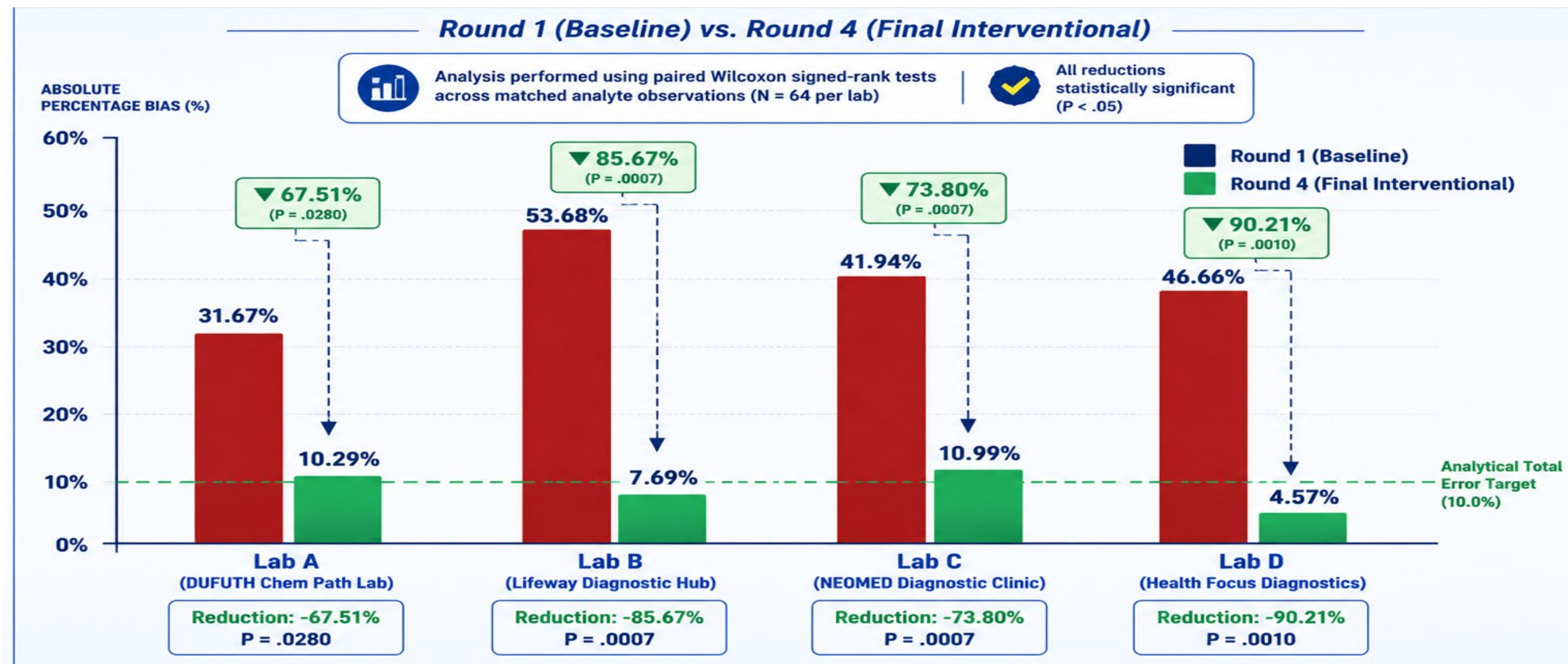
### Systemic Root Causes Uncovered

- **Uncalibrated automatic micropipettes and inaccurate reconstitution volumes.**
- **Reagent water contamination (degraded deionizer resin cartridges).**
- **Use of unverified, third-party non-traceable calibrators.**
- **Absence of active multi-rule IQC rejection tracking before patient runs.**

## Phase 2: Longitudinal Outcomes – Statistically Significant Bias Reduction

| Laboratory | Facility Description       | Round 1 Median Abs. Bias (%) | Round 4 Median Abs. Bias (%) | Absolute Reduction | Relative Bias Reduction (%) | Wilcoxon P Value |
|------------|----------------------------|------------------------------|------------------------------|--------------------|-----------------------------|------------------|
| Lab A      | Academic Tertiary Hospital | 31.67%                       | 10.29%                       | -21.38%            | -67.51%                     | .0280            |
| Lab B      | Large Urban Diagnostic Hub | 53.68%                       | 7.69%                        | -45.99%            | -85.67%                     | .0007            |
| Lab C      | Urban Diagnostic Clinic    | 41.94%                       | 10.99%                       | -30.95%            | -73.80%                     | .0007            |
| Lab D      | Independent Clinical Lab   | 46.66%                       | 4.57%                        | -42.09%            | -90.21%                     | .0010            |

