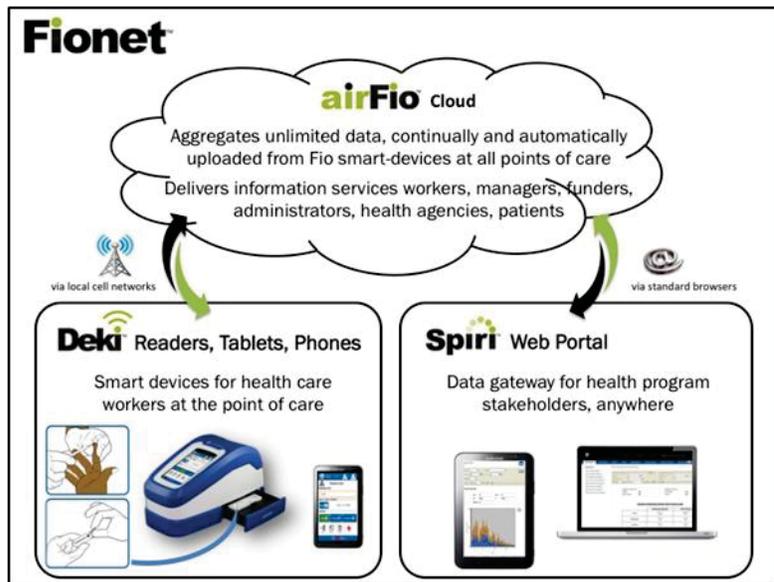


FIONET: MOBILE DIAGNOSTICS INTEGRATED WITH CLOUD INFORMATION SERVICES



BRIEF OVERVIEW

Two of the biggest problems in the management of infectious diseases in resource-limited settings are 1) inadequate diagnosis and clinical management at the point of care, and 2) inadequate capture and transfer of point-of-care data to health program stakeholders for monitoring and evaluation, continuous quality improvement, and resource allocation. Rapid diagnostic tests (RDTs), the only practical diagnostic tests compatible with point-of-care settings, are read by eye, commonly resulting in field accuracy far below the manufacturer's performance rating. Meanwhile, health care workers are too busy delivering essential care to patients to focus on data capture. As a result, data from the point of care – where planning and trends must begin and where spending outcomes have their end – is largely inaccessible.

Fio Corporation has developed Fionet to address these problems. Fionet comprises three integrated components: Deki, Spiri, and airFio. Deki mobile software applications and companion devices for health care workers integrate clinical workflow guidance and digital data capture at the point of care, then transmit records of patient encounters to airFio. Deki is designed for use with standard Android phones, tablets,

and the Deki Reader, a mobile, in vitro diagnostic device that interprets commercially available RDTs for infectious diseases such as malaria, HIV, syphilis, hepatitis, and dengue and is CE-marked for malaria RDTs. airFio is a secure cloud database that stores point-of-care data transmitted by Deki over local mobile phone networks. Spiri is the gateway via web browsers to airFio and its menu of cloud information services. Spiri allows health program stakeholders to remotely monitor diagnostic performance, adherence to case management protocols, health care workers activity levels, and other health performance indicators.

ABOUT FIONET IN GHANA

The Ghana Health Service (GHS) expressed a desire to expand the usage of RDTs throughout Ghana with the following objectives: 1) improved quality control of diagnostic procedures, 2) consistent and highly accurate interpretation of RDTs and 3) improved data capture from clinical encounters where RDTs are used. In September 2012, GHS and Fio Corporation launched an initial deployment of Fionet in three districts of the Accra region: Greater Accra East, Dangme East and Dangme West.

EVALUATION AND RESULTS

Before launching Fionet, over 180 GHS and private health workers and managers were trained on Fionet. Participating facilities and managers were instructed to utilize Fionet full time for malaria RDT processing and interpretation as well as for malaria reporting and case management. Deki Readers were configured to collect data on malaria RDTs as well as microscopy samples for comprehensive reporting. Since the launch, Deki Readers have been active in 50 clinics and over 20,000 records have been uploaded to the airFio cloud database. 500 RDT-based and 250 microscopy-based records continue to be collected each week.

The Accra Phase demonstrated the effectiveness of Deki Readers to ensure RDT quality through step-by-step guidance during RDT processing, identification of misuse or poor RDT quality, and objective interpretation of RDT results. RDT processing quality issues including

using expired RDTs, mismatching patients and RDTs, mistakes in incubation timing, and evidence of RDT misuse such as adding too much blood, were detected by Deki Readers in 26% of RDTs processed.



The Deki Readers also improved district and program managers' abilities to remotely monitor quality control at the individual-, facility-, and program-wide levels. Records uploaded by Deki are geo-tagged and contain complete user, facility, and patient data; RDT records contain an image of the RDT being processed. Through Spiri, managers remotely audited diagnostic performance and monitored adherence to case management protocols.

Data captured was automatically transmitted over the local mobile phone network; 74% of records were uploaded to airFio within 10 minutes, 89% within two hours, and 97% within one week. The data was automatically aggregated and securely stored on airFio, and Sub-district, district, regional and national reports were automatically updated, eliminating laborious manual data entry and reporting.

LESSONS LEARNED

- During the training period, many health workers whom had little prior experience with RDTs made significant processing errors. Fio enhanced the Deki Readers via an over-the-air software update to better identify conditions of RDT misprocessing, invalidate RDTs of compromised quality, and recommend that the health worker repeat the test.
- Midway through the program, the flow of data to airFio slowed due to RDT stock outs. The program switched to an RDT from a different manufacturer

which the Deki Reader was not yet compatible with. Fio has since added that and others to its list of compatible RDTs.

CONCLUSION

The Accra Phase demonstrated that Fionet works in Ghana and is well suited to meet the needs of the Ghana Health Service in a transformative manner that can be rapidly deployed and centrally managed using the existing mobile phone infrastructure. GHS has the systems and capability to train users and leverage Fionet to make measurable and sustainable gains in monitoring and evaluation, quality of diagnoses, improved health care worker performance, and minimization of material waste in primary health care services.

As a result of the Accra Phase's success, Fio and GHS are working to implement a phased deployment of Fionet in the country over the course of 2013/14.

GEOGRAPHIC COVERAGE

Ghana. Fionet is also being utilized in Kenya, Tanzania, Indonesia, Democratic Republic of Congo, Sierra Leone, and Colombia.

IMPLEMENTATION PARTNERS

Ghana Ministry of Health, Ghana Health Service, Fio Corporation, Fio Health Ghana Ltd.

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