Global Good Innovator Meeting
March 16–17, 2022 | Zoom

Meeting Report
June 2022
## Contents

Abbreviations ............................................................................................................................................. ii
Executive summary ........................................................................................................................................ iii
Background ..................................................................................................................................................... 1
Session overviews .......................................................................................................................................... 1
  Opening keynote ........................................................................................................................................... 1
  Global Good Lightning Talks, Part 1 .............................................................................................................. 1
  Understanding the total cost of ownership (TCO) for digital solutions ...................................................... 2
  Challenges and lessons learned in interoperability ....................................................................................... 3
  Global Good Lightning Talks, Part 2 .............................................................................................................. 5
  Digital public goods (DPGs) and governance best practices ........................................................................ 6
  Looking at tomorrow: Emerging trends in digital health funding ............................................................... 7
  What can Digital Square do for you? ........................................................................................................... 9
Post-meeting survey ....................................................................................................................................... 9
Appendix A. Participant list ............................................................................................................................. 13
Appendix B. Meeting agenda .......................................................................................................................... 16
Appendix C. Presentation slides ................................................................................................................... 18
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>CDC</td>
<td>Centers for Disease Control and Prevention</td>
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<tr>
<td>COVID-19</td>
<td>coronavirus disease 2019</td>
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<td>DHIS2</td>
<td>District Health Information System 2</td>
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<td>DPG</td>
<td>digital public good</td>
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<td>DPGA</td>
<td>Digital Public Goods Alliance</td>
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<td>FHIR</td>
<td>Fast Healthcare Interoperability Resources</td>
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<td>GIZ</td>
<td>Deutsche Gesellschaft für Internationale Zusammenarbeit</td>
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<td>GOFR</td>
<td>Global Open Facility Registry</td>
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<td>HISP</td>
<td>Health Information Systems Programme</td>
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<td>MPI</td>
<td>master patient index</td>
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<td>OCL</td>
<td>Open Concept Lab</td>
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<td>OpenHIE</td>
<td>open health information exchange</td>
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<td>OpenMRS</td>
<td>open medical record system</td>
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<td>SMART</td>
<td>Standards-based, Machine-readable, Adaptive, Requirements-based, and Testable</td>
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<tr>
<td>TCO</td>
<td>total cost of ownership</td>
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<tr>
<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
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<td>USAID</td>
<td>US Agency for International Development</td>
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<td>WB</td>
<td>World Bank</td>
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Executive summary

The fourth annual Digital Square Global Good Innovators meeting was held virtually via Zoom on March 16 and 17, 2022. Due to the ongoing COVID-19 pandemic, the meeting was held virtually for a second year. The goal of the meeting was to bring together partners of global goods approved through Digital Square, along with the Peer Review Committee and investors, to discuss the progress of Digital Square’s global good implementing partners and allow the project to share relevant updates with innovators. Around 80 participants convened on each day, both of which were full of interactive presentations and discussions. The value of the meeting is in connecting global good partners. Digital Square is the convener of this community and strives to give the community a platform to share, learn, and connect with each other and with other stakeholders, like investors. A few highlights from the two days were eight lightning talks from the global goods partners, a discussion with investors on funding for digital health, especially regarding COVID-19, and updates on Digital Square market analytics work.

In the weeks following, seven participants completed a post-meeting survey. The majority expressed that the meeting was beneficial to their work and indicated they would attend another Global Good Innovator meeting in the future. Digital Square continues to see value in this annual convening and will plan to host the next innovator meeting in late 2021.
Background

The fourth annual Global Good Innovators meeting was held via Zoom on March 16 and 17, 2022. Attended by more than 80 participants each day, the purpose of the 2 three-and-half-hour sessions was to discuss progress made by various Digital Square global good implementing partners and allow the project to share relevant updates with innovators. The meeting also served as a forum for digital health global good innovators to engage with each other and with investors to share lessons learned on technical and operational topics.

Participants invited to attend the meeting were those who have received funding or have been approved and were seeking funding through Digital Square Notices A, B, C, D, and E; the Peer Review Committee; and Digital Square investors. A full list of participants can be found in Appendix A.

Session overviews

Opening keynote

The meeting was opened on March 16, 2022, at 10:00 a.m. (EDT) by Vrunda Rathod, Digital Square Program Officer, who shared the agenda and welcomed participants. She introduced the keynote speakers, Carl Fourie, Skye Gilbert Yoden, and Philippe Veltsos, who all shared reflections and focuses from the past year.

Carl Fourie, Deputy Director of Global Goods at Digital Square, began with an overview of Digital Square’s accomplishments in the past year (Figure 1), including facilitation of 50 active agreements covering a range of global goods and activities and the specific work being done towards continuing to combat the COVID-19 pandemic.

Skye Gilbert Yoden, Executive Director for Digital Square, provided insight on shifts that occurred while she was on maternity leave the previous year. She noted the continued focus on COVID-19 preparedness and vaccine delivery and the need to maintain other services in the midst of the pandemic. In emerging trends, Skye had observed a gain in momentum around cross-sectoral public goods, including bilateral organizations working together on public goods charters. Co-development has also been emerging, including a new initiative that has four different funder investments.

Philippe Veltsos, in his new role as Digital Square’s Technical Director of Digital Health, highlighted new perspectives, like the ways that COVID-19 is affecting public health ecosystems and priorities. He also stressed the value of performing cross integration, ensuring portability of health records, and making the lives of patients easier.

