USAID | DELIVER PROJECT

FROM THE AMERICAN PEOPLE

Ethiopia Pilot for E2E Supply Chain Data Visibility

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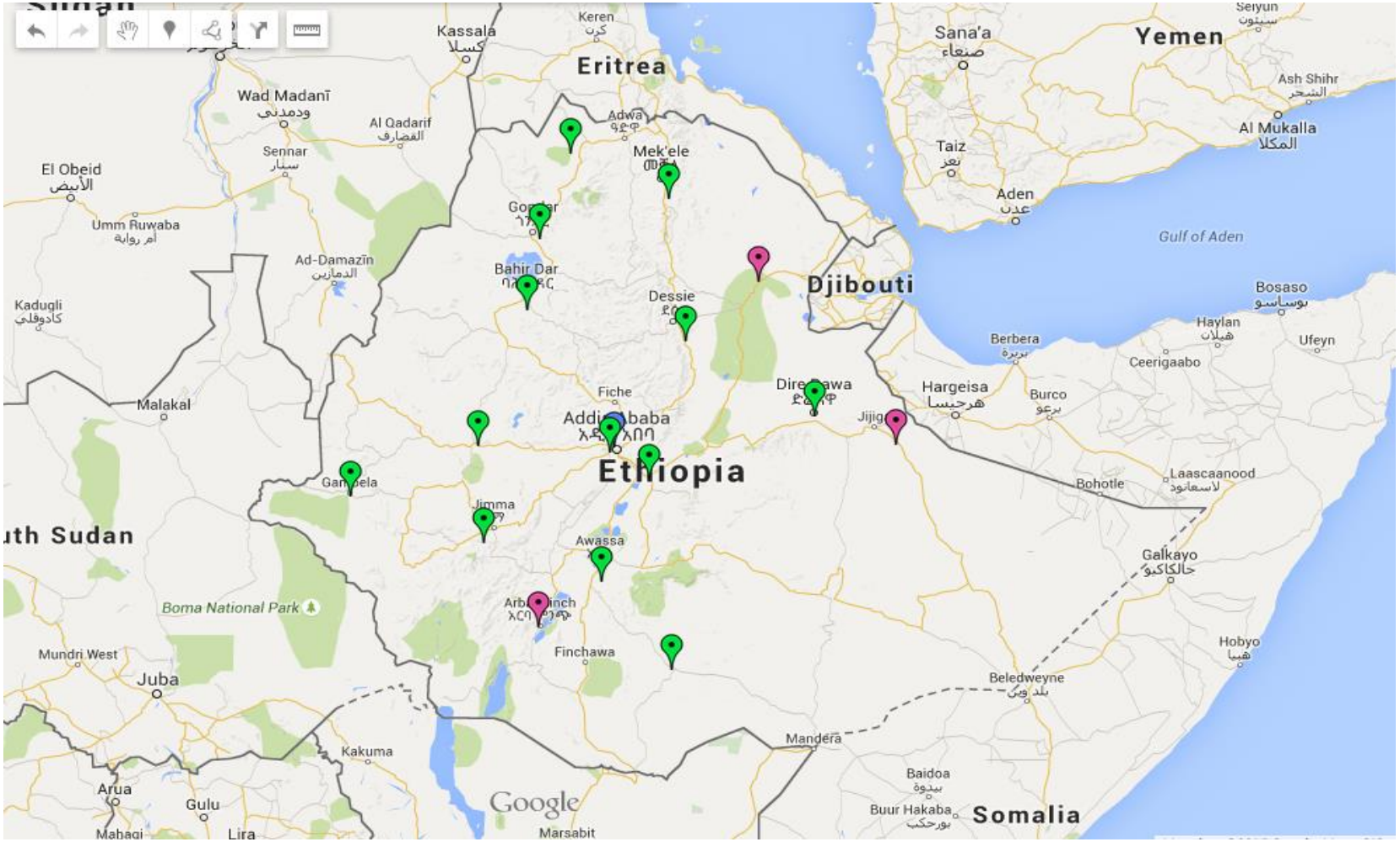
USAID DELIVER PROJECT

- Funded by the US government, the USAID | DELIVER PROJECT designs, develops, strengthens, and operates reliable and sustainable public health supply chains in developing countries.
- The project works on a range of health commodities, including contraceptives and condoms, essential drugs, and various commodities for HIV/AIDS, malaria, maternal and child health, infectious diseases, and avian influenza.
- Our motto—**No Product, No Program**—is a reminder that health programs cannot operate successfully without a full supply of essential commodities.

