Digital Square Webinar: Reutilizing PEPFAR Investments during the COVID-19 Response

March 26, 2020

Agenda

- Welcome, Announcements, Introductions - Amanda BenDor
- Framing of data exchange challenges experienced during the Ebola response - Carl Leitner
- PEPFAR / DATIM investments in digital health infrastructure - Annah Ngaruro
- Patient Level Monitoring tools - Vlad Shioshvili
- GOFR - Emily Nicholson

Digital Square Announcements

- Digital Square Webinar: Global Goods Adaptation for COVID-19 Response
  - Monday, March 30th, 10am-noon EDT via Zoom. This webinar will feature demos of global goods that have adapted their software for the COVID-19 response. Register here.

Introductions

Carl Leitner, Technical Director, Digital Square. Carl Leitner, PhD, brings more than 15 years of experience in informatics, information technology, software development, and education, including more than eight years designing and adapting open-source interoperable digital health systems in low-and middle-income countries.

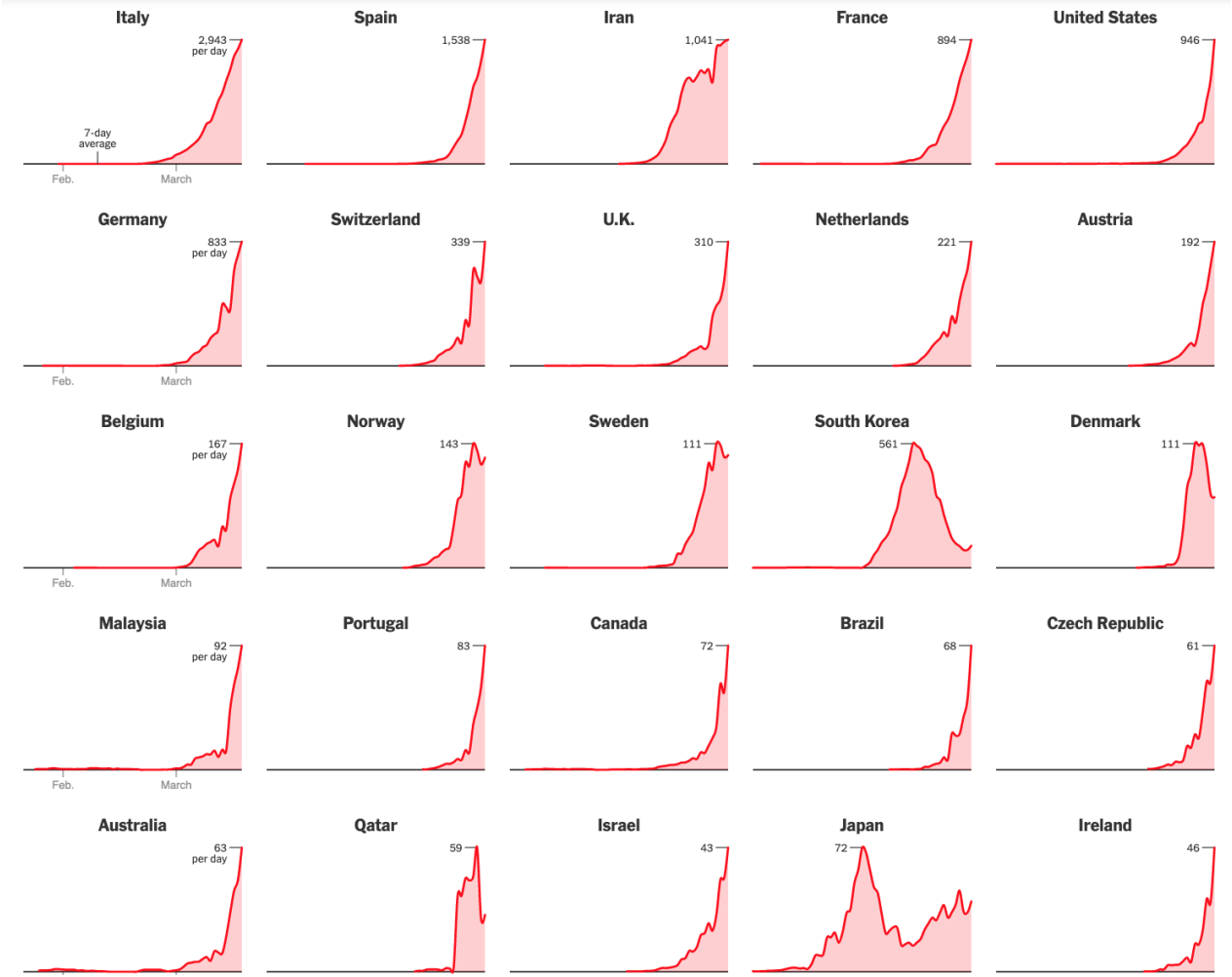
Annah Ngaruro, Director, Technology Solutions, ICF. Annah is currently the DATIM Data exchange and Interoperability portfolio lead responsible for providing S/GAC PRIME with portfolio leadership and product ownership for the data exchange and interoperability portfolio within the DATIM ecosystem.

Vlad Shioshvili, Technical Lead, ICF. Vlad serves as the technical lead for PEPFAR/DATIM's data exchange and interoperability activities since 2015, working on establishing DATIM data and metadata exchange platforms, working closely with OHIE.

Emily Nicholson, Technical Advisor, IntraHealth International. Emily manages multiple digital health projects at IntraHealth including the Open Client Registry, mHero and the Global Open Facility Registry (GOFR); her work has contributed to the evolution of health systems in Liberia, Sierra Leone, Tanzania, South Sudan and Uganda.

Data Exchange Challenges

Carl Leitner



NY Times March 19, 2020

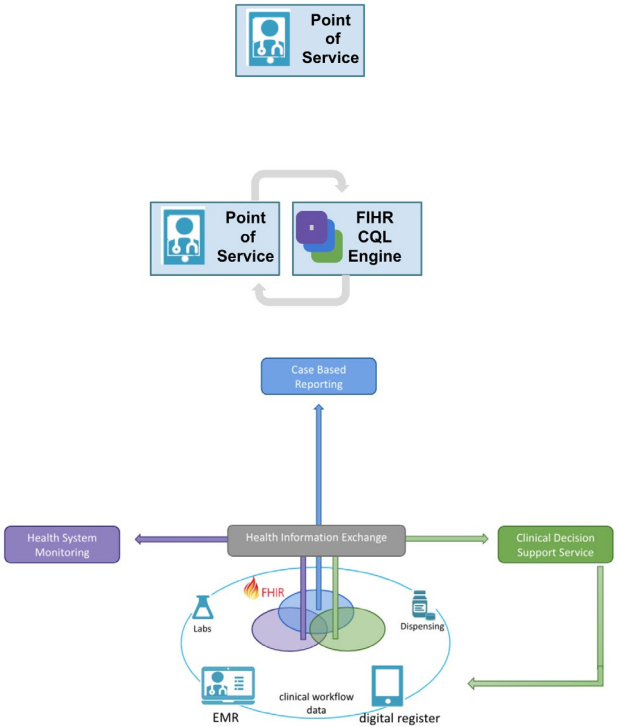
Case reporting
- to district
- to national
- to regional
- to global

Contact tracing
- cross-platform
- cross-jurisdiction
- line lists

Care management
- at-risk populations
- immunocompromised

Supply Chain
- PPEs
- reagents / test kits

Three scenarios defined in terms of *Health Information Systems Interoperability Maturity Toolkit* and *HIS Stages of Continuous Improvement Toolkit*



Standalone - a standalone digital health system using a bespoke data model running on a low-powered and often disconnected device required to send a data extract.
Requires precise definitions for native implementation of an indicator report, care guideline or case report.

Integrated - a digital health system that can share data using the HL7 FHIR data model and which offloads processing of FHIR resources to a locally available service using reusable software components.
Requires profiled data models and computable assets.

Exchanged - a connected digital health system operating within a health information exchange that wants to contribute data to a longitudinal client record on which indicator calculations are performed, case reports are generated, and decision support services are provided.
Requires profiled data models, computable assets and metadata registries and shared operational data.

Exchanged	Integrated	Siloed		
4	3	1	National HIS enterprise architecture	HIS Interoperability Maturity
4	3	1	HIS Subsystems	
4	2	1	ICT business Infrastructure support	HIS Stages of Continuous Improvement
4	2	1	Networks and Internet connectivity	
4	2	1	Enterprise Architecture	
4	2	1	Patient Data Exchange	
3	2	1	Terminology Management	
3	2	1	Unique Person Identity Management	
3	2	1	Indicator Registry	
4	2	1	Master Facility List	

OpenHIE Covid-19 Task Force

Terms of Reference (*draft*):

- Identifying and collating information relating to data standards and exchange relevant to the Covid-19 response
- Identifying gaps in and establishing standards for data exchange priorities
- Provide documentation and guidance (to both the global good community as well as proprietary software tools) to improve adherence to these standards
- Ensure that rapidly deployed solutions can be integrated into the national digital health architectures

Co-Chairs: Terry Cullen, Carl Leitner, +1

Logistics:

- weekly calls = doodle https://bit.ly/ohie-taskforce-covid-19
- wiki = coming soon
- discourse = coming soon

Outputs:

- HL7 FHIR profile / implementation guide for case reporting & contact tracing
- What do you need?

