8. Brief History of LIMS

8.1 Introduction

The current LIMS documentation provides information about the **present national LIMS environment and major implementation milestones**, but it does not provide a complete chronological history of LIMS development in Malawi.

Therefore, this section should be treated as a **high-level evolution of the documented LIMS environment**, rather than a definitive historical account.

A comprehensive historical section should eventually be developed from program records, previous system documentation, project reports, implementation reports, and release histories.

8.2 Evolution Toward a National LIMS Ecosystem

The development of LIMS in Malawi can be understood as an evolution from individual laboratory processes and specialized laboratory information systems toward an integrated national laboratory information ecosystem.

The current documentation demonstrates the following major stages of development.

Stage 1 — Digitization of Laboratory Processes

The introduction and expansion of laboratory information systems enabled laboratory processes that were previously dependent on manual procedures to be digitized.

The objective was to improve efficiency, reduce manual processes, strengthen quality assurance and improve access to laboratory information.

Stage 2 — Development and Expansion of iBLIS

iBLIS became the facility-level laboratory information system supporting day-to-day laboratory operations.

Its functionality includes:

- Patient management
- Order management
- Sample management
- Barcode management
- Result management
- Analyzer interfacing
- Quality control
- Inventory management
- Reporting

The system was subsequently expanded to additional laboratories, including district hospital laboratories.

Stage 3 — Establishment of National-Level Aggregation

The development and implementation of NLIMS introduced a national-level aggregation and analytics layer.

Laboratory information generated at participating facilities could be synchronized into NLIMS for:

- National reporting
- Data aggregation
- Dashboards
- Analytics
- Laboratory performance monitoring
- Integration with external systems

Stage 4 — Integration with ART/EMR

A major milestone was the integration of LIMS with ART/EMR systems.

The integration enabled the following:

- Electronic laboratory ordering
- Electronic result delivery
- Improved interoperability between clinical and laboratory systems

Currently the integration with ART/EMR is across approximately **272 facilities**.

Stage 5 — Expansion of Analyzer Interfacing

Laboratory analyzer interfacing became an important part of the national LIMS architecture.

More than **80% of supported laboratory analyzers** have been interfaced, reducing manual result entry and transcription.

Machine interfaces have also been deployed across **35 priority laboratories**.

Stage 6 — Development of National Dashboards

National dashboards were developed to provide visibility into laboratory operations and synchronization.

Current dashboard indicators include:

- Region
- District
- Sending facility
- Clinic frequency
- Last synchronization date
- Days since last synchronization
- ART/EMR status

- Facility reachability
- Last order received
- Possible synchronization issues

Additional analytics include:

- Test volumes
- Turnaround time
- Facility performance
- Sample rejection trends
- Reporting completeness

Stage 7 — Improved Laboratory Turnaround Time

The implementation of electronic laboratory workflows and interoperability contributed to significant improvements in Viral Load result turnaround time.

The current documentation reports a reduction from approximately **70 days to 13 days**.

This represents an important example of the potential impact of integrated laboratory information management.

Stage 8 — Expansion of Laboratory Functionality

The LIMS has continued to expand beyond basic laboratory information management.

Documented enhancements include:

- Blood bank crossmatch workflows
- Microbiology reporting
- Malaria reporting
- Quality control reporting
- Enhanced metadata collection
- Expanded laboratory dashboards
- API-driven interoperability
- Addition of the Test Catalog to maintain uniformity in test naming across facilities

Stage 9 — Towards an Integrated and Sustainable National Ecosystem

The current direction of the LIMS ecosystem is toward greater interoperability, sustainability, and national ownership.

The future roadmap includes:

- Expanded interoperability
- HL7 FHIR support
- Improved synchronization
- Enhanced laboratory performance dashboards

- Mobile-friendly workflows
- Advanced inventory management
- Additional analyzer integrations
- AI-assisted quality assurance and anomaly detection
- Strengthened cybersecurity

This direction represents a transition from individual laboratory applications toward a more integrated national laboratory information ecosystem.

Revision #1
Created 10 August 2026 12:15:50 by Precious Bondwe
Updated 10 August 2026 12:16:27 by Precious Bondwe