Ethiopia Ministry of Health & PFSA

- The supply chain for pharmaceutical products and medical supplies is managed by the Pharmaceutical Fund and Supply Agency (PFSA)
- PFSA is an automatous federal agency under the Ministry of Health; one of the three agencies under the Ministry
- With a population of 92 million; PFSA handles over $850 million dollars worth of commodities
- About 85% of these commodities are donated to support Family Planning, HIV, Malaria, TB, etc. programs

Central and Regional Distribution Centers



Health Commodities Management Information System (HCMIS)

- HCMIS is a warehouse and inventory management software developed to support PFSA
- The application captures all transactions (Receives & Issues, transfers, orders, etc.) at Central and Regional hubs
- HCMIS is used to serve over 3,500 public health facilities (Hospitals and Health Centers) and thousands more private pharmacies and clinics
- Dashboard provides near live stock status across the country for use by the MOH as well as Donors

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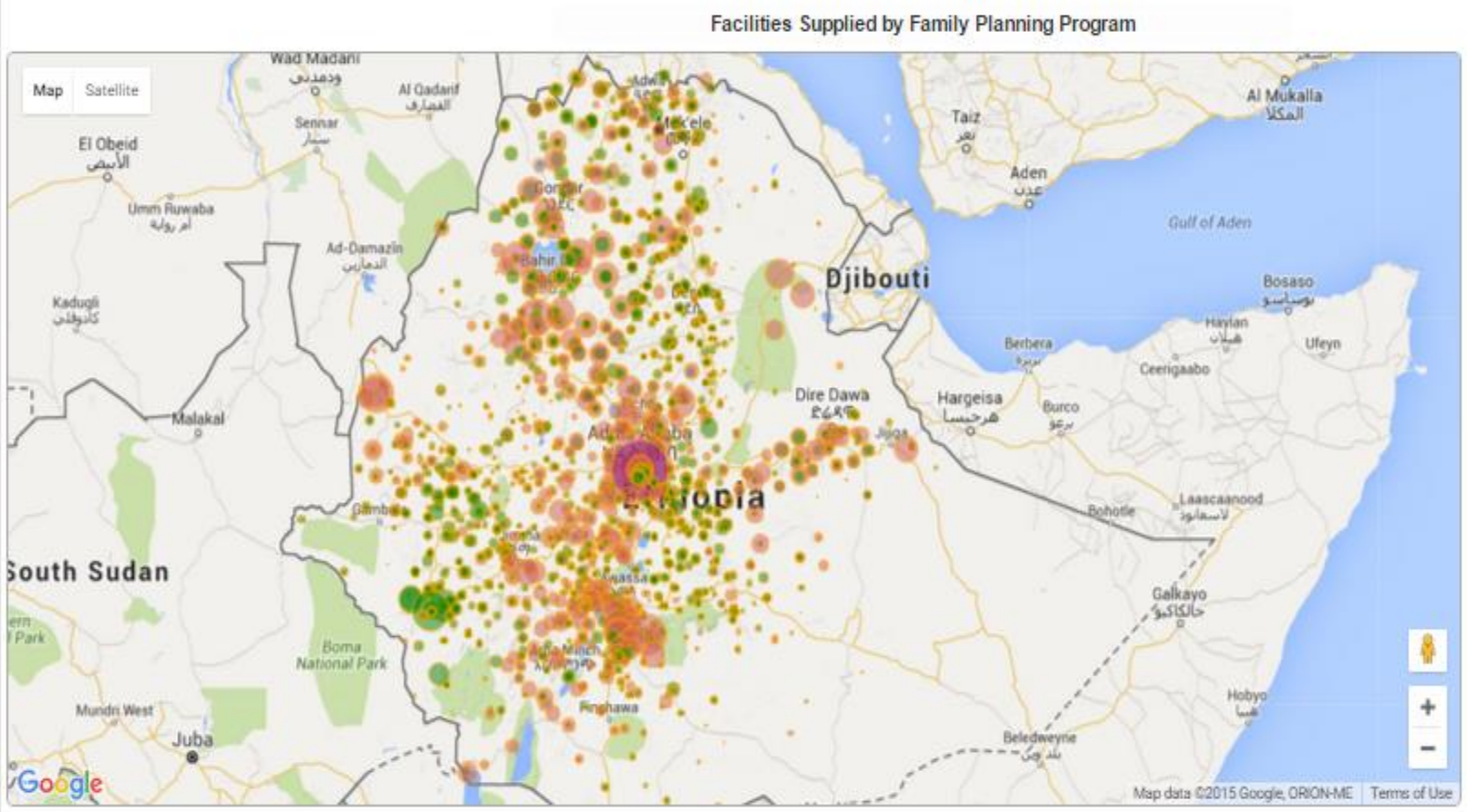
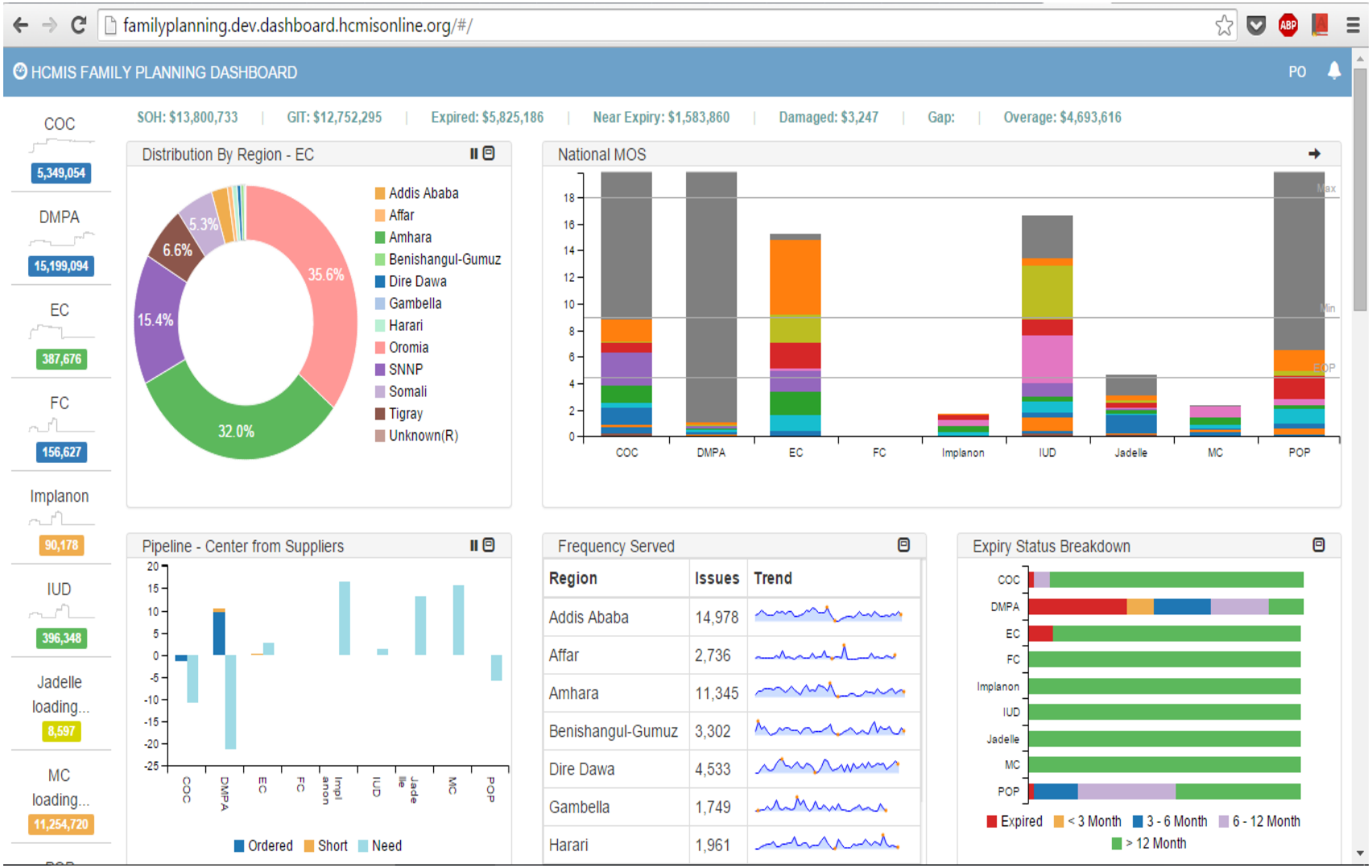
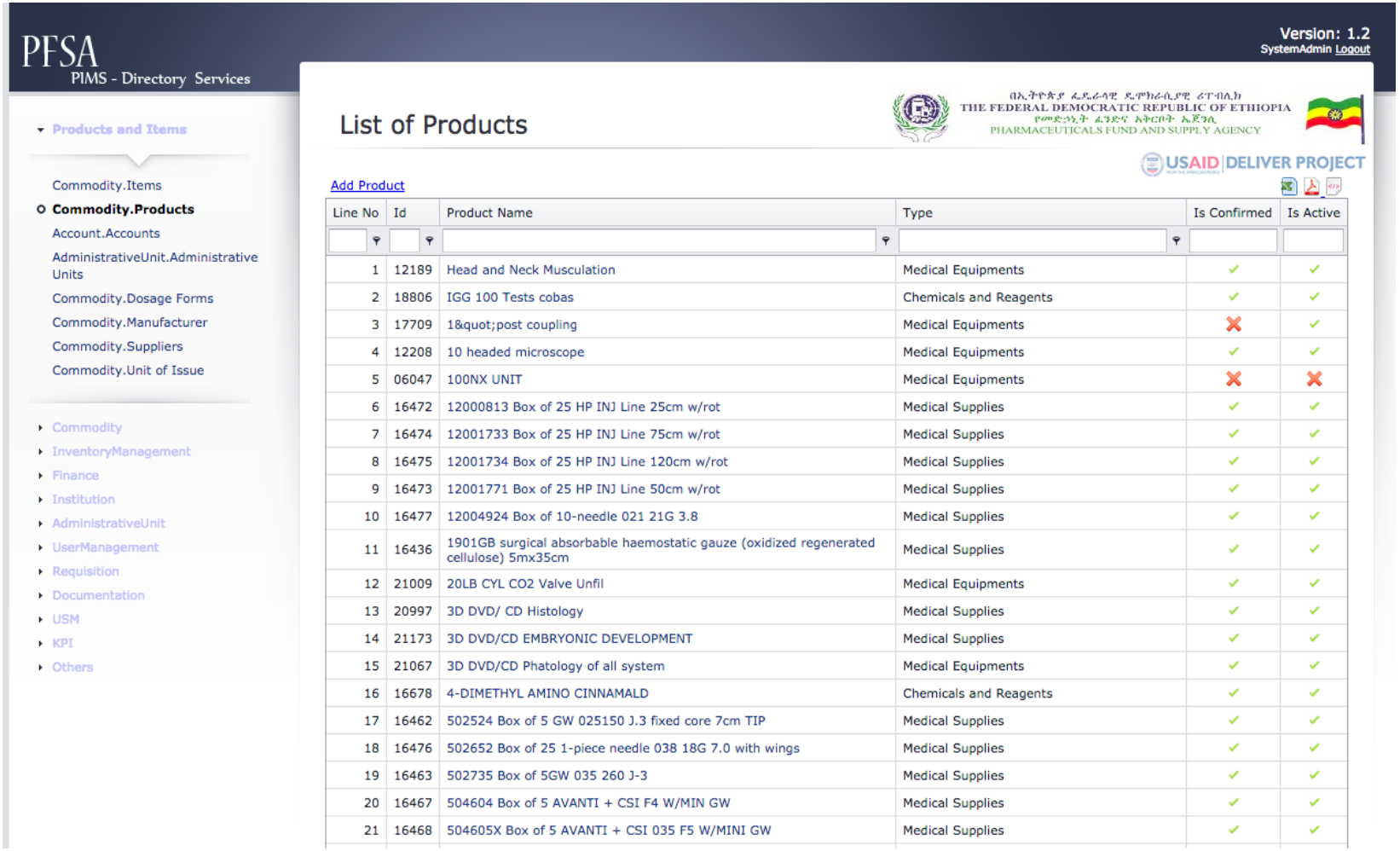
Where Family Planning Commodities go