PEPFAR / DATIM Investments in Digital Health Infrastructure

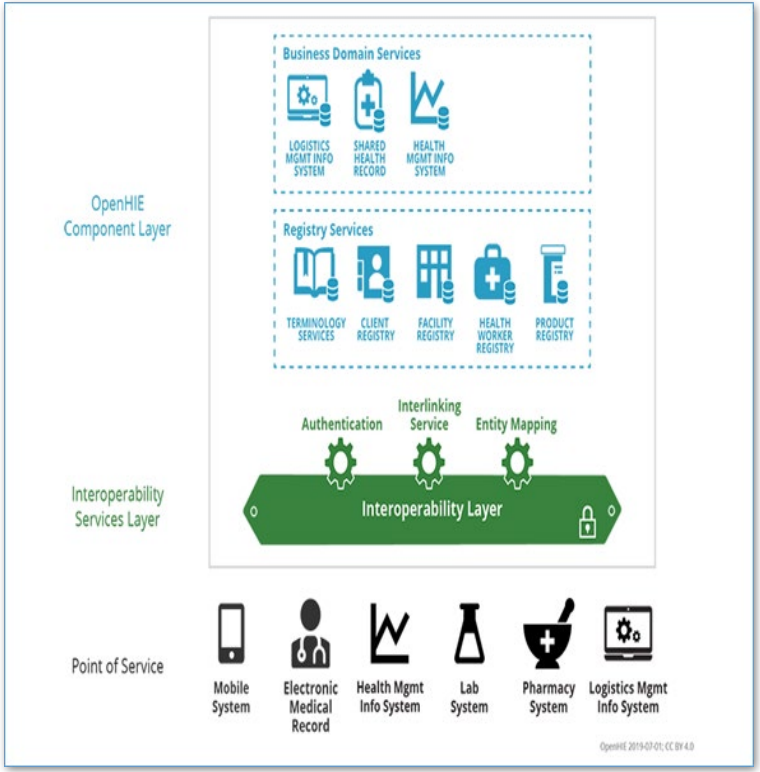
Annah Ngaruro

PEPFAR/DATIM Investments in Digital Health Infrastructure

- Over the last 15yrs, S/GAC has communicated its priorities consistent with enabling use of new and existing data from multiple sources (i.e., EMRs, EHRs, E-Registers, lab systems, etc.) and in a variety of formats (i.e., paper, import files, etc.) that necessitates investments in digital health infrastructure.
- Digital investments fall into a number of categories including standards, open source tools, communities of practice, and development of foundational technology infrastructure.

PEPFAR/DATIM Investments: Standards

- Supporting development of OpenHIE Reference Architecture: a reusable architectural framework that introduces a service oriented approach, maximally leverages health information standards, enables flexible implementation by country partners, and supports interchangeability of individual components.
- Adoption and use data exchange standards such ADX, FHIR, CSD, mCSD to store and transfer data between systems.

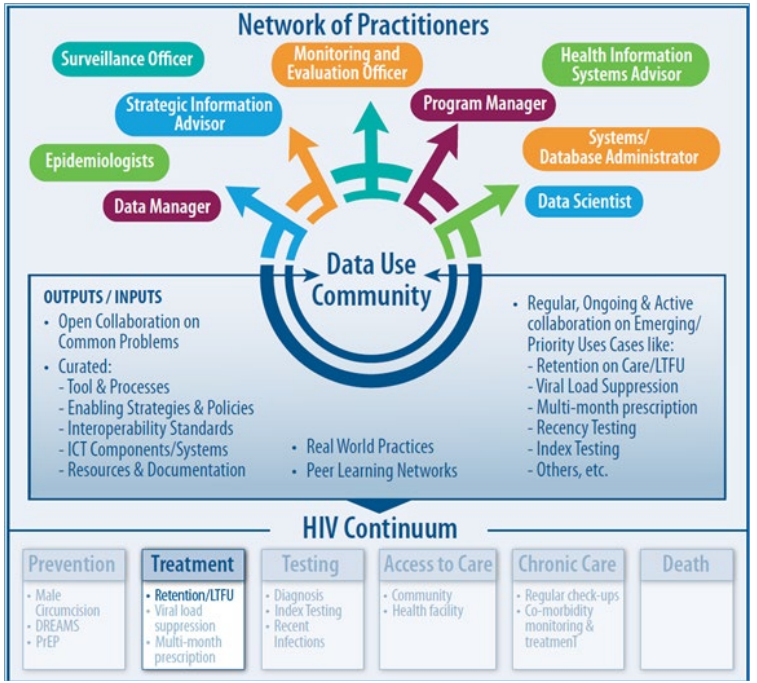


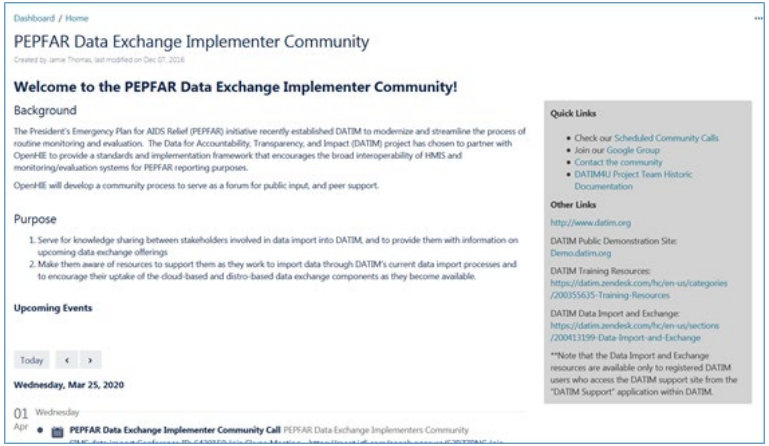
PEPFAR/DATIM Investments: Open Source Tools

- Paper Tools: like the PEPFAR/WHO MFL resource package, a free resource package to provide guidance for countries to establish or strengthen their Master Facility List (MFL) a key element of any electronic health system. http://www.who.int/healthinfo/country_monitoring_evaluation/mfl/en/
- Electronic Tools:
  - OpenMRS: an application developed on a common framework which enables design of a customized medical records. https://openmrs.org/
  - DHIS2 : an open source software platform for reporting, analysis and dissemination of data for all health programs. https://www.dhis2.org/

PEPFAR/DATIM Investments: Communities of Practice

- Groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly.




Dashboard / Home

PEPFAR Data Exchange Implementer Community

Created by Jamie Thomas, last modified on Dec 07, 2016

Welcome to the PEPFAR Data Exchange Implementer Community!

Background

The President's Emergency Plan for AIDS Relief (PEPFAR) initiative recently established DATIM to modernize and streamline the process of routine monitoring and evaluation. The Data for Accountability, Transparency, and Impact (DATIM) project has chosen to partner with OpenHIE to provide a standards and implementation framework that encourages the broad interoperability of HMIS and monitoring/evaluation systems for PEPFAR reporting purposes.

OpenHIE will develop a community process to serve as a forum for public input, and peer support.

Purpose

1. Serve for knowledge sharing between stakeholders involved in data import into DATIM, and to provide them with information on upcoming data exchange offerings
2. Make them aware of resources to support them as they work to import data through DATIM's current data import processes and to encourage their uptake of the cloud-based and distro-based data exchange components as they become available.

Upcoming Events

Today

Wednesday, Mar 25, 2020

01 Apr Wednesday

PEPFAR Data Exchange Implementer Community Call PEPFAR Data Exchange Implementers Community

Quick Links

- Check our Scheduled Community Calls
- Join our Google Group
- Contact the community
- DATIMHU Project Team Historic Documentation

Other Links

http://www.datim.org

DATIM Public Demonstration Site: Demo.datim.org

DATIM Training Resources: https://datim.zendesk.com/hc/en-us/categories/200355635-Training-Resources

DATIM Data Import and Exchange: https://datim.zendesk.com/hc/en-us/sections/200413199-Data-Import-and-Exchange

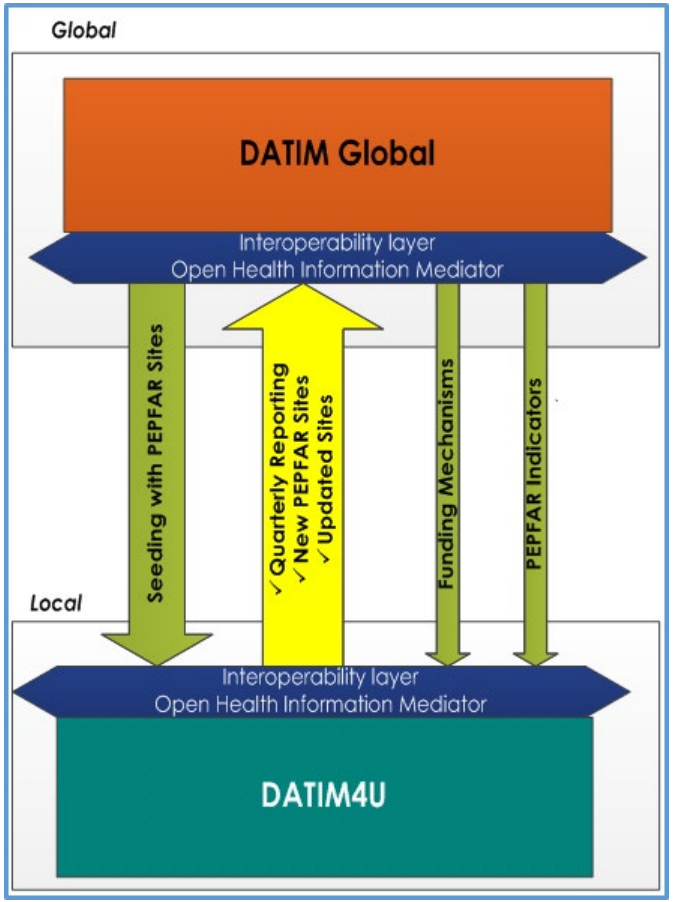
**Note that the Data Import and Exchange resources are available only to registered DATIM users who access the DATIM support site from the "DATIM Support" application within DATIM.