Global Good Lightning Talks, Part 1

During this session, innovators shared the status of their work in the context of COVID-19 and COVID-19 Global Vaccine Access developments.
Open Concept Lab (OCL)

Joe Amlung, business analyst and part of the OCL community, and Jonathan Payne, OCL founder, described the OCL highlights of 2021 (Figure 2)—including the launch of OCL v2, an overhauled infrastructure, and added Fast Healthcare Interoperability Resources (FHIR®) standard / Sharing Valuesets, Codes and Maps (SVCM) support—and the 2022 “year of the user” framework world Health Organization (WHO) SMART (Standards-based, Machine-readable, Adaptive, Requirements-based, and Testable) guidelines, and defining a new technical roadmap.

Open medical record system (OpenMRS)

Jennifer Antilla, OpenMRS Director of Community at the University of Washington, and Grace Potma, OpenMRS Director of Product, discussed the expansion of OpenMRS to more than 6,700 facilities and the changing ecosystem to a country-ownership approach. They also highlighted the creation of a framework that allows multiple organizations to be involved in working together and the OpenMRS 3 framework.

Tamanu

Megan Lane, Tamanu Program Manager at Beyond Essential Systems, presented on the five principles guiding Tamanu processes: sync-ability, free and open source software, desktop and mobile deployment, and interoperability. Megan then detailed the successes of Tamanu in the COVID-19 pandemic—specifically, the full-immunization module and COVID-19 campaign, as well as both a lab module and a patient management aspect (Figure 3).

Global Open Facility Registry (GOFR)

Richard Stanley, Senior Product Manager at IntraHealth International, discussed the use of GOFR and its support of multi-tenancy through partitions (data sources) per users. GOFR also has put focus on easy form customization based on FHIR resources, with a push towards HAPI (HL7 Application Programming Interface) FHIR and its updated version (6.0.0).

Instant open health information exchange (OpenHIE)

Daniel Futerman, Senior Program Manager at Jembi Health Systems, described the community effort basis of OpenHIE and the different use cases this approach enables. Instant OpenHIE packages that have been created support new apps and components, as well as new use cases (health workforce, longitudinal clinical data, COVID-19 case reporting) and workflows/tests.

Understanding the total cost of ownership (TCO) for digital solutions

[Please note this session overview is confidential.]

This session was led by Tara Herrick (Senior Market Dynamics Officer at PATH) and Abdul Basith Shaukath (Technical Program Officer for Digital Square), who presented on a Digital Square–developed TCO tool intended as an interactive budgetary and benchmarking resource to help country-level stakeholders understand and develop

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1 FHIR is a registered trademark of Health Level Seven (HL7) International, Inc.
more realistic budgets for digital health projects. The presenters discussed the scope of and methodology for a draft TCO tool for digital health interventions and included a demonstration of the tool.

Prior to the tool demo, Tara delineated the purpose of the tool in context of realistic budget development for country-level stakeholders. The tool uses the market maturity model and health interventions classifications to calculate budgets, and the tool can be used at any point in the scaling of an implementation. The approach/reference document was formed from a wide variety of sources and by a small working group.

The TCO tool is built in Excel (Figure 4) and has several components including a user guide, data input tabs, a benchmarking feature to highlight if costs may be out of range, data results, and budget commitments. Users can enter their own labor rates for deployment costs, which helps create more accurate budget predictions. The UN labor rates check is useful for annual salary resources. Users can also input equipment with suggested resources: suggested input, server, desktop, etc. The TCO tool calculates cost over a five-year period (cycle) and provides transparency, where the user is able to see the benchmark against the three cost areas (i.e., development, deployment, and operations). It also can be helpful in understanding which areas would benefit most from fundraising.

Estimating digital health costs can be challenging, and this tool is budgetary, not cost saving. As more people use it, improvements can be made. Initial key learnings include the general lack of transparency in cost data, the overlooking of operating costs, the impact of digital health market maturity on costs related to required infrastructure, and the differences between countries that depend on that digital health maturity.

There was enthusiasm from the audience towards the tool, and many partners volunteered to be part of the test group.

Challenges and lessons learned in interoperability

In this interactive session, Jenny Thompson (Senior Technical Program Officer for Digital Square), Luke Duncan (Technical Advisor for Digital Square), and Jose Costa Teixeira (Digital Square Health Information Systems, Global Standards, and Interoperability Advisor) shared challenges and lessons learned while working to create interoperable solutions. Using Jamboard, an interactive platform, open conversation between our partners was encouraged through use of questions on drivers for standards and enablers for achieving interoperability. The jamboards with jumping off discussion points can be found below in Figure 5.
What are the drivers you’ve seen for standards?

Cost of implementations!

I want data exchange to work *snug* like that

Integrate into a larger ecosystem / legacy systems

Using as a reference for aligning models & APIs

Re-use re-usable tools instead of developing own modules

Locally driven, globally connected!

Ability to scale

Capacity and learning

Standards require expertise that is not available

Standards take more energy/time than rolling your own.

One-off project setting direction

Free technical and policy education

Standards across domain contexts are hard

"FHIR doesn’t support that"

Tools not FHIR ready

Standards that become too complex and abstract are hard to retrofit into reality

FHIR is a WIP. Many immature resources.

"Sure, but later. For now we have to deliver something quickly"

Extension leads to high-cost standards implementation cost (e.g. EDI)

"If they are obscure, I don’t think we’ll have these ‘let’s-do-it-later’ problems.