familyplanning.dev.dashboard.hcmisonline.org/#/
HCMIS FAMILY PLANNING DASHBOARD
PO
SOH: $13,800,733 | GIT: $12,752,295 | Expired: $5,825,186 | Near Expiry: $1,583,860 | Damaged: $3,247 | Gap: | Overage: $4,693,616
COC 5,349,054
DMPA 15,199,094
EC 387,676
FC 156,627
Implanon 90,178
IUD 396,348
Jadelle loading... 8,597
MC loading... 11,254,720
Distribution By Region - EC
35.6%
32.0%
15.4%
6.6%
5.3%
Addis Ababa
Affar
Amhara
Benishangul-Gumuz
Dire Dawa
Gambella
Harari
Oromia
SNNP
Somali
Tigray
Unknown(R)
National MOS
COC
DMPA
EC
FC
Implanon
IUD
Jadelle
MC
POP
Pipeline - Center from Suppliers
Ordered
Short
Need
Frequency Served
Region | Issues | Trend
Addis Ababa 14,978
Affar 2,736
Amhara 11,345
Benishangul-Gumuz 3,302
Dire Dawa 4,533
Gambella 1,749
Harari 1,961
Expiry Status Breakdown
Expired
< 3 Month
3 - 6 Month
6 - 12 Month
> 12 Month

Directory Services – Master Lookup Database

- Central database to house commonly shared variables across the system such as:
  - Product/Items
  - Manufactures
  - Supplier
  - Facilities
  - Accounts
  - Region/Zone/Districts
  - Lookup Types (e.g. Purchase Order Status, etc.)



PFSA
PIMS - Directory Services

Version: 1.2
SystemAdmin Logout

- Products and Items
  - Commodity.Items
  - **Commodity.Products**
  - Account.Accounts
  - AdministrativeUnit.Administrative Units
  - Commodity.Dosage Forms
  - Commodity.Manufacturer
  - Commodity.Suppliers
  - Commodity.Unit of Issue
- Commodity
- InventoryManagement
- Finance
- Institution
- AdministrativeUnit
- UserManagement
- Requisition
- Documentation
- USM
- KPI
- Others

List of Products

የኢትዮጵያ ፌዴራላዊ ዲሞክራሲያዊ ሪፐብሊክ
THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA
የመድኃኒት ፈንድና አቅርቦት ኤጀንሲ
PHARMACEUTICALS FUND AND SUPPLY AGENCY