- https://wiki.ohie.org/display/SUB/PEPFAR+Data+Exchange+Implementer+Community
- https://ohie.org/duc/

PEPFAR/DATIM Investments: Foundational Technology Infrastructure

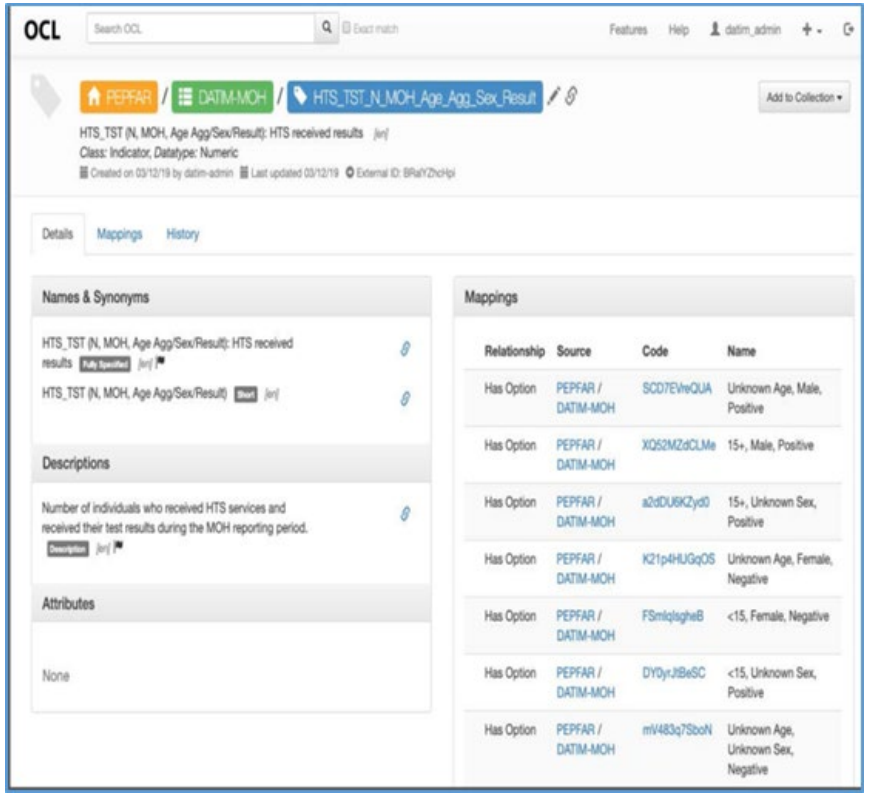
- Interoperability platform: a platform that allows disparate systems and devices to exchange and interpret data all while managing security, a single point of entry into an HIE, abstraction for simplicity of services applications and the HIE components as well as mechanisms for error management and tracking and also provides a view of metrics for monitoring the flow of messages through the HIE.

https://wiki.ohie.org/display/projects/DATIM4U+Technical+Overview+and+Purpose



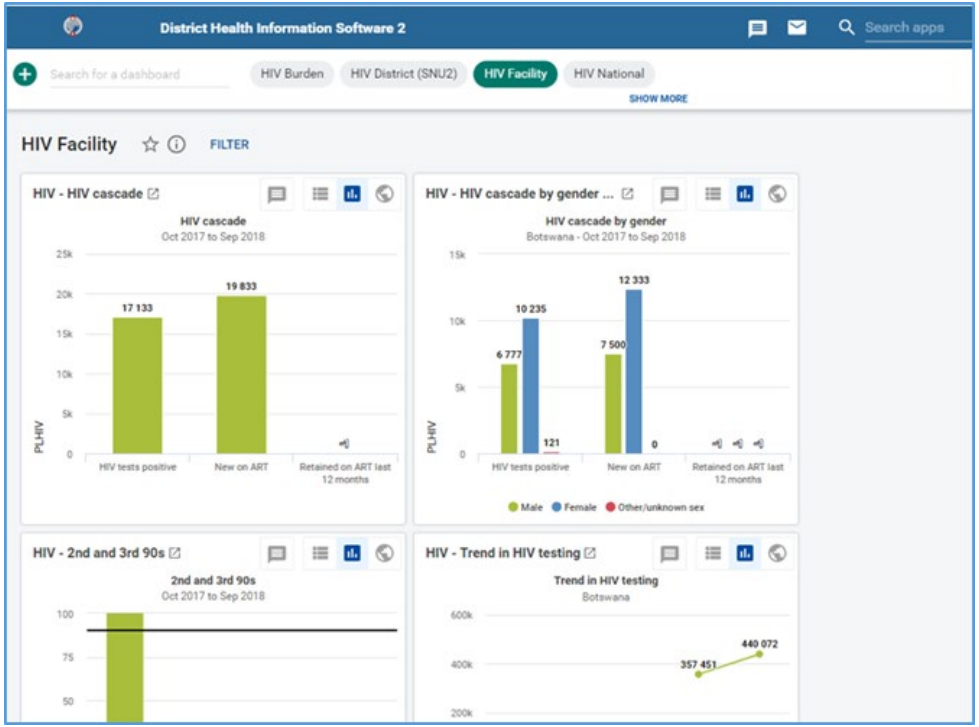
PEPFAR/DATIM Investments: Foundational Technology Infrastructure

- Terminology Services: a platform to manage, map, publish, and share data definitions such as medical and indicator so as to provide a standardized set of terms that can be understood by multiple disparate systems.
- The DATIM ecosystem uses OCL is an open-source terminology service that will centrally store PEPFAR indicator and disaggregation definition, PEPFAR/MoH indicator mappings and associated calculations. OCL content/functionality can be accessed through using APIs.



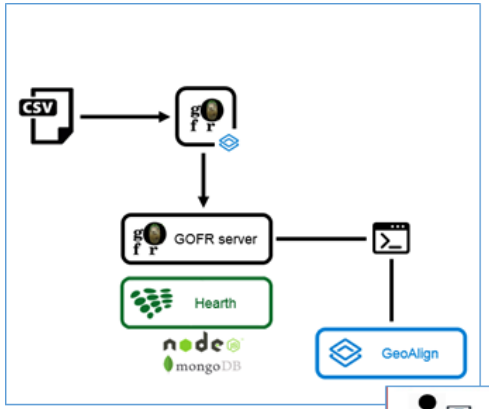
PEPFAR/DATIM Investments: Foundational Technology Infrastructure

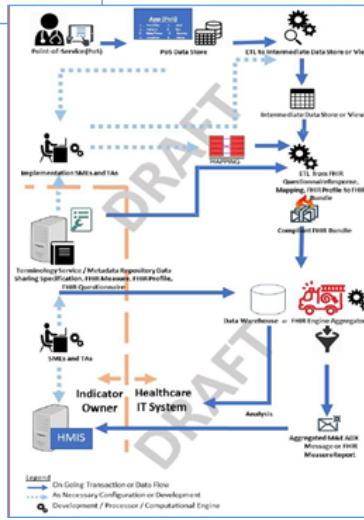
- Integration to reuse existing standardize tools like the already built WHO Metadata Package, a standardized set of indicators and associated DHIS2 dashboards. After mapping, the metadata package provides a standard set of dashboards and reports for health data reporting.



PEPFAR/DATIM Investments: Foundational Technology Infrastructure

- Global Goods: Are digital health tools that are adaptable to different countries and contexts and can be (1) a software tool, (2) a service or (3) content.
- Are typically free, open source, and have utility in several settings.
    - Global Open Facility Registry (GOFR) tool: a set of software tools that will identify and synthesize duplicate health facility records across multiple sources of data for the Global Open Facility Registry (GOFR) Core project.
    - Patient Level Monitoring (PLM) tools: A set of tools that implement a standards-based platform agnostic approach to leverage a ‘mine-able’ data set containing individual-level data that can support ever changing health programmatic decision criteria using primary data to help answer multiple health questions.