Sure, but later. For now we have to deliver something quickly"

"If it were easier, I don’t think we’d have these ‘let’s-do-it-later’ problems.

"Sometimes value proposition is a standard-by-standard basis, and granularity"}

People don’t always interpret standards the same way, so need some adapting needed to implement.

Implementation needs frequent rework and need for general solution.

"I don’t want to re-do work later"

Immutability (or non-existent) tooling

"FHIR doesn’t support that"

"FHIR is a WIP. Many immature resources."

Standards that become too complex and abstract are hard to retrofit into reality

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"Sometimes value proposition is a standard-by-standard basis, and granularity"
Global Good Lightning Talks, Part 2

[This session continued the Day 1 presentations from Global Good partners.]

OpenSRP (open-source smart register platform)

Matt Berg from Ona Systems described the company’s decision to go all in on FHIR and its importance for interoperability. For Ona, FHIR has been looked at as a common data model and a way to think about health with the same language, a common way tasks can be done in FHIR, such as their building of native content with Android Software Development Kit. Ona is leveraging questionnaire makers, semantic interoperability, clinical decision support, and referrals and tasking.

Reveal

Livashan Soobramoney, Technical Product Manager for Akros, focused on ways to reach unreachesd, last-mile communities and on data-driven decision-making. Because of low coverage, planning and delivery are often impeded by outdated population data. Technology can improve delivery though geospatial intelligence tools. When Reveal transitioned from mSpray, the use case expanded, and spray coverage improved from 83 to 93 percent in one year.
District Health Information System (DHIS2)

Mike Frost, Senior Advisor at Health Information Systems Programme, or HISP (DHIS2), at University of Oslo, emphasized vaccine delivery using Tracker, as evidenced by 60+ countries using Tracker for the last four to five years, bringing COVID-19 surveillance and vaccine systems to scale. DHIS2 has seen a number of improvements in Tracker in the last year, with 2 million people who registered in one month. DHIS2 has also reorganized around interoperability (Figure 7), and they are working on increasing communications on integration efforts, and the Capture app will replace the Tracker model for longitudinal data.

SanteMPI (master patient index)

Joseph Dal Molin, Director at SanteSuite Inc., outlined SanteMPI’s consortium partners: Mohawk Ideaworks and Hamilton Health Sciences. Their work is targeting strategic challenges, including person-centered data and records. MPI has a core value proposition for a person-centered solution that helps establish a master person (or patient) index. Focus also has been placed on expanded quality assurance and testing, added Instant OpenHIE support, and integration with Civil Registration and Vital Statistics.

Digital public goods (DPGs) and governance best practices

David Eaves, a lecturer in Public Policy at the Harvard Kennedy School, presented on interviews conducted with various groups developing digital infrastructure to learn about the governance issues they faced, from large funders to local governments and offices. An early finding from the interviews were limitations based on there being few:

- Examples of failed DPGs.
- People willing to talk about failure.
- DPGs available

The concept behind Moore’s “strategic triangle” was used as the starting point for discussion (i.e., that public value, operational capacity, and legitimacy and support must work together though they often contradict one another). Improving any piece of the triangle risks harming the other pieces. The core of governance is broken down to two questions (Figure 8):

- Who makes the decisions?
- What is the decision about?

David gave five detailed recommendations for DPGs aligned with governance best practices:
1. Finding a mission, vision, and value statement. This is a must-have on Day 1 and Day 500. It communicates to people who you are, what you are trying to create, what values you are bringing, who you are serving, and which values guide the problem. Being able to articulate and write this
down lets people understand you and know what to expect from you. Including specific language around certain topics will serve to keep the people involved aligned with your mission, vision, and value statement

- Delineate who would be effective or ineffective contributors.
- Shape strategic decision-making.
- Create assumed norms that dictate how stakeholders work.

2. *Drafting a code of conduct.* This is necessary relatively early in development and acts as a concrete manifestation of a value statement. It holds teams accountable and becomes more important as a team grows.

3. *Designing governance bodies.* Scale-up and growth creates the need for a governance structure. Separating roadmap strategy decisions from technology and implementation decisions is key in this step. When combined, technical decisions tend to influence roadmap strategy, and keeping committees separate helps to alleviate this issue. Key stakeholders should be involved in governance questions, while technical staff do not need to be—though they are responsible for finding a way to implement the roadmap.

4. *Ensuring stakeholder voice and representation.* Once beyond the start-up phase, stakeholders control the direction of a DPG. Though funders should not generally be on strategy committees, there is no single best practice. This group should have a healthy mix of users, developers, and implementors, and no single implementor should take dominant control of the project, unless this is the intention. (Many organizations have requirements to make unanimous decisions, but vetoes hinder work. Without vetoes, the group is forced to make difficult decisions and choose to override a veto that would otherwise degrade the mission.)

5. *Engaging external contributors:*

- There are three different types of contributor, each with its own ideas and priorities:
  - Voluntary contributors, who may not be a friend but instead driven by personal benefit.
  - Paid contributors from entities that are not a part of the project governance structures.
  - Contributors that members of the community pay.
- There are no best practices in engaging external contributors due to the wide variety of motivations; by continuously tying back to the mission, vision, and value statement, the focus can remain on user needs.