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Add Product

Line No	Id	Product Name	Type	Is Confirmed	Is Active
1	12189	Head and Neck Musculation	Medical Equipments	✓	✓
2	18806	IGG 100 Tests cobas	Chemicals and Reagents	✓	✓
3	17709	1"post coupling	Medical Equipments	✗	✓
4	12208	10 headed microscope	Medical Equipments	✓	✓
5	06047	100NX UNIT	Medical Equipments	✗	✗
6	16472	12000813 Box of 25 HP INJ Line 25cm w/rot	Medical Supplies	✓	✓
7	16474	12001733 Box of 25 HP INJ Line 75cm w/rot	Medical Supplies	✓	✓
8	16475	12001734 Box of 25 HP INJ Line 120cm w/rot	Medical Supplies	✓	✓
9	16473	12001771 Box of 25 HP INJ Line 50cm w/rot	Medical Supplies	✓	✓
10	16477	12004924 Box of 10-needle 021 21G 3.8	Medical Supplies	✓	✓
11	16436	1901GB surgical absorbable haemostatic gauze (oxidized regenerated cellulose) 5mx35cm	Medical Supplies	✓	✓
12	21009	20LB CYL CO2 Valve Unfil	Medical Equipments	✓	✓
13	20997	3D DVD/ CD Histology	Medical Supplies	✓	✓
14	21173	3D DVD/CD EMBRYONIC DEVELOPMENT	Medical Supplies	✓	✓
15	21067	3D DVD/CD Phatology of all system	Medical Equipments	✓	✓
16	16678	4-DIMETHYL AMINO CINNAMALD	Chemicals and Reagents	✓	✓
17	16462	502524 Box of 5 GW 025150 J.3 fixed core 7cm TIP	Medical Supplies	✓	✓
18	16476	502652 Box of 25 1-piece needle 038 18G 7.0 with wings	Medical Supplies	✓	✓
19	16463	502735 Box of 5GW 035 260 J-3	Medical Supplies	✓	✓
20	16467	504604 Box of 5 AVANTI + CSI F4 W/MIN GW	Medical Supplies	✓	✓
21	16468	504605X Box of 5 AVANTI + CSI 035 F5 W/MINI GW	Medical Supplies	✓	✓