Patient Level Monitoring Tools

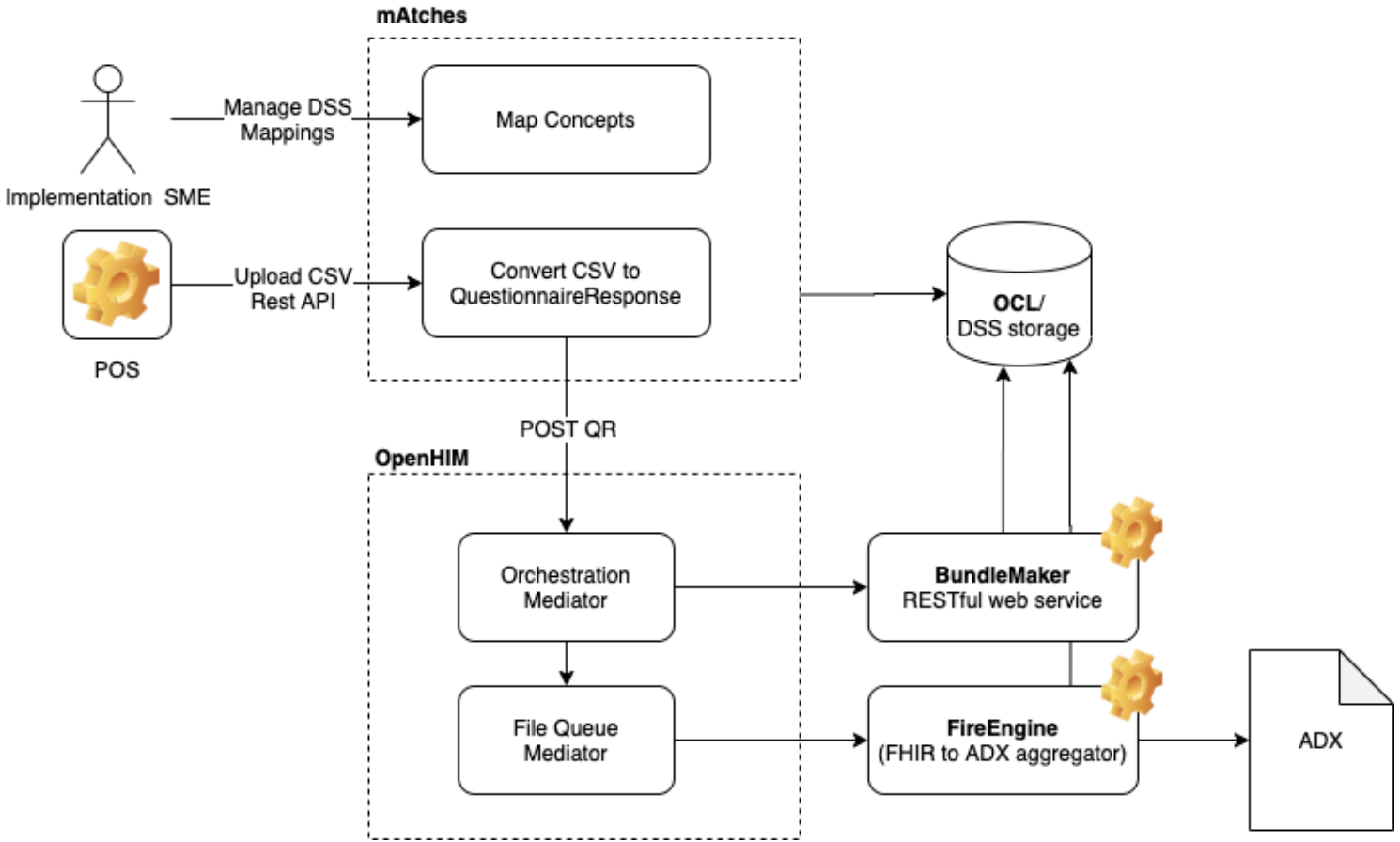
Vlad Shioshvili

Patient Level Monitoring tools

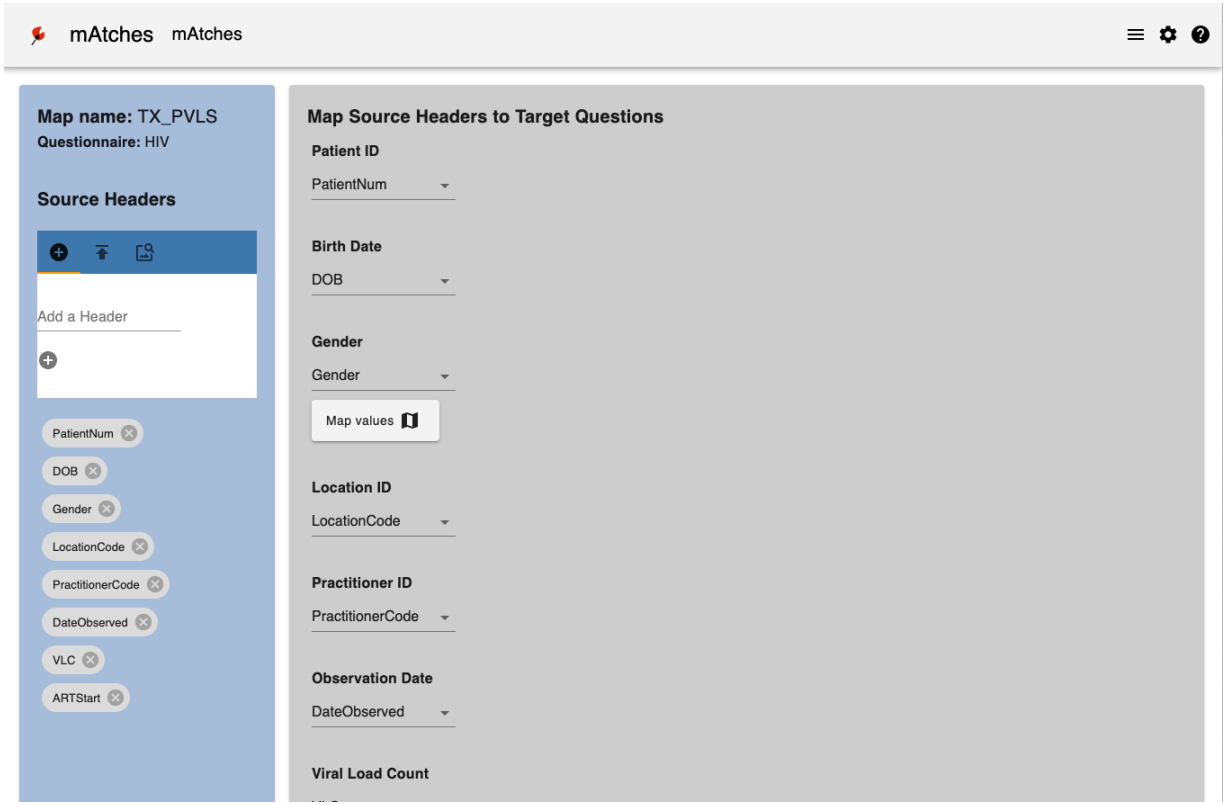
- In addition to PEPFAR's contribution to the development of standards and tools like OCL, OpenHIM, DHIS2, GOFR, and so on, PEPFAR's data exchange and interoperability group is working on a set of tools that allow integration of patient clinical data with health management information systems for health system monitoring using health information exchange.
- Tools are in a third iteration of a proof of concept phase, where number of improvements have been made. Toolset was created to be as generic as possible, and have been tested for HIV and family planning indicators.

PLM components

- A set of tools have been developed to address the needs.
- Developed as open source applications, with Global Goods guiding principles in mind.
- Relying on already existing, proven standards and platforms, such as OpenHIM for interoperability, OCL as the terminology service, FHIR for patient clinical data, ADX for aggregate data representation, etc.
- Toolset bridges the gap by introducing apps and process that do data transformation and integration of the above components:
  - mAtches for managing mappings
  - BundleMaker for FHIR resource transformation
  - FireEngine for data aggregation
  - OCL integration mediators


mAtches
Implementation SME
Manage DSS Mappings
Map Concepts
POS
Upload CSV Rest API
Convert CSV to QuestionnaireResponse
OCL/ DSS storage
POST QR
OpenHIM
Orchestration Mediator
File Queue Mediator
BundleMaker RESTful web service
FireEngine (FHIR to ADX aggregator)
ADX

mAtches


mAtches
mAtches
Map name: TX_PVLS
Questionnaire: HIV
Source Headers
Add a Header
PatientNum
DOB
Gender
LocationCode
PractitionerCode
DateObserved
VLC
ARTStart
Map Source Headers to Target Questions
Patient ID
PatientNum
Birth Date
DOB
Gender
Gender
Map values
Location ID
LocationCode
Practitioner ID
PractitionerCode
Observation Date
DateObserved
Viral Load Count