**Looking at tomorrow: Emerging trends in digital health funding**

Digital Square planned a one-and-half-hour session for participants to hear from investors in the global good space and ask questions of the donor representatives. Facilitated by Vrunda Rathod (Senior Program Officer, Digital Square), they engaged in conversation with the following representatives:

- Sean Blaschke, Co-founder and Global Coordinator, Digital Health Center of Excellence, UNICEF.
- Robert Cryer, Country Technology Services Manager, Global Fund.
- Natschja Ratanaprayul, Technical Officer, Digital Health and Innovation, WHO.
- Dan Rosen, Chief, Health Informatics, Data Management, and Statistics Division of Global HIV/TB, Center for Global Health, Centers for Disease Control and Prevention (CDC).
The session kicked off with a facilitated discussion around the future of digital health funding over the next years. The panel spoke to focus areas for each of their organizations and key trends they see emerging in the field. The session was then opened for Q&A. The following are a few highlights from the discussion:

- Rob Cryer delineated the Global Fund’s country-led framework, where all work is initiated from the country perspective with a priority to approach funding with solid foundations. COVID-19 has shown the Global Fund how fast data can be gathered and disseminated, which has led to interest in doing this for other diseases, like tuberculosis, using digital health tools.

- Matt Hulse explained the funding direction of the WB, where a large data portal exists that feeds up into WB’s financing institution. With little direct partnership support across the sector, WB sees a large gap in public health financing in the coming years, which was foreseen due to and exacerbated by the COVID-19 pandemic. While the WB is looking to improve funding towards technologies, including information and communications technology, much of the financing to WB will focus on health care system quality, design, and equity.

- Sean Blaschke provided an overview of the Digital Health Center of Excellence, including the standards-based and agility-focused approach that UNICEF and other partners are endorsing. Sean outlined some reflections on country responses to COVID-19 and used COVID-19 vaccination as a lens through which to view other issue areas. By leveraging geospatial mapping and microplanning, vulnerable communities will be missed less frequently.

- Natschja Ratanaprayul articulated the focus of WHO in standards and best practices, including SMART guidelines for all primary health care intended for digital health. Additional focus was explained in focusing market-shaping activities, such as ecosystems and tools, adoption of standards, and global goods centered around free and open source software.

- Dan Rosen explained how the CDC is honoring the dual importance and difficulty in limiting siloed and competing systems and instead moving towards a One Health system. Organizationally, the CDC is much more focused on security, and funding guidelines are being updated to reflect this. Overarching issues of focus are security, clear cost models, cross product communities, and value of data. Future topics of interest include artificial intelligence, low-cost medical interventions, and social insurance.

- Merrick Shaefer explained USAID’s digital health vision, towards which all of USAID is focusing and driving and which contains four pillars: health architecture, global goods, digital health capacity, and national health strategies. Additional focus includes better ministry capacity and ownership, standards and integration, and FHIR.

- Chuck Slaughter presented on resonance within the Goldsmith Foundation around country focus for those that are serious about digitalization. Areas of excitement within digitalization are both developer and user focused, especially data-to-action tools that can be used immediately. Direct patient tools contain a large opportunity in funding, as the driver of digital disruption is found in the convenience of the end user.

- Barakissa Tien-Wahser elucidated the unique position of GIZ as a government-owned agency in providing both technical assistance and some grant and financial support. GIZ focuses primarily on principles for digital developments, and GIZ’s digital health portfolio includes more than 29 countries in Africa and Asia, spanning information technology infrastructure, mHealth, eHealth, health management information systems, telemedicine, and eLearning.
What can Digital Square do for you?

Due to exceptionally engaging sessions on Day 2, this session was shortened to a few minutes of wrap-up by Vrunda Rathod, who shared a Google document to provide input on improving Digital Square’s serving of the needs of the community, summarized as follows:

- Digital Square is a very important and well-thought-out mechanism for funding coordinated adoption of digital health solutions that are globally relevant and financially sustainable, apart from conforming to the Principles for Digital Development. In line with this, instead of funding needs assessments or funding the development of new digital health solutions, Digital Square should tap much more into current efforts from partner organizations to see what type of digital health interventions can be taken to scale. To do this, we need guidance on and a toolkit to help us determine what the maturity level of digital health solutions is and what can be taken to scale, and how.

- It would be nice if Digital Square would coordinate better with the Digital Public Good Alliance (DPGA) to recommend DPGs to the community. The DPGA has done a nice job in coming up with criteria and a list of DPGs; Digital Square might support this work by promoting the operationalization of DPGs instead of replicating the type of work already done by the DPGA.

The meeting closed at 1:30 p.m. EDT. on March 17, 2022.

Post-meeting survey

A post-meeting survey was sent to participants to gauge their reflections on meeting content and to provide a space for sharing additional feedback. This section summarized the questions asked and/or feedback elicited in the survey, along with the responses received from eight participants.

(1) **Overall, how would you rate this meeting?** Participants feedback is shown in Figure 9.

![Frequency of rating](image)

<table>
<thead>
<tr>
<th>Rating of meeting on a scale of 0-5</th>
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<tr>
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<td>1 (12.5%)</td>
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<td>2 (0%)</td>
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<td>3 (37.5%)</td>
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<td>4 (50%)</td>
<td>4</td>
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<tr>
<td>5 (0%)</td>
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(2) **What topics would you like to see covered in future meetings?**

*Figure 9. Survey question on rating the meeting from 0 (no help) to 5 (very helpful).*

Participants offered the following feedback (paraphrased):
• I would like to know how to make open source sustainable and support the SC [undefined] maturity in low- and middle-income countries.