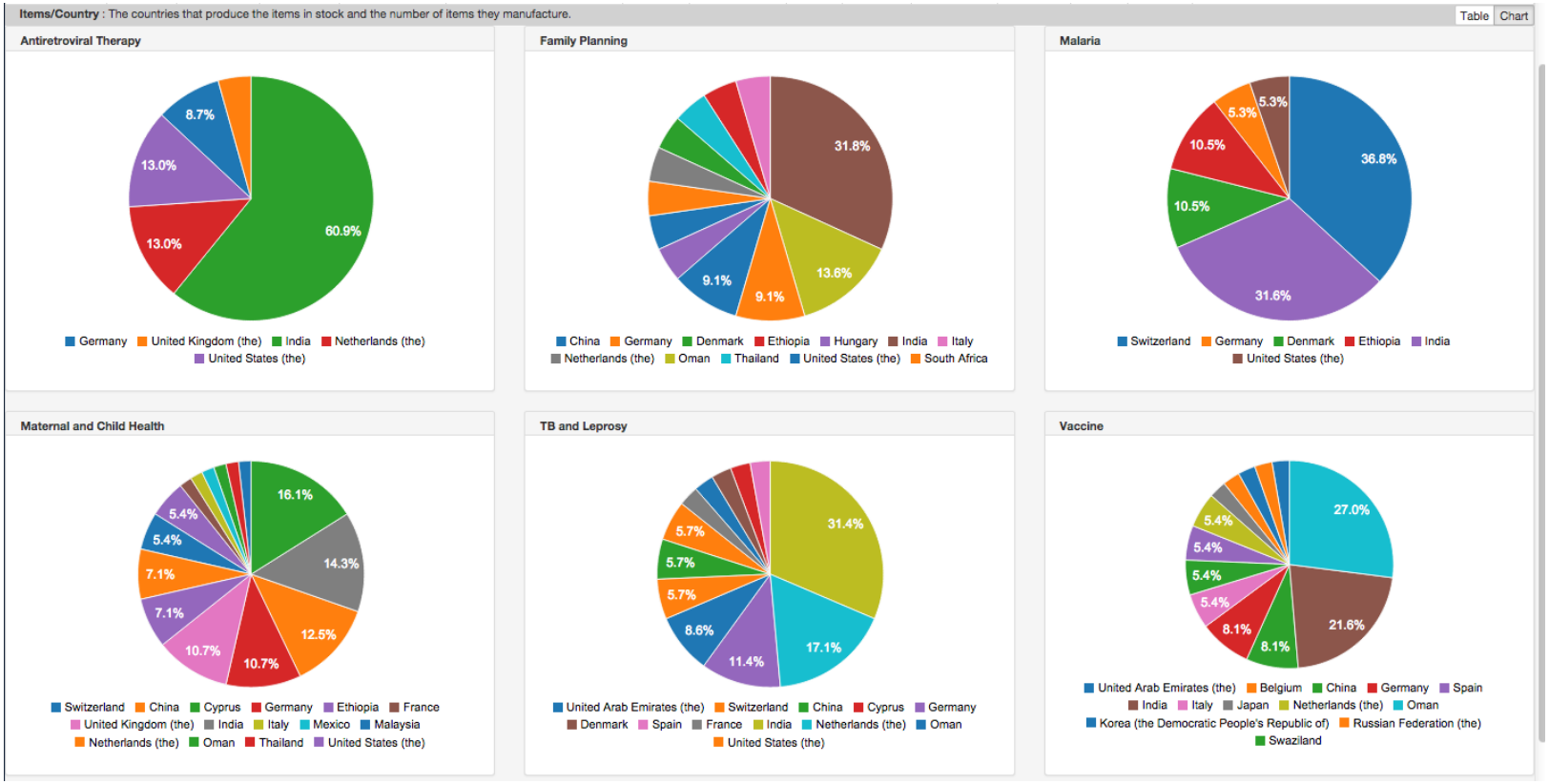
Challenges

- Unmanaged lists
  - Products / Item
  - Suppliers / Manufactures
  - Facilities
- Receipt
  - Manual receipts
- Pipeline / Confirmation
  - What's coming
  - What's received / as well as not received

Unmanaged lists

- Products
  - Most, it not all, products purchased for donation must be approved by the WHO (not the FDA; in the case of the US)
  - Very few of the products we see in country have any kind of barcode (with few exceptions)
  - Countries do not always have a say on the purchase process which adds to the complexity
  - Having to maintain a local ‘manual list’ of products and related variables leads to bad data – simply unsustainable
  - Adoption GTINS, GLNs & possible use of GDSN

Countries by Program



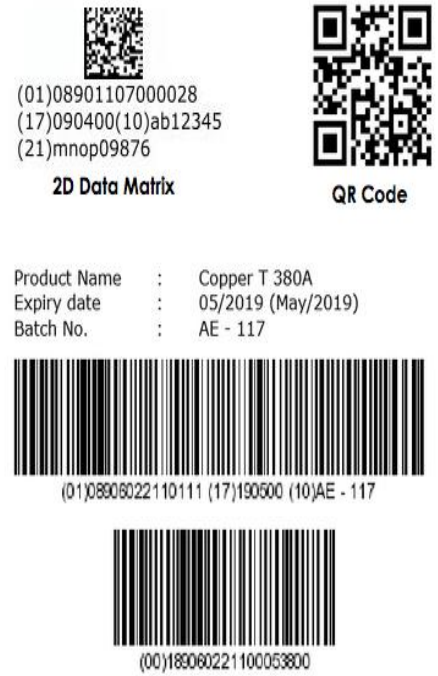
Duplicate Manufactures

42	AB Amsterdam	✓	✓
43	Abbot Diagnostic Divisiona	✓	✓
44	Abbot Laboratories Ltd.	✓	✓
45	Abbott GmbH and Co.	✓	✓
46	Abbott Molecular Inc.	✓	✓
47	Abima Trade and engineering PLC.	✓	✓
48	Abon Biopharm Hanzhou Co. Ltd.	✓	✓
49	ABS international FZE	✓	✓
50	Abtek Biologicals Ltd	✓	✓
51	Abu Dhabi Medical Devices Co.	✓	✓
52	Access Bio Inc.	✓	✓
53	Acid Chem International	✗	✓
54	Acid Chem International SDN.BHD	✓	✓
55	Acoma	✓	✓
56	Acon Biotech	✓	✓
57	ACON Laboratories Inc.	✓	✓
58	ACP	✓	✓
59	Action Medeor	✓	✓

Barcode Pilot

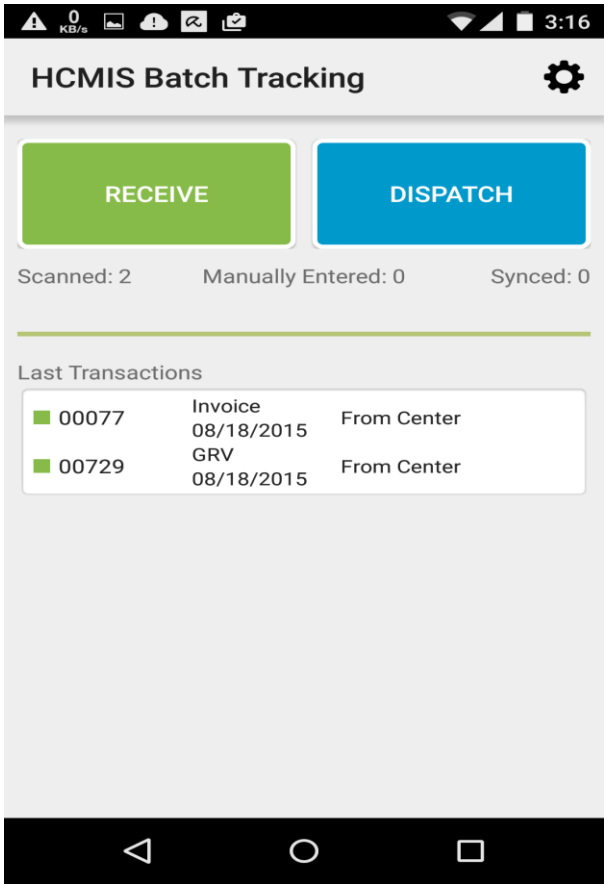
HCMIS GS1 BARCODE READER

The HCMIS GS1 BARCODE READER is an android mobile application designed to scan **GS1** barcodes available on pharmaceutical products during warehouse transactions. The **batch number, expiry date, serial number** and quantity of commodities and other meta-data like geolocation captured by the mobile application enables our partners to build a robust supply chain management system.