mAtches transformation

PatientNum	DOB	Gender	LocationCode	PractitionerCode	DateObserved	VLC	ARTStart
H10124	1992-08-01	M	Gambela144	C170	2019-08-01	10000	2019-02-01
X13143	1989-08-01	M	Somali167	L165	2019-12-01	1000	2014-03-01
M15811	2006-09-01	M	Southern_Nations159	O186	2019-07-01	10000	2010-12-01
V12356	2008-03-01	F	Amhara104	Q153	2018-03-01	1	2015-09-01
N14590	2006-06-01	M	Oromia154	U172	2018-04-01	1000	2018-03-01
S13209	2009-07-01	U	Oromia150	L194	2019-01-01	100	2017-09-01
P15133	1995-09-01	U	Somali109	R101	2019-05-01	10000	2014-12-01
J10396	2006-11-01	F	Gambela114	K126	2018-10-01	10	2010-10-01
Y10193	2006-03-01	F	Tigray163	B198	2018-11-01	1000	2018-04-01
X16372	1984-09-01	M	Oromia145	G141	2019-08-01	10000	2013-09-01
Q11370	2004-06-01	M	Oromia168	S119	2018-12-01	1	2010-02-01
P17222	1972-04-01	U	Somali103	F179	2018-03-01	10	2013-05-01
E14781	1998-11-01	M	Gambela111	H121	2018-12-01	10	2019-04-01
B14883	2005-02-01	U	Dire_Dawa161	R174	2018-09-01	100000	2013-04-01
Q18858	1990-01-01	U	Benishangul-Gumuz194	R162	2019-02-01	100000	2011-11-01
I11178	1996-05-01	U	Afar178	B120	2019-11-01	1	2019-07-01
F10548	1995-08-01	F	Southern_Nations140	T108	2019-03-01	1000	2016-07-01
O14293	1998-05-01	U	Oromia128	B121	2019-10-01	1000	2019-09-01
P12943	1979-10-01	U	Amhara128	R193	2019-05-01	100	2015-01-01
L19419	1974-08-01	M	Somali131	J194	2019-09-01	1	2012-03-01
C18415	1998-03-01	M	Amhara117	L192	2019-09-01	100	2015-01-01
M15249	1982-07-01	M	Dire_Dawa102	X101	2018-07-01	10	2018-04-01
F15594	2008-08-01	M	Benishangul-Gumuz126	F154	2019-02-01	10000	2019-07-01
D14073	1977-01-01	F	Harari110	Y193	2019-01-01	10000	2011-01-01
U10898	2009-04-01	M	Amhara198	I150	2019-07-01	100	2019-01-01
W11937	1999-11-01	U	Afar181	E139	2018-11-01	1000	2014-08-01
H15888	1981-05-01	M	Addis161	I143	2018-08-01	10	2017-03-01
S15557	1991-01-01	U	Amhara104	Y135	2018-05-01	10000	2014-09-01
E18402	2000-03-01	U	Amhara104	J160	2019-08-01	10	2017-11-01
R10139	1971-09-01	M	Tigray130	J183	2019-02-01	10000	2019-01-01
I13379	1995-08-01	U	Benishangul-Gumuz147	C160	2019-09-01	10000	2013-12-01
J19866	1982-10-01	M	Addis122	K199	2019-07-01	100	2012-05-01
P10613	1993-07-01	U	Benishangul-Gumuz166	W180	2018-12-01	100	2011-12-01
A11261	1972-10-01	F	Benishangul-Gumuz177	Y122	2018-07-01	100000	2013-04-01
G12094	1982-06-01	F	Harari151	H157	2018-06-01	100000	2019-07-01
H14477	1977-10-01	F	Oromia145	I189	2018-11-01	100000	2010-05-01
K17772	1985-10-01	U	Afar146	L131	2018-10-01	100000	2015-05-01
F13173	1978-12-01	M	Tigray191	Y113	2018-07-01	1000	2013-09-01
S12468	1985-05-01	U	Tigray127	C176	2018-10-01	100000	2011-10-01
F14211	1989-06-01	F	Addis192	Z102	2018-10-01	100000	2017-05-01
L11127	1974-07-01	U	Benishangul-Gumuz105	A135	2018-10-01	1	2014-03-01
U14622	1991-12-01	F	Oromia140	N171	2019-04-01	10000	2012-02-01
R14635	1975-07-01	U	Tigray108	P149	2018-03-01	1	2010-10-01
N13411	1978-12-01	F	Addis172	S155	2018-12-01	10000	2016-07-01


```
{
    "resourceType": "Bundle",
    "id": "auto-generated",
    "meta": {
        "profile": [
            "http://datim.org/fhir/StructureDefinition/PLM-QuestionnaireResponse-Bundle"
        ]
    },
    "type": "message",
    "timestamp": "2020-03-25T13:23:03.326Z",
    "entry": [
        {
            "resource": {
                "resourceType": "QuestionnaireResponse",
                "id": "e92Ags-2020-03-25T13:23:03.326Z-row0",
                "status": "completed",
                "questionnaire": "http://datim.org/fhir/Questionnaire/PLM-HIV-Questionnaire",
                "item": [
                    {
                        "linkId": "/Patient",
                        "text": "Patient ID",
                        "item": [
                            {
                                "linkId": "/Patient/id",
                                "text": "Patient ID",
                                "answer": {
                                    "valueString": "H10124"
                                }
                            },
                            {
                                "linkId": "/Patient/birthDate",
                                "text": "Birth Date",
                                "answer": {
                                    "valueDate": "1992-08-01"
                                }
                            },
                            {
                                "linkId": "/Patient/gender",
                                "text": "Gender",
                                "answer": {
                                    "valueCoding": {
                                        "code": "male"
                                    }
                                }
                            }
                        ]
                    },
                    {
                        "linkId": "/Encounter",
                        "text": "Encounter",
                        "item": [
                            {
                                "linkId": "/Encounter/location",
                                "text": "Location ID",
                                "answer": {
                                    "valueString": "Gambela144"
                                }
                            }
                        ]
                    },
                    {
                        "linkId": "/Observation",
                        "text": "Practitioner",
                        "item": [
                            {
                                "linkId": "/Observation/performer",
                                "text": "Practitioner ID",
                                "answer": {
                                    "valueString": "C170"
```

Applicability to COVID-19 Response

- As the amount of COVID-19 clinical data grows, faster and more flexible ways of getting it up to the aggregate level will be required;
- PLM tool-set can be adapted to COVID-19 use case to provide a way to connect point of service applications to health management information system for data analysis.

Global Open Facility Registry (GOFR)

Emily Nicholson

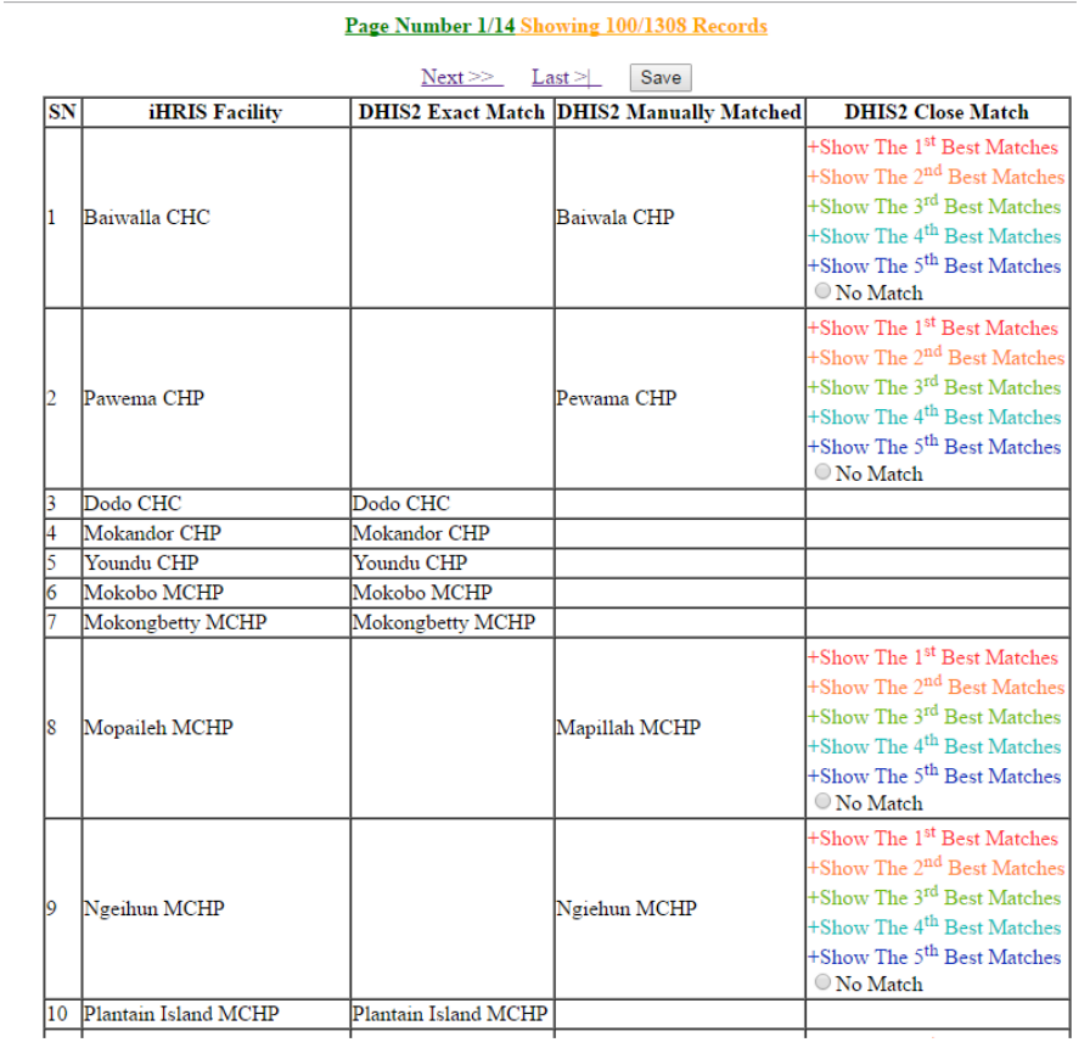
Master Facility Lists and Facility Registries

- **Master Facility List (MFL)**: Complete, up-to-date, **authoritative** list of health facilities and associated data.

