



USAID | DELIVER PROJECT

Brief

Traceability in Ethiopia's Health Sector: Piloting GS1 Barcodes with Global Trade Item Number Serialization to Track Health Commodities from Supplier to Health Facility

Overview

Barcodes have been used in the food industry for several decades to identify and capture product information and trace products from the point of origin to their destination. More recently, the global health sector has applied the technology in health commodity supply chains. Despite its widespread use in North America and Europe, Africa has relatively fewer examples of its application.

Ethiopia's Pharmaceuticals Fund and Supply Agency (PFSA), with support from the USAID | DELIVER PROJECT, has successfully piloted the GS1¹ barcode technology to enhance their health commodity supply chain. PFSA, a division of the Federal Ministry of Health, currently distributes more than U.S. \$850 million dollars' worth of health commodities annually, supplying nearly 20,000 health service delivery points: hospitals, health centers, and health posts.

The pilot project developed a custom mobile app—GS1 Barcode Reader—and it had positive results, including faster and more accurate data entry, as well as the successful tracking and tracing of health products from manufacturer to health facilities.

How did the pilot project work?

The USAID | DELIVER PROJECT, United Nations Population Fund, and PFSA collaborated to launch a pilot project in Ethiopia that would test the feasibility of using GS1 barcode technology

DECEMBER 2016

This publication was produced for review by the U.S. Agency for International Development. It was prepared by the USAID | DELIVER PROJECT, Task Order 4.

¹ Global Standards 1 (GS1) is an international standards organization that designs and implements supply chain standards for a variety of sectors, from retail and health to transport and logistics. <http://www.gs1.org/barcodes>

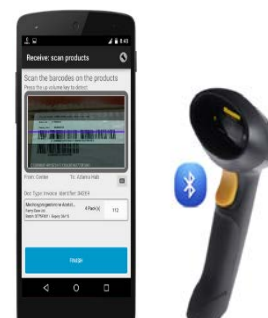
with Global Trade Item Number (GTIN) serialization to track a health commodity from a supplier to health facilities.

- The product piloted was an emergency contraceptive pill (levonorgestrel 750 mg), supplied by Famy Care Limited, India.
- The supplier printed barcodes (both linear 1D and 2D; e.g., QR codes) on tertiary- and secondary-level packaging of the product. The barcodes included a **GTIN with serialization that uniquely identifies the products down to the item level**.
- Boxes of the product were then shipped from the supplier to PFSA's central warehouse in Addis Ababa, Ethiopia.
- Upon receipt at the warehouse, a barcode reader app, linked to an existing health commodity management information system (HCMIS)², scanned the GS1 barcodes on all the packaging (see figures 1 and 2).
- The barcode reader worked by checking scanned GTINs placed in the barcodes against a local database of known GTINs in the HCMIS.
- At the central warehouse, the products to be issued to the Addis Ababa distribution hub—one of 17 hubs in the country—were then scanned.
- Upon receipt, using the barcode reader, the products were distributed to the Addis Ababa distribution hub and scanned.
- At the Addis Ababa distribution hub, the products were scanned again and issued to the two health facilities in the Addis Ababa area (see figure 3 for pilot project supply chain stages).

Benefits

- **Traceability.** Utilizing GTIN's that include serialization gave PFSA the ability to track and trace the distribution of each product, down to the individual package. This degree of traceability can assist in many critical ways, from implementing product recalls to reducing counterfeiting.
- **Time savings.** Prior to the pilot project, information on health commodities, such as the batch number and expiration dates, were manually put into the HCIMS for each level of packaging. Use of the barcode reader allowed information to be captured in a timelier manner—2.5 times faster when compared to the manual process.

Figure 1. HCMIS GSI Barcode Reader (Smartphone and handheld scanner)



The GSI Barcode Reader was a custom built android **mobile application**. The app, using the CMOS camera found on most android phones, or an optional Bluetooth scanner hardware; to scan GS1 barcodes **to identify the product, batch number, expiry date, serial number, and quantity of the commodity in the transactions**. It also keeps the geographical location of where the scans take place and, periodically, syncs to the Cloud, enabling near real-time data visibility of the data captured by the barcode reader.

Figure 2. Scanning GSI Barcodes on Tertiary Level Boxes



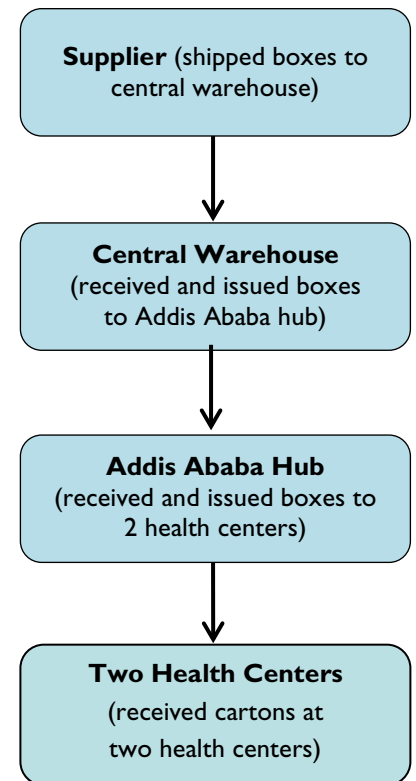
² The HCMIS is a locally developed, open source, custom software platform created by the USAID | DELIVER PROJECT to support warehouse management, inventory control, and logistics management information.

- **Reduction in errors and redundancies.** Using the barcode technology also means more accurate data and less redundancies, compared to inputting information manually.
- **Adaptability.** Because the software was custom built, any adjustments that needed to be made were executed quickly, which would not be the possible with a standard commercial mobile application product.
- **Real-time centralized information.** The pilot project enabled the staff at PFSA to, in real-time, view and track the product and transaction information at each stage in the supply chain on a customized web platform.

Lessons Learned

The pilot project received very positive feedback from PFSA staff, particularly for the speed and accuracy by which data was collected. A number of lessons were also learned to inform potential broader application. Issues, such as the quality, size, and placement of the barcodes on the products, were noted as critical factors in determining the success rate of the application. Because of their smaller size, 2D data barcodes, for example, are more difficult for the mobile application to read, compared to 1D barcodes. Tracking secondary-level packages at the central warehouse was considered challenging if taken to scale; therefore, tracking at the container level may provide more immediate benefits. Finally, a dedicated hardware scanner (rather than a Smartphone) should be considered for future work. Overall, this pilot project has promising results to inform broader traceability efforts in Ethiopia's public health sector.

Figure 3. Pilot Project Supply Chain Stages



The USAID | DELIVER PROJECT, Task Order 4, is funded by the U.S. Agency for International Development, and implemented by John Snow, Inc. The project improves essential health commodity supply chains by strengthening logistics management information systems, streamlining distribution systems, identifying financial resources for procurement and supply chain operations, and enhancing forecasting and procurement planning. The project also encourages policymakers and donors to support logistics as a critical factor in the overall success of their health care mandates.

The authors' views expressed in this publication do not necessarily reflect the views of the U.S. Agency for International Development or the United States Government.

USAID | DELIVER PROJECT

John Snow, Inc.

1616 Fort Myer Drive, 16th Floor

Arlington, VA 22209 USA

Phone: 703-528-7474

Fax: 703-528-7480

Email: askdeliver@jsi.com

Internet: deliver.jsi.com