HCMIS Barcode Scanner

- The HCMIS Barcode scanner application is a locally developed android application that makes use of the CMOS camera
- Using open source barcode decoding library called Zxing
- Also makes use of GSON and ActiveAndroid for serializing and de-serializing data to and from JSON format

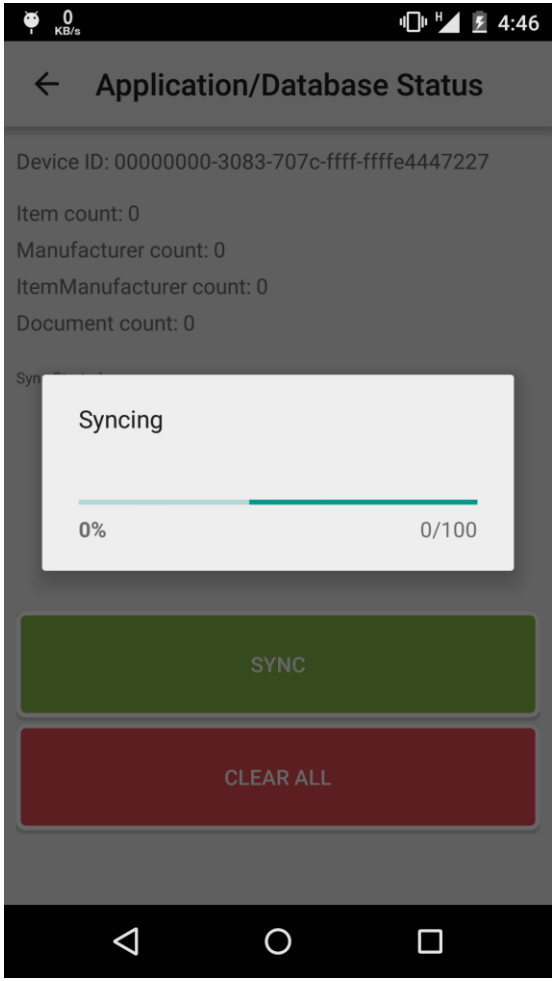


HCMIS Barcode Scanner Main Screen

Continued

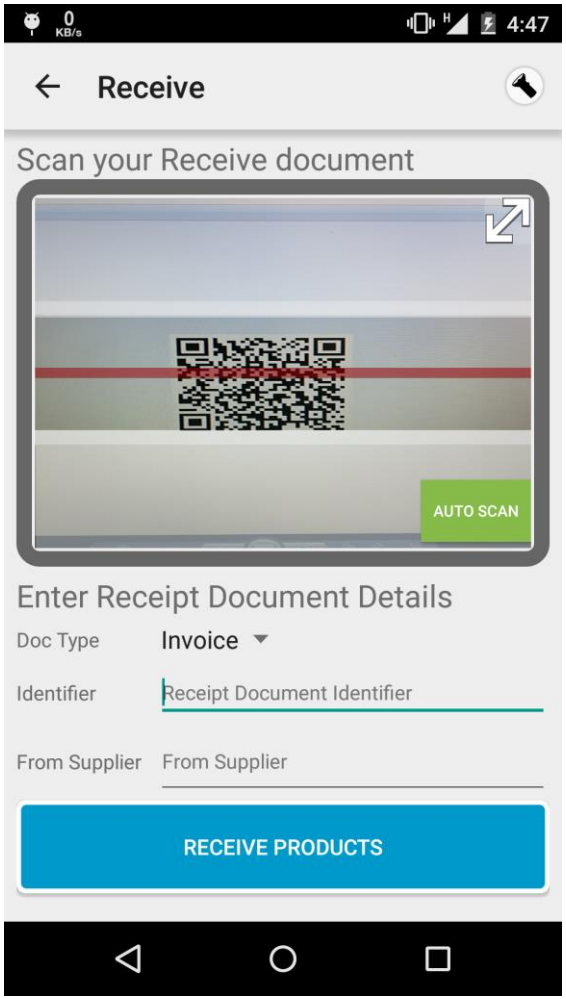
- After extracting the data, the mobile application tries to identify the product and record the batch number, expiry date, serial number.
- In addition, the application captures other Metadata like geolocation of the scanning event.
- The application works by checking scanned GTIN number against a local database of known GTINs.
- If no match is found, the application offers to register the new GTIN to a local database which then gets synced to the data warehouse
- GDSN Data pools are not currently being used