  The source of truth which must be
  - Validated
  - Continuously Updated
  - Accessible

- **Facility Registry (FR):** “a service, or software program that **houses the MFL** and makes it **accessible** to ministries, donors or implementing organizations that need information about the facilities.” - Master Facility List Resource Package

- Beta version of the Facility Reconciliation Tool, developed out of necessity during the Ebola Epidemic in West Africa

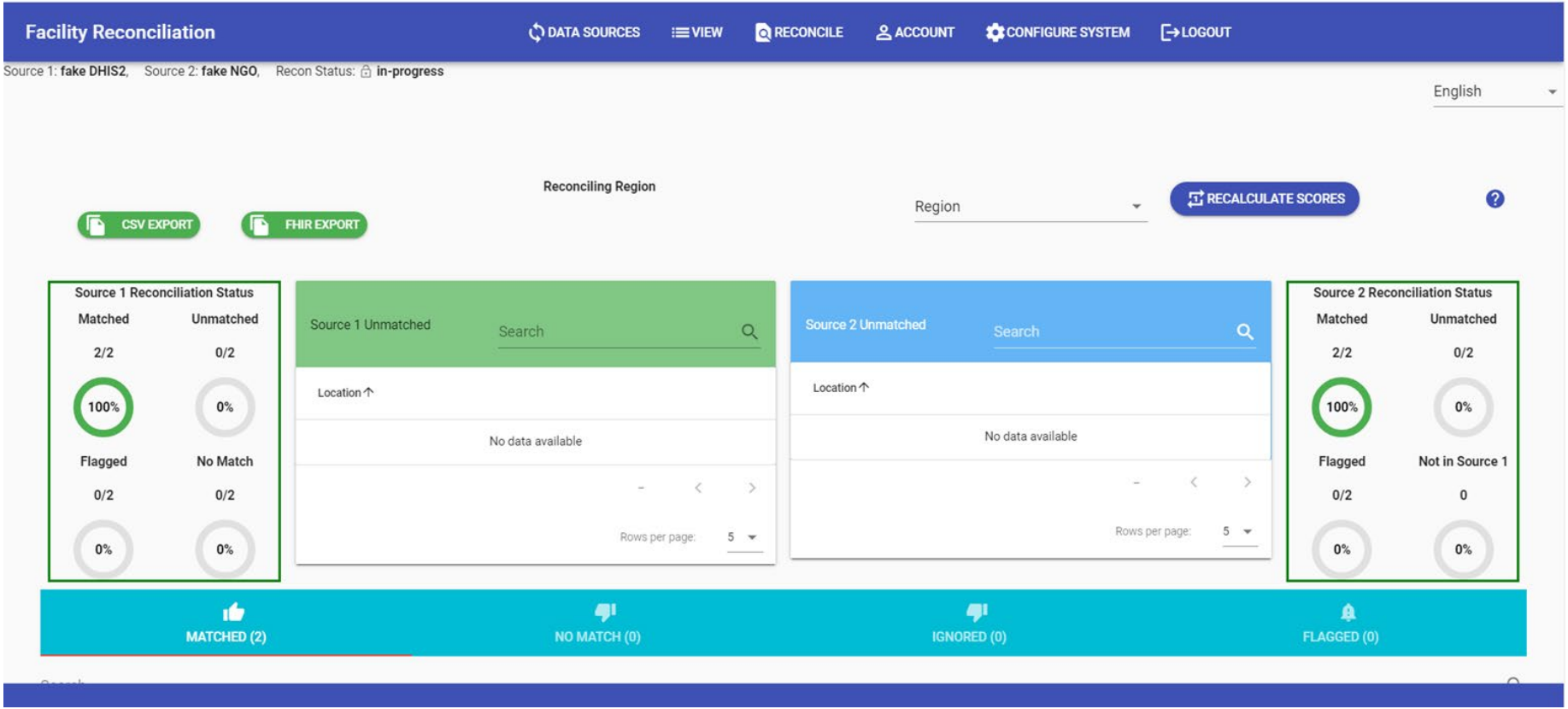


Page Number 1/14 Showing 100/1308 Records

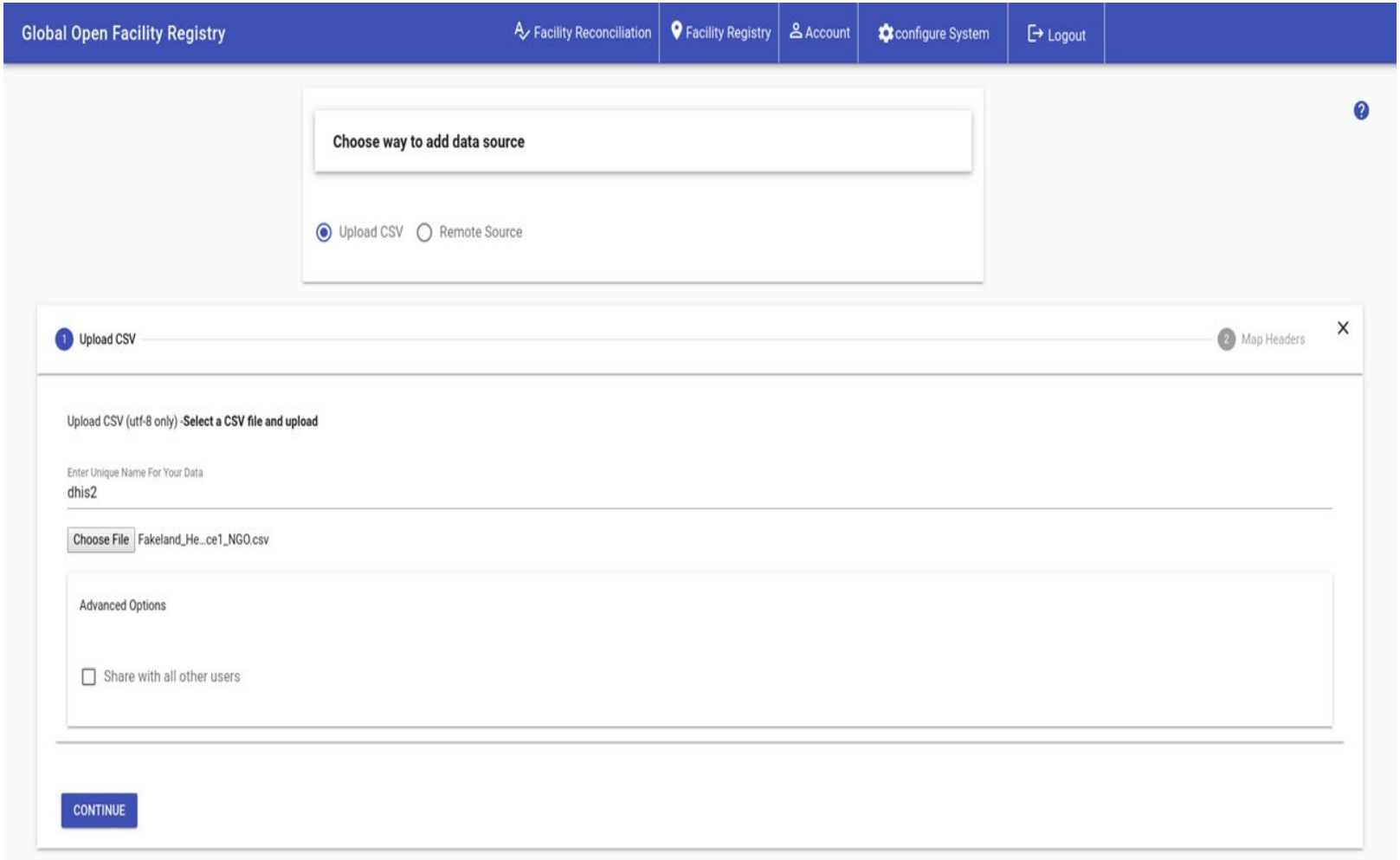
Next >> Last >| Save

SN	iHRIS Facility	DHIS2 Exact Match	DHIS2 Manually Matched	DHIS2 Close Match
1	Baiwalla CHC		Baiwala CHP	+Show The 1st Best Matches +Show The 2nd Best Matches +Show The 3rd Best Matches +Show The 4th Best Matches +Show The 5th Best Matches No Match
2	Pawema CHP		Pewama CHP	+Show The 1st Best Matches +Show The 2nd Best Matches +Show The 3rd Best Matches +Show The 4th Best Matches +Show The 5th Best Matches No Match
3	Dodo CHC	Dodo CHC		
4	Mokandor CHP	Mokandor CHP		
5	Youndu CHP	Youndu CHP		
6	Mokobo MCHP	Mokobo MCHP		
7	Mokongbetty MCHP	Mokongbetty MCHP		
8	Mopaileh MCHP		Mapillah MCHP	+Show The 1st Best Matches +Show The 2nd Best Matches +Show The 3rd Best Matches +Show The 4th Best Matches +Show The 5th Best Matches No Match
9	Ngeihun MCHP		Ngiehun MCHP	+Show The 1st Best Matches +Show The 2nd Best Matches +Show The 3rd Best Matches +Show The 4th Best Matches +Show The 5th Best Matches No Match
10	Plantain Island MCHP	Plantain Island MCHP		

Current User Interface of GOFR



Features


Global Open Facility Registry
Facility Reconciliation
Facility Registry
Account
configure System
Logout
Choose way to add data source
Upload CSV
Remote Source
1 Upload CSV
2 Map Headers
Upload CSV (utf-8 only) -Select a CSV file and upload
Enter Unique Name For Your Data
dhis2
Choose File
Fakeland_He...ce1_NGO.csv
Advanced Options
Share with all other users
CONTINUE

