Evaluating a Digital Laboratory Sample Tracking System's Impact on Tuberculosis Diagnosis Turnaround Time in Ugandan Peripheral Health Units

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Abstract

Delays in laboratory sample transportation and result delivery are a major barrier to timely tuberculosis (TB) diagnosis in low-resource settings. Peripheral health units in Uganda often rely on manual, paper-based systems for tracking sputum samples, which can contribute to sample losses and prolonged turnaround times. This short report evaluates the impact of implementing a digital laboratory sample tracking system on the total turnaround time for TB diagnosis in selected Ugandan peripheral health units. A comparative analysis was conducted using routine programme data. Turnaround times—defined as the period from sample collection at the health unit to result availability—were measured for intervals before and after the digital system's implementation across four health units. Data were extracted from paper laboratory registers and the digital system's administrative dashboard. Following implementation, the median total turnaround time for TB diagnosis decreased. The proportion of samples with a result returned within seven days increased from 42% to 68% after the digital system was introduced. The introduction of a digital sample tracking system was associated with a reduction in diagnostic delays for tuberculosis at the participating peripheral health units. Programme managers should consider scaling up digital tracking interventions, supported by targeted training for health workers. Further operational research is needed to assess long-term sustainability and cost-effectiveness. tuberculosis, diagnostic delay, health information systems, digital health, laboratory systems, Uganda This report provides preliminary evidence from a real-world setting on how digital tools can improve laboratory sample management for tuberculosis control programmes in peripheral health facilities.

Keywords: *Tuberculosis diagnosis, turnaround time, digital health, Sub-Saharan Africa, laboratory information systems, health systems strengthening, peripheral health units*

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