## Phase 2 Outcomes: Mean Absolute Percentage Bias Reduction



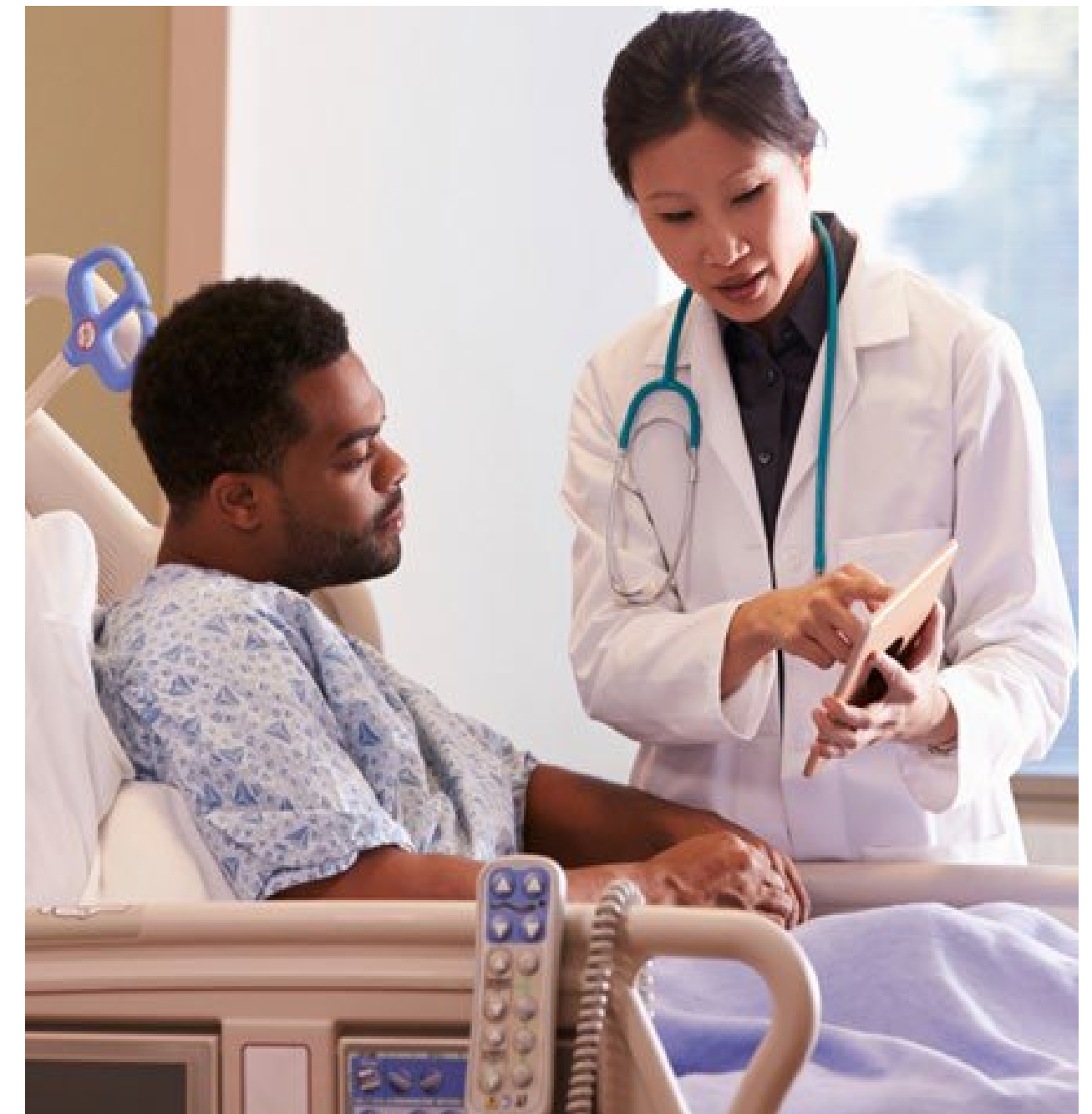
# How does this translate directly to the patient at the bedside?

## • Direct Patient Impact:

- **Renal Function:** Eliminating a +43% baseline creatinine bias prevents false diagnoses of acute kidney injury and avoids unnecessary medication adjustments.
- **Hepatic Monitoring:** Correcting transaminase and alkaline phosphatase overestimation prevents misdiagnosis of liver injury in patients on long-term pharmacotherapies.
- **Electrolyte Management:** Accurate sodium and potassium testing ensures appropriate fluid therapy management in emergency triage.

## • Institutional Culture Change:

- Transition from informal testing routines to documented SOPs, traceability logs, and structured incident investigation.
- Increased clinician trust in laboratory turnaround times and reported values.