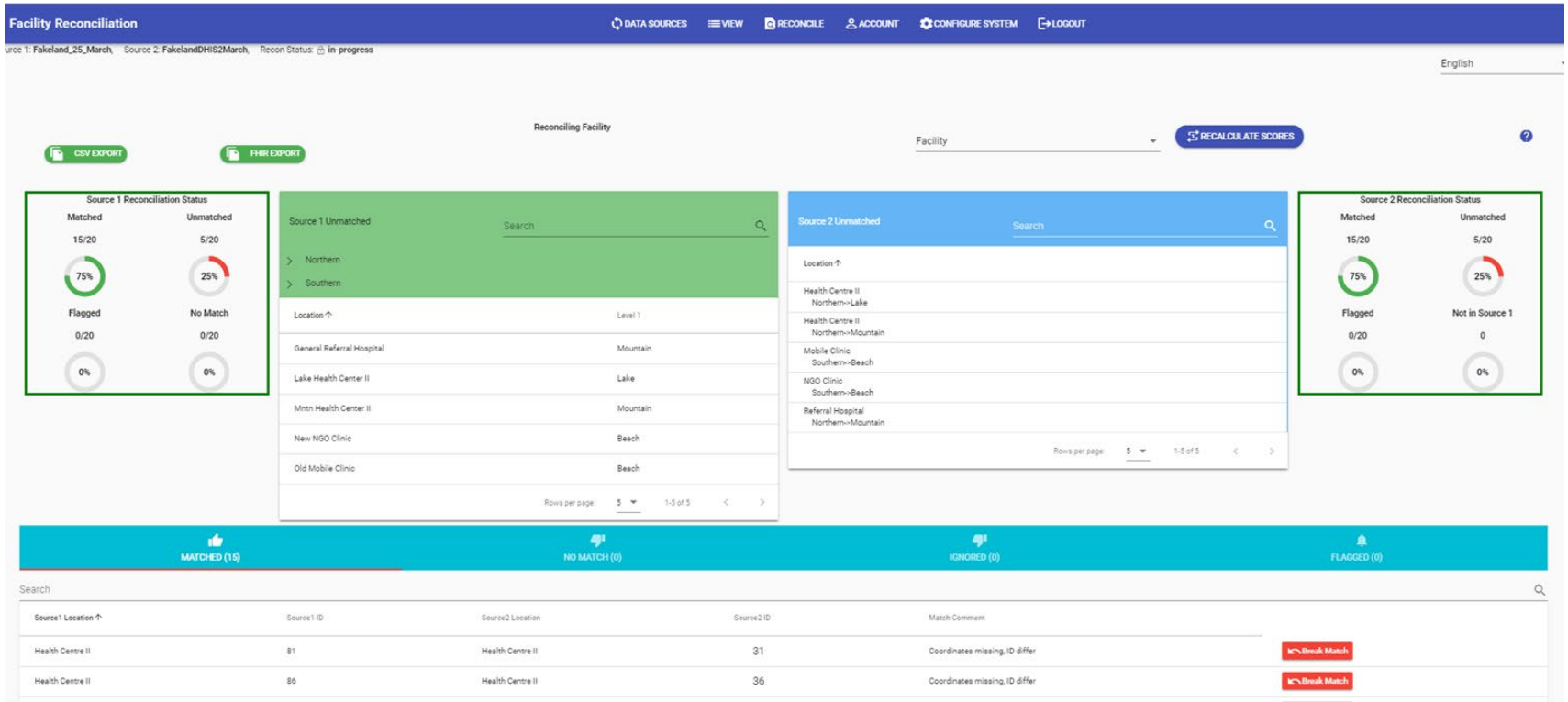
Uploaded Sources

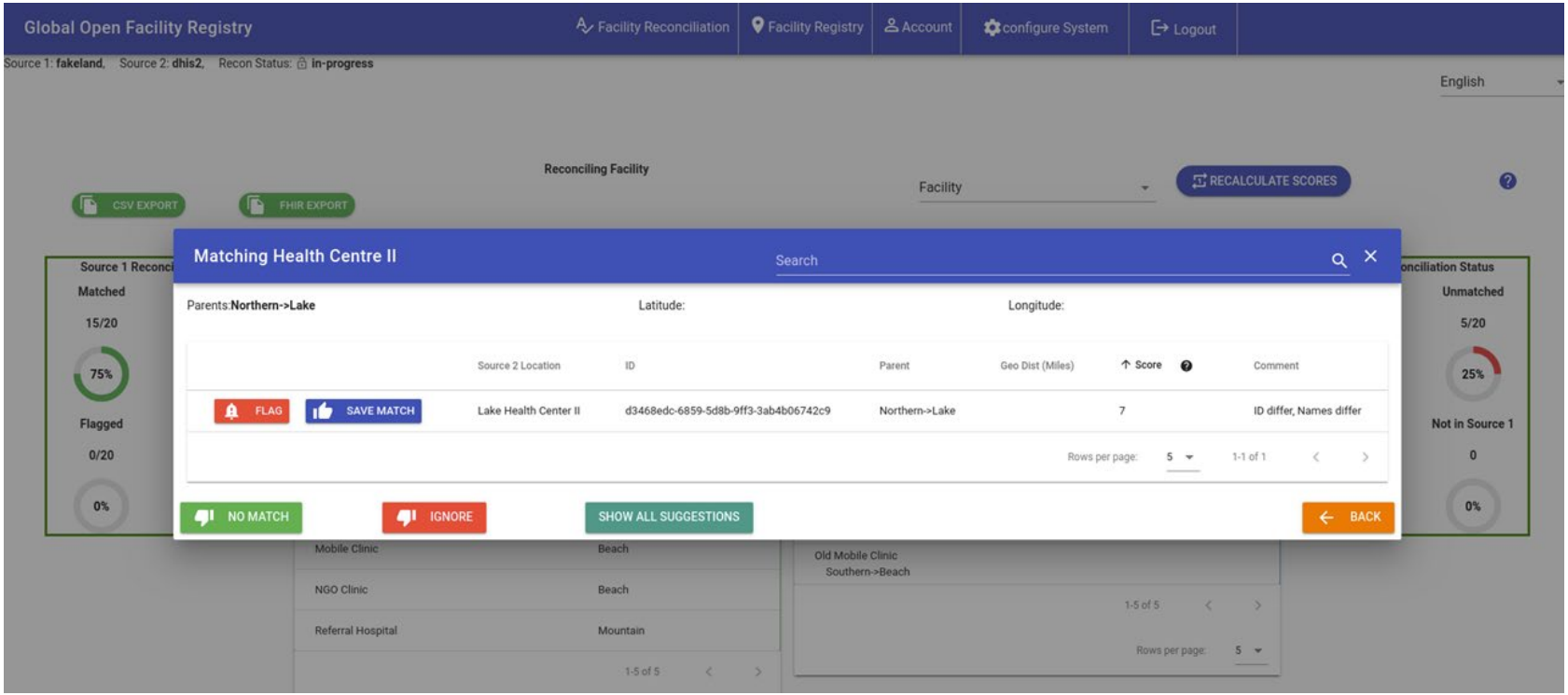
EXPORT

DELETE

	Source Name ↑	Owner	Shared To	Created Time	
○	fake DHIS2	root@gofr.org		26th Feb 2020 8:51:36 pm	
○	fake NGO	root@gofr.org		26th Feb 2020 8:50:51 pm	
○	Fakeland_25_March	demo		25th Mar 2020 7:48:33 pm	SHARE
○	FakelandDHIS2March	demo		25th Mar 2020 7:49:50 pm	SHARE

Rows per page: 5 1-4 of 4


Facility Reconciliation
DATA SOURCES
VIEW
RECONCILE
ACCOUNT
CONFIGURE SYSTEM
LOGOUT
urce 1: Fakeland_25_March, Source 2: FakelandDHIS2March, Recon Status: in-progress
English
Reconciling Facility
CSV EXPORT
FHIR EXPORT
Facility
RECALCULATE SCORES
Source 1 Reconciliation Status
Matched
15/20
75%
Unmatched
5/20
25%
Flagged
0/20
0%
No Match
0/20
0%
Source 1 Unmatched
Search
Northern
Southern
Location
Level 1
General Referral Hospital
Mountain
Lake Health Center II
Lake
Mntn Health Center II
Mountain
New NGO Clinic
Beach
Old Mobile Clinic
Beach
Rows per page: 5
1-5 of 5
Source 2 Unmatched
Search
Location
Health Centre II
Northern->Lake
Health Centre II
Northern->Mountain
Mobile Clinic
Southern->Beach
NGO Clinic
Southern->Beach
Referral Hospital
Northern->Mountain
Rows per page: 5
1-5 of 5
Source 2 Reconciliation Status
Matched
15/20
75%
Unmatched
5/20
25%
Flagged
0/20
0%
Not in Source 1
0
0%
MATCHED (15)
NO MATCH (0)
IGNORED (0)
FLAGGED (0)
Search
Source1 Location
Source1 ID
Source2 Location
Source2 ID
Match Comment
Health Centre II
81
Health Centre II
31
Coordinates missing, ID differ
Break Match
Health Centre II
86
Health Centre II
36
Coordinates missing, ID differ
Break Match

