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In Senegal, the availability and reliability of health data was constrained due to a number of causes. The SEDA mobile phone-based reporting system for health data assists in easier and more timely reporting.

SEDA Automated Health Data Exchange System

IMPLEMENTATION DATE: October 2011 to Present

Applying mHealth to improve data monitoring in Senegal

In Senegal, the Automated Health Data Exchange System (SEDA) is an integrated health data and stock-out monitoring system that uses inexpensive and ubiquitous mobile phones for data collection, reporting, and supervision. Data are aggregated in a web-based central system to visualize and manage decision support. SEDA targets the IntraHealth International-led Health Services Improvement (HSI) project's aim to improve the quality and frequency of data collected at the district and regional levels in partnership with Senegal's Ministry of Health and Social Action. A prime goal of SEDA is to transform the methods and speed with which health workers, supervisors, and senior-level ministry staff use collected data to make decisions about maternal, neonatal, and child health programs, and to prevent stock-outs of essential medicines and contraceptive products. Prior to SEDA, available data were often outdated, incomplete, and unreliable. This situation left the ministry unable to make timely decisions to improve health programs, appropriately deploy health workers, or positively influence the health of clients and their families.

About SEDA

SEDA analytics allow health system managers to visualize data submitted from health facilities via mobile phone. In collaboration with the ministry, HSI developed 70 specific health indicators that address key health issues in Senegal, including family planning, maternal and child health, malaria, HIV/AIDS referrals, and health commodities/products. These facility-level indicators are reported into a web-based data analytics platform that creates custom data visualizations and dashboards. Supervisors at all levels of the health system

can use SEDA to monitor and ensure data consistency and completeness, and analyze data through the system's predefined dashboards.

SEDA employs user-centered design principles and aligns with existing technologies to provide key indicators. It is possible to scale SEDA nationally wherever GSM networks (the most widely used cell phone technology) are available. Moreover, using ubiquitous and inexpensive technology supports sustainability. SEDA's open source technology includes Ubuntu

server software using a standard GSM gateway, GAMMU SMS texting software, and JSON forms on mobile phone SIM cards to collect structured data. The system protects privacy and security by using phone numbers to authenticate data from the local level. Web-based authentication and security methods protect data at the central server.

SEDA aligns with the Ministry of Health's district-level deployment of DHIS2 by interoperating with DHIS2 as a mobile data collection tool. Aggregate-level data reported into the mobile system from health facilities are automatically uploaded into DHIS2 once validated.

Evaluation and Results

Benefits of SEDA include the use of inexpensive mobile phones and related infrastructure to reliably upload data for analysis and decision-making. Collected operational data are useful to supervisors and health care providers because they allow for timely and direct feedback about data reporting and errors. SEDA has also helped to eliminate the repetition or omission of data, reduced duplication of effort during reporting, and made data more transparent and available. Likewise, the HSI project has found that SEDA encourages participation in the information-reporting cycle since it permits providers to directly see how their performance corresponds to district, regional, and national indicators.

By the end of 2014, 35 ministry staff and over 500 health workers in 21 districts in four regions covering 318 service delivery points (SDPs) were using SEDA. In 2015, the HSI project anticipates adding an additional 100 health workers from 800 SDPs in 54 districts in 10 regions to the system. An analysis of data uploaded by providers into SEDA shows that in districts using SEDA for reporting, 80 percent of pregnant women received intermittent preventive treatment for malaria, 96 percent of births received active management of third stage of labor, and 82 percent of newborns received a check-up by a qualified provider one to three days postpartum. With SEDA, providers, supervisors, and district and regional health teams are better able to directly analyze, monitor, and improve performance in a timely and efficient manner.

Despite SEDA's success, challenges still exist to enabling all health workers to access and use the system. Facilities and health districts often grapple with the high cost of mobile services, experience insufficient wireless coverage, or a lack of reliable electricity. Furthermore, providers in some health districts have commented on the need to further expand the current list of indicators to respond to emerging issues such as Ebola.

Lessons Learned

- The automatic recovery and analysis of health data by mobile technologies is **reliable and inexpensive**.
- The use of data collected at the operational level **adds value** and is a source of motivation for providers and district health teams.
- Automated reports are **time savers** and improve data management.
- Data can be **easily analyzed** at all levels of the health system.
- **Constraints include** insufficient wireless coverage in some areas of the country; limited Internet access in certain areas; and barriers of electricity and cost, which can prevent some health districts and providers from accessing and using SEDA.

Conclusion

In Senegal, a number of factors previously constrained the availability and reliability of health data, including health worker data retention, lack of infrastructure in rural health facilities, limited resources, and inadequate staff engagement. IntraHealth, in collaboration with the Ministry of Health, is addressing these issues by implementing the SEDA mobile phone-based reporting system for health data. SEDA's benefits include the use of inexpensive mobile phones and related infrastructure to reliably upload data for analysis.

When operational data are routinely and reliably collected, they can be useful to the health workers implicated in the reporting process. By assisting the government of Senegal to build an efficient health information system accessible to all cadres of health workers, the HSI project is ensuring that health data can be more easily reported and acted upon. The new and easy-to-use SEDA technology—which streamlines the collection and exploitation of health data by providers, supervisors, and district and regional health teams—will strengthen decision-making and ultimately improve the health of communities. ■

Geographic Coverage: 10 out of 14 regions in Senegal

Implementation Partners: IntraHealth International; Ministry of Health and Social Action; Medic Mobile

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