Scanning GS1 Barcode

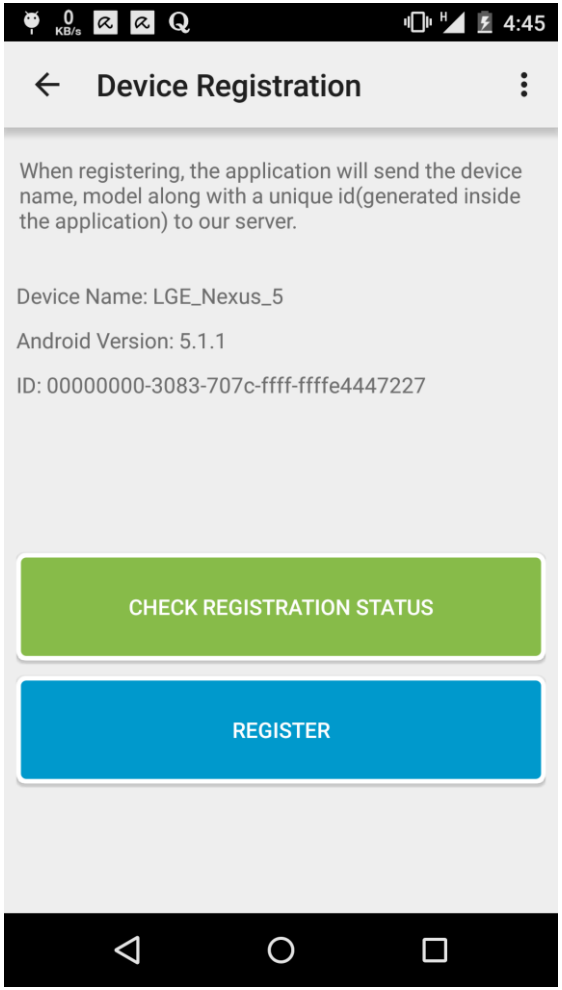


Syncing with the Data Warehouse

Continued



QR Code Scanning



Device Registration

GS1 Barcode Pilot Test

- The pilot test exclusively uses GS1 Standard barcodes. The product piloted is:
  - **Emergency Contraceptive** –known as **Levonorgestrel (D-Norgestrel) - 0.75mg – Tablet**
- Supplied by **Famy Care LTD(India)** and have GS1 barcodes printed on the tertiary and secondary level packaging.
- The pilot test was done on emergency contraceptive products at PFSA's Central Store and the Addis Ababa distribution hub.

Pilot Test Results

- The products were shipped from the manufacturer (Famy Care ltd) in 14 tertiary level boxes with 13 containing 450 secondary level packages
- the remaining box containing 265 secondary level packages.

Continued

PFSA Central Warehouse

Continued

PFSA Central Warehouse

Continued

Scanning GS1 Barcodes on Tertiary Level Boxes

Continued

Family Planning Products Secondary Level Packaging

Pilot Test Continued…

- Scanning was done at the following key stages in the supply chain
  - Central Store where the products were first received
  - Products issued to the Addis Ababa distribution Hub
  - Received by the Addis Ababa distribution Hub
  - Issued by A.A Hub to Health Centers in the area.

Challenges and Observations

- Identifying 2D Data matrix barcodes is harder for the mobile application than identifying 1D barcodes.
- The main reason is the much smaller size of the 2D data matrix

Size of a 2D Data Matrix on a Secondary Level Package compared To an Ethiopian 50 Cents Coin

Continued

- The quality and placement of the barcodes on the products is also critical in determining the success rate of the application.
- In some cases, the 1D barcodes on the tertiary level packages were covered by plastic stabilizer straps and other wrapping materials.

Conclusions

- Handling secondary level packages at the Central Store might not be feasible. Instead, more attention should be given to track products at the container level (SSCC).

- PFSA's personnel found the application very exciting, however, more work needs to be done to educate them of the benefits

- Using handheld Bluetooth device is preferred

Advantages and Disadvantages

- Advantages of a software platform
  - Easy to modify to adopt to changes and new requirements
  - Supports many types of barcode types(QR Codes, 1D barcodes, 2D data matrix)
  - The platform can be programmed to include/enforce business rules without relying on another computing platform

Continued

- Disadvantages
  - Not as fast or as accurate as a dedicated hardware scanner which could make it a harder sell to warehouse personnel
  - May not be as ergonomically convenient as some hardware scanners
  - Depending on the model, a smartphone's battery might not last full day

Next Steps

- Adoption
  - Electronic Purchase Order
  - Electronic Advanced Shipped Notices
  - EDI

Links

- http://gs1.hcmisonline.org
- http://barcode.hcmisonline.org/
- https://play.google.com/store/apps/details?id=org.hcmis.barcodereader