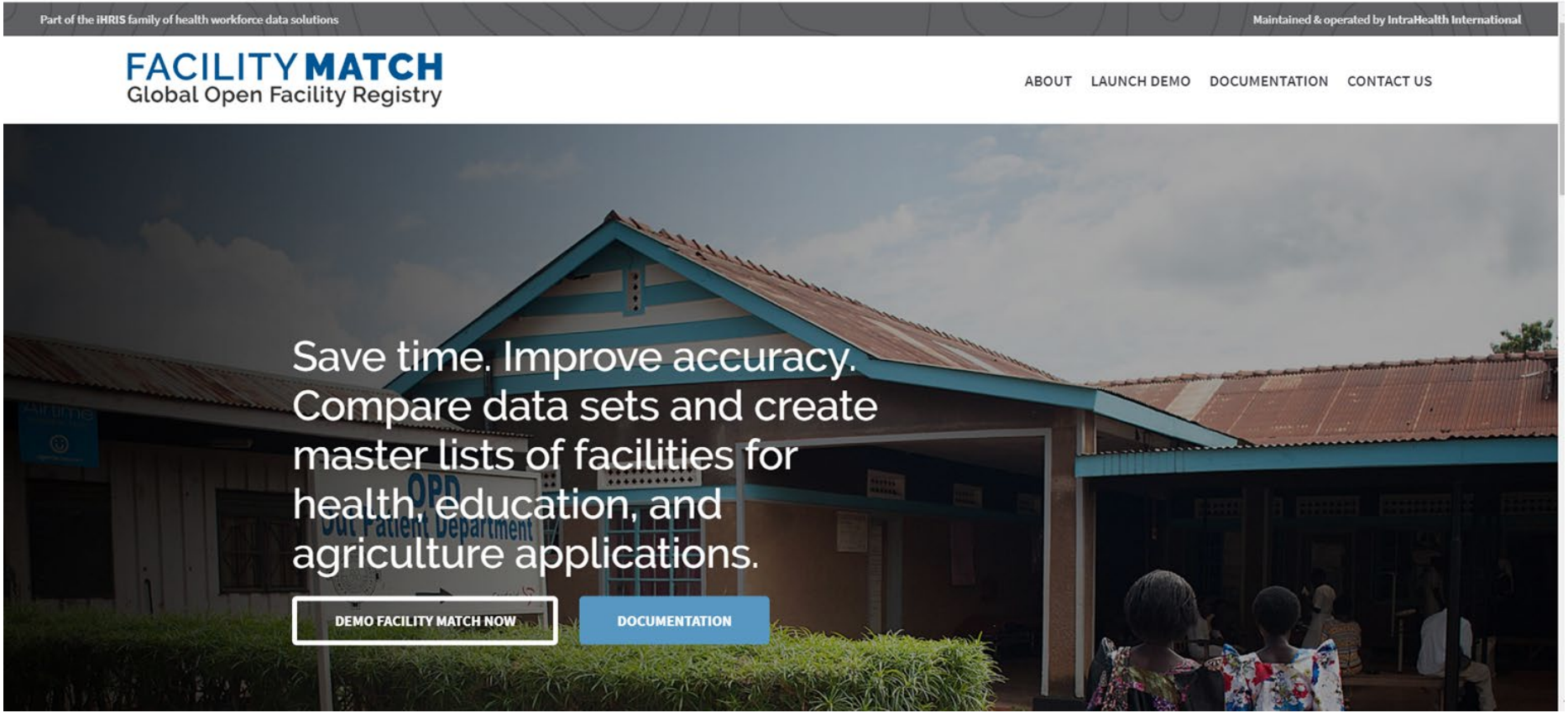

Global Open Facility Registry
Facility Reconciliation
Facility Registry
Account
configure System
Logout
Source 1: fakeland, Source 2: dhis2, Recon Status: in-progress
English
Reconciling Facility
CSV EXPORT
FHIR EXPORT
Facility
RECALCULATE SCORES
Matching Health Centre II
Search
Parents:Northern->Lake
Latitude:
Longitude:
Source 2 Location
ID
Parent
Geo Dist (Miles)
Score
Comment
FLAG
SAVE MATCH
Lake Health Center II
d3468edc-6859-5d8b-9ff3-3ab4b06742c9
Northern->Lake
7
ID differ, Names differ
Rows per page: 5
1-1 of 1
NO MATCH
IGNORE
SHOW ALL SUGGESTIONS
BACK
Source 1 Reconci
Matched
15/20
75%
Flagged
0/20
0%
onciliation Status
Unmatched
5/20
25%
Not in Source 1
0
0%
Mobile Clinic
Beach
NGO Clinic
Beach
Referral Hospital
Mountain
1-5 of 5
Old Mobile Clinic
Southern->Beach
1-5 of 5
Rows per page: 5

Applicability to COVID-19 Response

- Rapid spread of COVID-19 creates urgent need for accurate understanding of locations of permanent facilities, makeshift hospitals and testing sites

- Ministries can deploy the GOFR tool to reconcile quickly changing lists of service delivery locations, increasing the speed with which testing and treatment are provided.

facilitymatch.net website



FACILITY MATCH
Global Open Facility Registry

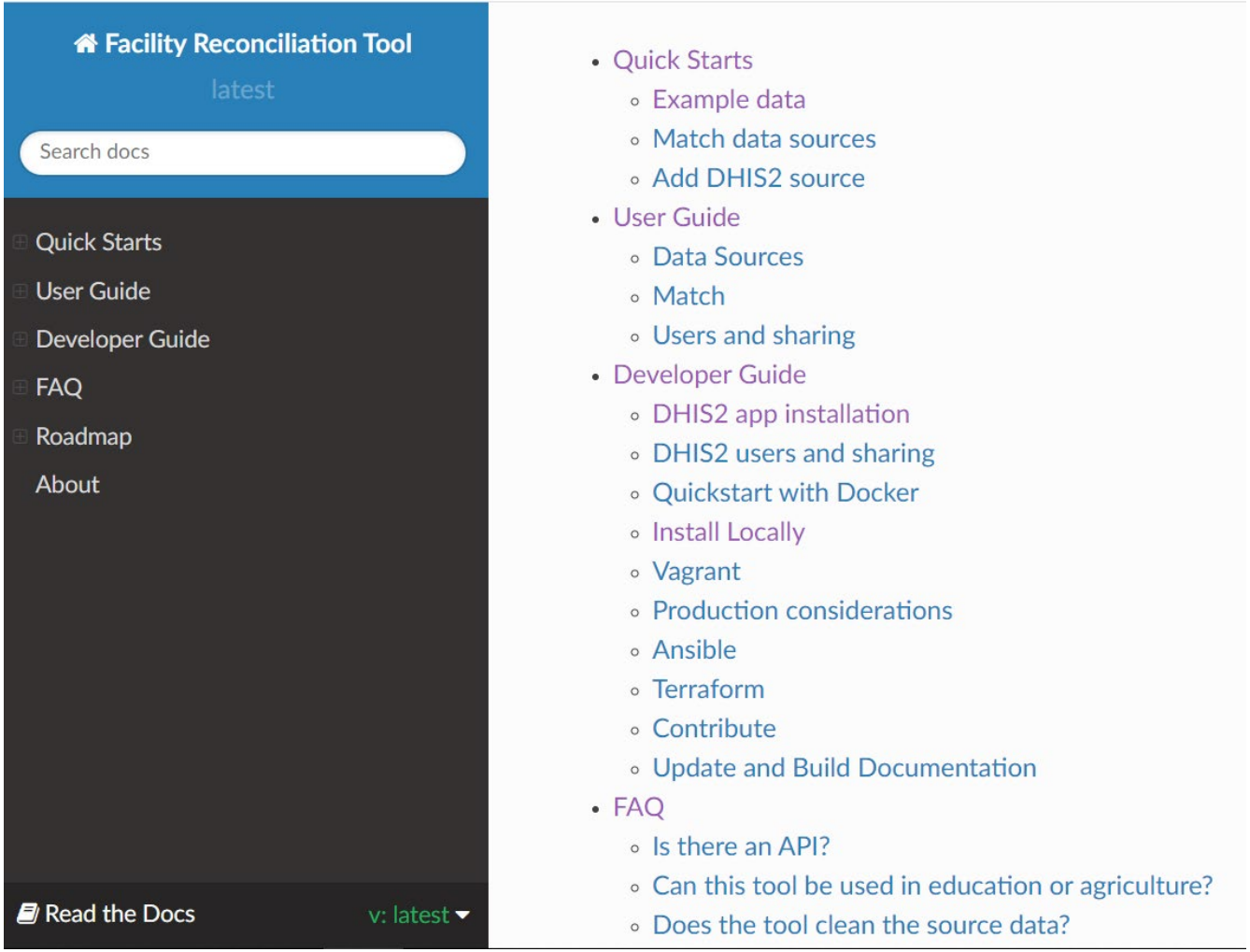
Disclaimer

This is a demonstration site. Please do not upload or connect to sensitive data sources. Please also remove data sources once you are done testing. Data sources will be removed by the administrators as needed. Demo user is 'demo' and password is 'demo'

AGREE TO ABOVE AND PROCEED TO DEMO

QUICK START GUIDE

This is a sandboxed demo site. Please use the demo responsibly.



Installation Options:

- DHIS2 app
- Docker
- Local installation

Thank you!

digital square