• I want to see us create a global goods interoperability portal, as well as things like FHIR implementation guides for those global goods that work with FHIR and possibly some kind of forum where we can get engineers together to work on interoperability. OpenMRS has been great at hosting this kind of thing for OpenMRS, but it would be great if we had a smoother path to interoperability in the future.

• It would be helpful to get more country perspectives on some of these priority topics, such as interoperability.

• Sustainable financial models for digital global goods should be included.

• Some more academic-like thinking will be useful.

(3) Please share one or more examples of how this meeting has added value for you and/or your work.

Participants offered the following feedback:

• It provided insight into open-source tools being used in light of the open logistics management information system.

• Being familiar with the future outlook from the prospective of funders was interesting.

• The connections I have made for moving forward on integration with some other global goods are great, and I have moved those relationships up on my to-do list (I'll be headed to the OCL office hours tomorrow!).

• I gained valuable insight into the work being done in our field and into donor priorities.

• I have met people working in a similar area, and we can now share about similar challenges and experiences.

• We are an information technology services firm. Hence, having better understanding of and appreciation for various global goods helps us provide better services to our clients.

(4) Which sessions did you find most valuable (select up to 3)? Participant feedback is shown in Figure 10.

![Figure 10. Survey question on which sessions were most valuable, from 0 (not valuable) to 5 (very valuable).](image-url)
(5) Did you feel like you could have open and honest conversations about the global goods community?

Participant feedback is shown in Figure 11.

Did you feel like you could have open and honest conversations about the global goods community?
8 responses

Figure 11. Survey question on the freedom and openness of discussions.
(6) How likely are you to attend one of our meetings in the future? Figure 12 shows participant feedback.

Figure 12. Survey question on how likely participant is to attend meetings in the future, from 0 (not likely) to 5 (very likely).
## Appendix A. Participant list

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<thead>
<tr>
<th>Name</th>
<th>Organization</th>
<th>Email</th>
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<tbody>
<tr>
<td>Abdul Basith Shaukath</td>
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<td>Ali Habib</td>
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</table>

**Abbreviations**: CDC, Center for Disease Control and Prevention; GIZ, Deutsche Gesellschaft für Internationale Zusammenarbeit; HIS, Health Information Systems Programme; MRS, medical record system; OCL, Open Concept Lab; UNICEF, United Nations Children’s Fund; USAID, US Agency for International Development; WHO, World Health Organization.
## Appendix B. Meeting agenda

### Day 1 – March 16, 2022

10:00 a.m. – 1:30 p.m. (EDT)

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
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<tbody>
<tr>
<td>10:00 – 10:10</td>
<td>Welcome and agenda preview</td>
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<td>10:10 – 10:35</td>
<td>Opening Keynote</td>
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<td>10:35 – 11:30</td>
<td>Lightning Talks, Part 1</td>
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<td>• OCL</td>
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<td>• OpenMRS</td>
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<td>• Facility Registry</td>
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<td>• Instant OpenHIE</td>
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<tr>
<td>11:30 – 11:40</td>
<td>Innovator Mixer</td>
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<tr>
<td>11:40 – 11:45</td>
<td>Break</td>
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<tr>
<td>11:45 – 12:30</td>
<td>Understanding the Total Cost of Ownership for Digital Solutions</td>
</tr>
<tr>
<td>12:30 – 1:25</td>
<td>Challenges and Lessons Learned in Interoperability</td>
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<td>1:25 – 1:30</td>
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### Day 2 – March 17

10:00 a.m. – 1:30 p.m. (EDT)

<table>
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<tr>
<td>10:00 – 10:05</td>
<td>Opening MentiMeter</td>
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<tr>
<td>10:05 – 10:50</td>
<td>Lightning Talks, Part 2</td>
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<td>• OpenSRP (open-source smart register platform)</td>
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<td>• Reveal</td>
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<td>• DHIS2</td>
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<td>• SanteMPI</td>
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<td>10:50 – 11:30</td>
<td>Digital Public Goods and Governance Best Practices</td>
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<td>11:30 – 11:45</td>
<td>Break</td>
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<tr>
<td>11:45 – 1:15</td>
<td>Looking at Tomorrow: Emerging Trends in Digital Health Funding, with speakers:</td>
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<tr>
<td></td>
<td>• Sean Blaschke, Co-founder and Global Coordinator, Digital Health Center of Excellence, <strong>UNICEF</strong></td>
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<td></td>
<td>• Robert Cryer, Country Technology Services Manager, <strong>Global Fund</strong></td>
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<td>• Matt Hulse, Senior Systems Architect, <strong>World Bank</strong></td>
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<td></td>
<td>• Natschja Ratanaprayul, Technical Officer, Digital Health and Innovation, <strong>WHO</strong></td>
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<td>Time</td>
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<tr>
<td>1:20 – 1:25</td>
<td>What can Digital Square do for you?</td>
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<tr>
<td>1:25 – 1:30</td>
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</tbody>
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**Abbreviations:** DHIS2, District Health Information System 2; GIZ, Deutsche Gesellschaft für Internationale Zusammenarbeit; MPI, master patient index; MRS, medical record system; OCL, Open Concept Lab; OpenHIE, open health information exchange; UNICEF, United Nations Children’s Fund; USAID, US Agency for International Development; WHO, World Health Organization.
Appendix C. Presentation slides