# Scholarly Dissemination & Open-Access Legacy

## Academic Output (5 Publications Generated / 7 currently under Review)

- Basil, B., & Eze, O. E. (2026). Strengthening laboratory quality through risk-based thinking: Implementation challenges and opportunities in Nigeria. *Clinica Chimica Acta*, 589, Article 121041. <https://doi.org/10.1016/j.cca.2026.121041>
- Basil, B., Okoro, N. I., Mba, I. N., & Myke-Mbata, B. K. (2026). Translating laboratory quality management system into practice: Strategic opportunities and challenges for ISO 15189:2022 implementation in Nigeria's healthcare system. *Frontiers in Health Services*, 6, Article 1850576. <https://doi.org/10.3389/frhs.2026.1850576>
- Mba, I. N., Basil, B., & Myke-Mbata, B. K. (2026). Customer service delivery in clinical laboratories: Challenges, innovations, and policy directions for strengthening quality management systems in Nigeria. *Nigerian Medical Journal*, 66(5), 1745–1758 . <https://doi.org/10.71480/nmj.v66i5.1086>
- Myke-Mbata, B. K., Basil, B., & Mba, I. N. (2026). Strategies for effective occurrence Management in Resource-Limited Clinical Laboratories: Challenges and practical solutions. *Clinica Chimica Acta*, 592, Article 121211 . <https://doi.org/10.1016/j.cca.2026.121211>
- Myke-Mbata, B. K., Basil, B., Mba, I. N., & Ugwu, A. O. (2026). Best practices in sample management & pre-analytical quality control: Overcoming challenges in resource-limited laboratory settings. *Tropical Medicine and Health*, 54(1), Article 131 . <https://doi.org/10.1186/s41182-026-01038-x>.

## Permanent Open-Access Digital Infrastructure

- Dedicated YouTube Playlist:  
@PathologyAndForensicInstitute
- Downloadable SOP templates, audit forms, and QC tools hosted permanently at <https://www.iipfsr.com>

# Lessons Learned

| Theory Alone Does Not Fix Bench Error                                                                                                                                                                                                                                                                                                                                                              | Most Errors Are Systemic, Not Malicious                                                                                                                                       | Non-Punitive Culture Is Essential                                                                                           | Digital Transformation Bridges Resource Gaps                                                                                               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Didactic lectures create awareness, but real-world proficiency testing paired with targeted feedback is what drives analytical correction.                                                                                                                                                                                                                                                         | Severe initial biases typically stem from common operational points, such as degraded water purity, pipette drift, and unverified calibrators, rather than instrument failure | Creating an open, blame-free environment encourages laboratory staff to report non-conformances and investigate root causes | Asynchronous video repositories and digital reporting tools make high-quality training accessible despite local infrastructure constraints |
| Quality improvement is not an all-or-nothing state; laboratories can substantially reduce diagnostic error without immediate full ISO 15189 accreditation. Stepwise, incremental improvements within existing resource constraints enable systematic progression from baseline vulnerability toward sustained analytical competence. This is the SLIPTA/SLMPTA Stepwise Transformation Philosophy. |                                                                                                                                                                               |                                                                                                                             |                                                                                                                                            |

## Next Steps & Strategic Roadmap

### Regional EQA Expansion

- **Scaling the EQA scheme from 4 to 20+ diagnostic centers across Nigeria.**

### Local PT Panel Manufacture

- **Developing locally validated, low-cost proficiency testing materials at DUFUHS/IIPFSR to reduce reliance on expensive international imports.**

### Policy Advocacy

- **Engaging the Ministry of Health, MLSCN, and MDCN to advocate for mandatory EQA participation as a condition for laboratory re-licensure.**

### Phase 3 Qualitative Assessments

- **Completing focus groups and post-implementation sustainability audits with participating laboratory managers.**

## Our Expert Resource Facilitators and Contributors



**Dr. Blessing Kenechi Myke-Mbata (BSc, MBBS, PhD, FMCPath., IFCAP)**

Benue State University Teaching Hospital (BSUTH), Makurdi, Nigeria.

**Role:** EQA Project Coordinator & Facilitator



**Dr. Onyinye Ezinne Eze (MBBS, PGD, FMCPath., IFCAP)**

Enugu State University of Science and Technology (ESUT), Enugu, Nigeria

**Role:** Facilitator



**Dr. Emmanuel Adewole Ojo (BMLS, MPH, PhD)**

APIN Public Health Initiatives, Abuja, Nigeria

**Role:** Facilitator



**Dr. Izuchukwu Nnachi Mba (MBBS, FMCPath., IFCAP)**

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**Role:** Facilitator



**Dr. Ijeoma Angela Meka (MBBS, MSc., FMCPath., IFCAP)**

University of Nigeria, Nsukka/Teaching Hospital, Ituku-Ozalla, Nigeria.

**Role:** Facilitator



**Dr. Israel Aliu (BMLS, MPH, MBA, DBA, ASQ)**

Pegisol Limited / Pegisol Consultancy,

**Role:** Facilitator

## Conclusion & Questions

- **Summary:**

- Over 100 laboratory professionals trained across 12 QSE modules.
- Four clinical laboratories achieved 67% – 90% longitudinal bias reductions ( $P < .05$ ).
- A substantial number of academic publications and permanent open-access digital repositories established.

- **Acknowledgements:**

- CAP Foundation Leadership & Global Pathology Development Grant Committee
- Resource persons, Participating Laboratory Directors, Bench Scientists, and Trainees

- **Contact:**

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- Website: <https://www.iipfsr.com> | YouTube: @PathologyAndForensicInstitute





# Final words:



**Small, consistent improvements lead to big changes in lab quality!**



# Thank You

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# Questions?



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You