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# Data Integration for Better Influenza Surveillance in Kenya

Influenza testing and surveillance in Kenya is managed via a system of 13 sentinel sites, led by the National Influenza Center (NIC)—located within the National Public Health Laboratory (NPHL) in Nairobi—and the Kenya Medical Research Institute (KEMRI) in Kisumu and Nairobi. When a patient at one of these sentinel sites meets the case definition for severe acute respiratory infection (SARI) or influenza-like illness (ILI), samples are collected and sent to NIC for testing.

Epidemiological and laboratory data collection and management are handled through separate systems. KEMRI uses a custom in-house surveillance system, Netbooks, to handle epidemiological data. NIC uses a proprietary laboratory information management system (LIMS), LabWare, for sample processing, testing and results. However, the reliance on separate systems has led to significant delays in testing and results reporting. It also limits data sharing between public health laboratory and epidemiology facilities.

To improve influenza data integration, APHL supported the development of an electronic reporting system to modernize and streamline data management for all influenza surveillance samples tested at NIC. The resulting integration solution highlights how effective coordination can allow laboratory data to support surveillance efforts and enable quick decision-making and timely, informed public health responses.

## Shaping a Solution

The team started by engaging partners at all levels—including APHL, the Kenya Ministry of Health, CDC, KEMRI and NIC—to shape a shared vision of a successful integration system.

Once a plan was approved, informatics teams from APHL, KEMRI and NPHL met regularly over several months to explore integration options between Netbooks and LabWare. The selected solution was an application programming interface (API) that could connect Netbooks and LabWare.

With the API in place, sample data entered into Netbooks at KEMRI can be shared electronically with LabWare. As a result, sample data is available in the LIMS prior to the sample arriving at the NIC; laboratory staff can acknowledge sample receipt within the system and are no longer required to manually enter data. Test results entered into LabWare can be electronically transferred via the API to Netbooks in real time.



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# Benefits for Populations and Individuals

Since implementation of the API in 2023, total average turnaround time from sample collection to receipt of results at KEMRI has reduced from two weeks to less than five days.

Electronic delivery of sample data has significantly reduced workload for laboratory staff and eliminated errors from manual data entry. Without manual data entry, laboratory staff can focus their time on testing; results turnaround time at NIC has improved from one to two weeks to an average of two days. This system has also allowed NIC to receive additional patient variables, enabling a more comprehensive analysis for national disease surveillance.

Electronic laboratory reporting back to KEMRI has also improved patient management, as clinicians can access test results more quickly and reliably.

## An Adoptable Approach

A similar approach could be used in other regions where integration is needed between in-house data management systems. Leveraging existing technologies, rather than introducing new systems, has been key to the success of this project. Users are already familiar with the systems, reducing the learning curve and accelerating adoption of a new process.

### Leveraging Existing Technology for Adoptable Solutions

NIC and KEMRI systems both run on Microsoft SQL databases and can be configured by in-house informatics staff.

- LabWare LIMS is proprietary and configurable by administrative-level users without need to contact the vendor.
- Netbooks is an in-house solution developed on a .NET framework.

The API was developed by configuring custom web APIs that return JSON-formatted data in an agreed-upon format.

Schedulers on both systems coordinate daily sends of sample data and test requests, though users can also manually trigger test requests. Test results are released to KEMRI in real time.