Day 1 Agenda

<table>
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<tr>
<th>Time</th>
<th>Activity</th>
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<tr>
<td>7:00</td>
<td>Welcome and Agenda introductions</td>
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<tr>
<td>7:10</td>
<td>Opening Remarks</td>
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<tr>
<td>7:25</td>
<td>Lightning Talks, Part 1: OpenConceptLab, OpenDR, Privacy, Registry, Tensions, masked OpenDR</td>
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<tr>
<td>8:00</td>
<td>Break</td>
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<tr>
<td>8:15</td>
<td>Understanding the Total Cost of Ownership for Digital Solutions</td>
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<td>9:00</td>
<td>Lightning Talks, Part 1: OpenConceptLab, OpenDR, Privacy, Registry, Tensions, masked OpenDR</td>
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<td>10:30</td>
<td>Break</td>
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<td>11:15</td>
<td>Closing</td>
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Day 2 Agenda

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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</thead>
<tbody>
<tr>
<td>7:45</td>
<td>Day 2 Agenda Welcome</td>
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<tr>
<td>7:55</td>
<td>Lightning Talks, Part 2: OpenDR, Privacy, Registry, Tensions, masked OpenDR</td>
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<tr>
<td>8:00</td>
<td>Digital Health: Quicks and Governance Best Practices</td>
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<tr>
<td>9:00</td>
<td>Break</td>
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<tr>
<td>9:30</td>
<td>Lightning of Tomorrow: Emerging Trends in Digital Health Funding</td>
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<tr>
<td>10:15</td>
<td>Break</td>
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Break
Please return 5 minutes before the hour

Lighting Talks

Open Concept Lab (OCL): An open-source terminology service for the global community
March 2022
Joe Amfing, MPH; Business Analyst
Jonathan Payne, MS: Director, Open Concept Lab
Regenstrief Institute, Indianapolis, IN, USA
Outlines
- What is a terminology service? What are the benefits? (High level)
- Overview of tools
- Achievements from the past year
- Highlight: Year of the User
- Upcoming features and other OCL initiatives
  - Spell check
  - Contextual definition, particularly SNOMED-CT
  - OCL, FHIR, Core
- Integrations and Partnerships
- How users can join the community and use or contribute to the tools

Open Concept Lab (OCL) Toolkit
- OCL consists of these products:
  - OCL Terminology Service
  - OCL Terminology Viewer
  - OCL Terminology Manager
  - OpenNHS Dictionary Manager
- OCL Online is where you can use OCL in open-source tools in the cloud along with the global community and pre-loaded with key terminologies.

Highlights from 2021
A glimpse at the work accomplished in 2021 to prepare for community success in 2022:
- Technical Work Accomplished
  - Launch OCL Viewer
  - Overhaul infrastructure on polygons for quick and scalable performance
  - Implemented new FHIR/OMOP support

Open Concept Lab (OCL) Toolkit
- OCL Online Launched
  - Launched OCL Online during the Year of the User
  - Launched OCL Online during the Year of the User
- OCL Community Building
  - Established regular meetings
  - OCL, Architecture, FHIR, CDA
- OCL Leadership Committee
  - Oversee and lead OCL governance, structure, and services needs

OCL Online
- OCL Online is where you can use OCL in open-source tools in the cloud along with the global community and pre-loaded with key terminologies.

What is the Open Concept Lab?
Open Concept Lab (OCL) is an open-source terminology management system to help you collaboratively curate, publish, and use your definitions in the cloud alongside the global community.

OCL’s API provides real-time electronic access to terminology resources and straightforward integration with independent software platforms.

2022 is the Year of the User
- Embracing user experience and design expertise into OCL’s development process
- Supporting Terminology Implementers and Terminology Consumers
- Supporting users of the OpenNHS Dictionary Manager, INCO’s SMART Guidelines, and PEPFAR’s Metadata
Integrations

- Integrating OpenMRS Dictionary Manager with the OCL, PMDBrowser for management of concept dictionaries in the cloud and easy subscription to a local OpenMRS
- Bundling OCL and OpenHIE into Instant OpenHIE to help newer implementations to immediately start building their own health information exchanges using OCL-conformant tools.
- Capturing integrations with other software, such as OpenEHR.

Overview

The Instant OpenHIE project aims to reduce the costs and skills required for software developers to rapidly deploy a reference OpenHIE architecture for quicker solution testing, training and demos, and as a starting point for faster production implementation and customization.

Vision

Instant OpenHIE aims to showcase the functionality, use cases, and workflows of the OpenHIE architecture, offering a simple, easy-to-use prototyping platform. It is designed to make it easier for users to get up and running with a health information exchange and offers a framework for developers to more easily align their thinking around the OpenHIE architecture, and to support new workflows based on real-world use cases.
Package-Based Architecture

A key concept of Instant OpenHIE is that it can be extended to support new use cases and component building.

This is achieved using a package-based architecture. Each package contains scripts to stand up and configure applications that support various workflows in a health information exchange. A package will either extend directly from the core package or from another package.

Key Technologies

Instant OpenHIE uses the following technologies to allow packages to be executed and deployed once they have been defined:

- Docker is used for containerization of applications.
- Docker Compose is used for orchestration of containers for local deployments.
- Kubernetes is used for cloud-based deployments, with nix configuration for additional technical-simplistic.
- Gherkins and Cucumber provide a testing framework to support conformance and workflow testing.

