

SMART

SMS printer technology for early infant diagnosis of HIV/AIDS

In Nigeria, approximately 230,000 HIV-positive pregnant women are at risk of infecting their babies due to the absence of adequate care. Early infant diagnosis (EID) and immediate treatment with antiretroviral therapy (ART) are necessary measures to reduce this burden. However, almost 50% of infants tested for HIV across sub-Saharan Africa never receive their test results. Moreover, EID of HIV requires sophisticated virologic testing using PCR, which can only be performed at a handful of laboratories in Nigeria. This creates challenges for communicating the results back to the health facilities, and thus, contributes to delays in providing timely treatment. To address these challenges, the Government of Nigeria, in collaboration with a range of partners, has coordinated an aggressive response by scaling up prevention of maternal-to-child transmission (PMTCT) programs from 2010 to 2015.

The Clinton Health Access Initiative (CHAI) chose to address one of the primary objectives of Nigeria's PMTCT scale-up plan: to ensure that at least 90% of all HIV-exposed infants have access to EID services. CHAI partnered with two engineering companies to develop a new technology, SMS printers, to strengthen EID services by reducing the turnaround time for test results by more than half. These SMS Printers to Accelerate Return of Test Results for Early Infant Diagnosis of HIV/AIDS became known as the SMART Program. To keep

pace with the rapid expansion of EID, CHAI, in partnership with the Federal Ministry of Health and Implementing Partners (IPs), scaled up SMART in January 2010, integrating the program into local and national management structures.

Implementation date: January 2010

About SMART

Nearly every district in Nigeria has network coverage for mobile telecommunications, even in remote areas lacking roads and electricity. SMS printers combine mobile SMS technology and small, battery-operated printers, allowing health facilities to receive and print EID test results without the need for computers and internet access or waiting for hard copies to be delivered. The only consumable involved is thermal paper for printing.

When an infant is tested at a remote health facility, the sample is sent to the lab. HIV test results are immediately reported back to the health facility via SMS technology, received and printed by the SMS printer, and shared with the baby's caregiver. Unskilled health workers are easily trained on operating the printers and minimal maintenance requirements.

CHAI works closely with the Federal Ministry of Health, the PCR lab units and the IPs from both the President's Emergency Plan for AIDS Relief (PEPFAR) and the Global Fund to Fight AIDS, Tuberculosis and Malaria to develop management and technical expertise, both locally and nationally. The Hewlett-Packard Company also works with local universities to provide a centralized computing infrastructure as well as software applications for labs to enable real-time management and monitoring of program data.

Evaluation and Results

Since scale-up in January 2010, a total of 203 SMS printers have been installed in health facilities across all 6 geopolitical zones of Nigeria and over 500 skilled and unskilled health workers have been trained on printer operation. In 2012, a large scale, national impact



assessment of the SMS printer program to evaluate its impact on the National EID Program and generate robust evidence on its benefits was carried out in 33 study sites.

The impact assessment report was disseminated in 2013 to serve as an advocacy tool for partner buy-in on the technological innovation. Analysis of results showed significant reduction in turnaround time by approximately 21 days when compared to traditional paper-based methods, and the SMS printer system was 4.6 times cheaper than the paper-based method. Further analysis suggested that infant loss-to-follow-up was reduced through the use of SMS printers to facilitate return of results.

The report highlighted key recommendations to address programmatic and operational challenges with the SMART program. One recommendation was to demonstrate the needed support from all IPs for the successful operation of SMS printers on the field. Thus far, CHAI has secured buy-in from 50% of IPs who carry out routine monitoring and evaluation of health facilities and the SMS printers in the field, and provide troubleshooting assistance when required. Some partners have also procured SMS printers for use at their EID sites. CHAI continues to partner with the Federal Ministry of Health to provide technical support to IPs on SMS printer-related matters, when needed.

Lessons Learned

- The ability to instantly transfer results from the lab to the health facility via SMS has been demonstrated to reduce turnaround time significantly, thereby helping caregivers and clinicians to promptly initiate life-saving ART, resulting in fewer infants being lost to follow-up.
- IPs lacked a sense of ownership over the technology because they were not involved in the initial stages of design. To resolve this issue, CHAI adjusted its installation approach by adopting a “train-the-trainer” model in order to foster a greater sense of ownership among partners.
- CHAI created and disseminated a troubleshooting

guide in response to many sites that failed to report if printers were not functioning properly

Conclusion

The SMART program addresses a critical barrier to EID by leveraging simple mobile technology and design to more rapidly communicate HIV test results from the laboratories back to the health facilities. By providing aggregated data across all SMART-implemented sites, the government is then able to track PMTCT performance indicators nationally, thereby tailoring prevention and treatment efforts.

Geographic Coverage: Nigeria

Implementation Partners: Clinton Health Access Initiative (CHAI), Federal Ministry of Health of Nigeria, HIV/AIDS Division; Hewlett-Packard Company; Institute of Human Virology, Nigeria; PEPFAR Implementing Partners; Global Fund Implementing Partners

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