Creating Instant OpenHIE Packages

There are two kinds of contributing:

- Infrastructure packages - New apps and components.
- Use case packages - New use cases, workflows, and tests.

Basic steps for creating packages:
1. Create docker-compose and kubernetes files for deploying and configuring applications in the package.
2. Create instant.json file for metadata.
3. Create bash scripts to execute:
   a. docker-compose
   b. kubectl apply
   c. any prior data processing.

Use Cases

Health Workforce:
- Core Package
  - Health Workforce Package
Longitudinal Clinical Data:
- Clinical Package
  - 3rd party data collection package
COVID-19 Case Reporting:
- COVID-19 Use Case Package
- Health Management Info System Package

Long Term Roadmap

- At maturity, Instant OpenHIE aims to provide portable, launchable versions of multiple OpenHIE components to facilitate:
  a. Demonstrable reference products - models that align with the OpenHIE Community's vision for new relationship models.
  b. Rapid software development of mediator services and point-of-service systems by making it possible to launch several applications quickly so the developer can focus on their tasks.
  c. Reproducible, version-controlled infrastructure for user-contributed tools of the OpenHIE architecture profiles, workflows, and use cases.
  d. Production-ready containers and orchestrated components that are deployable in a range of contexts.

Acknowledgements

Jembi Health Systems is funded by Digital Square, a PATH-led initiative funded and designed by the United States Agency for International Development, the Bill and Melinda Gates Foundation, and a consortium of other investors, in support of the Instant OpenHIE project.
OpenMRS: Getting it Done

Global Goods Innovations Meeting
16 March 2022

More health facilities worldwide are using OpenMRS than ever before.

Past: We were focused on OMRS as a Platform.
Now: We’re growing a Product

Top 3 Strategic Directions for our Product
(our 3 C’s)

Care
Configuration
Communication
We want a framework that will

- Allow many eyes to work together simultaneously
- Modernize the technology stack
- Make incremental improvements easier (release, frontend, backend improvements, confidently without risk, broken record)
- Appeal to the global talent pool of data scientists, engineers, and developers
- Foster interoperability
- Focus on User Experience: using Solidus | Maintainable Development

3.0 Overview

Distribution
- Process to scale &
  collect data

OpenAPI 3.0 Reference Application
- Bit of API you need

Framework
- UI Framework
- Configuration Tools
- Simpler Deployment

Platform (x.x)
- Plug-and-Play, Frontend Architecture
- FHIR API
- Metadata Management

"3.0"

Designer-driven process

1. Working closely with Developers
2. User Research & UI Testing
   - Provide a sense of priority
   - Improve projects and multiple
countries
3. OpenAPI has a single source
   - JSON schema ready for Frontend

Implication: Designer works on it, then anyone
- backend, or any other team
- can work on it.
- backend needs to be ready to integrate
   ability to work using JSON schema.

The solution solves multiple problem areas:

Design
- Design System
- Ux, Convention
- Point of Care
- Designed for more demanding
- Users

Technology
- Tools enables multiple teams
to work on features
- Teams customer experience
- Tech Stack
- Modern Dev
- Scuba
- MarketPlace
- Tools & features can be easily
  shared across implementation

om.rs/productdashboard

Our current strategy & direction
for platform/products

Rapid roadmap of what we’re working on now, what’s up next,
& technical opportunities to
support/needs
We Are OpenMRS: Community-Driven Action

2019
- 26 daily active members
- 6 organizations contributing
- 3 engaged teams
- 5 OpenMRS for supported roles

2020
- 52 daily active members
- 12 organizations contributing
- 7 engaged teams
- 8 OpenMRS for supported roles

2021
- 59 daily active members
- 16 organizations contributing
- 7 engaged teams
- 7 OpenMRS for supported roles

Diverse perspectives inform technical approaches, use cases, designs, and solutions.

Greater likelihood of adoption by multiple OpenMRS implementations

Create and access a collection of reusable solutions

Reduce siloed development and duplication of effort

Make a positive impact on public health by contributing to a global good (OpenMRS)

Better understanding of our diverse landscapes and learn from each others' experiences

Make the most of limited resources.

Distribute the responsibility for maintaining and sustaining shared OpenMRS assets

Access a pool of talented designers, developers, product managers, and other experts

Top 3 Strategic Priorities for Community Engagement

Visible pathways to partner and contribute to community profiles

Boost community and country technical capacity

Targeted, maintainable engagement

What Makes Collaboration Possible?

Shared Purpose & Priorities

Mutual Trust & Respect

Governance

Shared Decision-Making

Clear Roles & Responsibilities

Shared Tools & Technologies

Communication

Shared Resources

Making Collaboration Easier

Shared Assets
- Tools that enable OpenMRS implementations
- Code of conduct
- Disaster recovery guides
- A culture that holds developers and sustainers accountable

Updated Community Conventions & Tools
- Code of Conduct
- Disaster Recovery Guides
- Conventions (Wiki, Talk, Blogs)
- Issue management tools & processes
- OpenMRS Style Guide, Coding Conventions

Updating Community Roles & Responsibilities
- The status committee role that ensures and maintains the community's goals
Growing Our Talent Pipeline... Together

Overview of TCO tool for digital health interventions (DHIs)

Purpose
- Identifies and highlights the key components and considerations of effective and efficient digital health solutions.
- Helps in making informed decisions about the cost-effectiveness of different DHIs.

Scope
- Focuses on cost-related aspects from the early stages of intervention development to post-launch evaluations.
- Covers the entire lifecycle of a DHI to ensure comprehensive cost analysis.

Approach
- Based on analyzing the different TCO elements and how they impact the overall cost of implementing a DHI.
- Offers a holistic view to assess the financial viability of different DHIs.

Components of TCO Tool

User Guide
- Provides guidance on how to use the TCO tool for efficient decision-making.

Benefits
- Identifies potential savings through optimized resource allocation.
- Helps in understanding the cost drivers of different DHIs.

Roadmap
- Provides a timeline for the implementation of DHIs, ensuring cost-effective planning.

Budget Considerations
- Aligns the financial planning with the strategic goals of the organization.

Total Cost of Ownership
Key learnings to date

- A general lack of transparency of cost data makes it difficult to understand the cost of digital health.
- Key learnings include:
  - Operating costs are often unaccounted for and can be substantial.
  - Costs can be underestimated by vendors.
  - Cost estimates may be misleading.
  - Digital health projects may overestimate benefits.
  - Digital health projects may underestimate costs.

- Key learnings include:
  - Operating costs are often unaccounted for and can be substantial.
  - Costs can be underestimated by vendors.
  - Cost estimates may be misleading.
  - Digital health projects may overestimate benefits.
  - Digital health projects may underestimate costs.

Next steps for TCO

**Near-term**
- Test the tool with select stakeholders:
  - Internal teams (testing)
  - External partners (World Bank, GICE Countries)

**Long-term**
- Develop a business plan for launching tool:
  - Identify markets (including the need for current markets in digital health)
  - Develop a plan to monitor and track tool usage:
  - Cost data will be requested from users, but limitations of cost data can improve and further validate the tool.

We are interested in hearing from you

- Who are your key customers and how do you budget costs with them?
- Are there common challenges with coming to consensus on costs and budgets?
- What would success look like for this tool?
- Please let us know in the chat feature or verbally if you are willing to test the tool with your own cost data.

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Thank you!

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Day 2 Agenda

- 7:00-7:30: Day 2 Agenda Review
- 7:30-9:00: Launching Tools, Part 2: OpenRP, Rawail, DH2, Standard
- 9:00-9:30: Overview
- 9:40-10:15: Applying Emerging Trends in Digital Health Training
- 10:15-10:30: What can Digital Square do for you?
ABOUT AKROS
- AKROS is a worldwide leader in digital mapping and analytics.
- AKROS has extensive experience in health, nutrition, and livelihoods projects.
- AKROS is a social impact technology company that uses data to make a positive impact on the world.

CORE CAPABILITIES:
- Support campaign planning, implementation, and data-driven decision-making through AKROS's unique solution.
- AKROS provides accurate and actionable insights that help organizations make informed decisions.
- AKROS's data-driven approach enables organizations to reach the most isolated and vulnerable populations.

THE CHALLENGE: REACHING THE UNREACHED
- The "last mile" is the final stretch of a campaign or program.
- AKROS helps organizations reach the most isolated and difficult-to-reach populations.

REACHING THE UNREACHED
- In 2019, 83% of households were reached with spray campaigns.
- In 2020, 93% of households were reached with spray campaigns.

Spray coverage in 2019 (83%) vs. 2020 (93%)

The spray coverage in 2020 shows a significant increase, with 93% of households reached compared to 83% in 2019. This improvement indicates a successful implementation of AKROS's technology and data-driven approach.

A REACHING THE UNREACHED
- 1. Accurate population data
- 2. Ability to find the houses
- 3. Effective communication
- 4. Intervention provided
- 5. Not reached
- 6. Not found

If houses or people are "not found," this is a driver for poor coverage and low impact.

REVEAL: PLAN, GUIDE, AND TRACK DELIVERY TO THE LAST MILE
- SETUP & PLANNING
- NAVIGATE & DELIVER
- MONITOR & RESPONS

The REVEAL platform helps organizations plan, guide, and track delivery to the last mile, ensuring accurate coverage and effective intervention.
Why we went all in on FHIR?
(and why you should too)
3. Computable Clinical Guidelines

- Ability to represent complex clinical decision support logic in CQL and FHIR expressions
- Ability to execute CQL artifacts in an implementation guide
- Logic maps to standard data model and terminology as a result very portable
- Fast to adapt, reduced transcription errors

4. Standards promotes specialization which creates software ecosystems

FHIR Web - Web interface for FHIR API Service

- Practitioner (user management)
- Location management
- Team assignment
- CarePlan management
- View Patient Data
- Update patients (via SDC) in progress
- HAPI Keycloak Integration

FHIR Core - Key Functionalities

- All data stored in FHIR resources
- Data collection and workflow logic configurable in FHIR
- FHIRDefinition used to define health modules and generate artifacts
- Data capture through FHIR Questionnaires
- Modular, Reusable view HAPI designed to interpret FHIR resources for Patient Data, CarePlan, Symptom
- Search
- Authentication & Secure Sync
- In-progress
- FOP sync
- Maps and geospatial data viz

FHIR Core - Covid-19 Smart Vaccine Certificate App

CHW Precision Health Tasking App

Builds on FHIR Tools and Locations
5. Semantic Interoperability

6. Care Coordination
- Workflow support key to FHIR
- Interoperability is not just pushing around patient data
- Providers agreed upon way to coordinate care: patients care across platforms
- Tasks, Referrals, Appointments, PlanDefinitions are all first class primitives

7. Promotes Local Ownership
- Allows countries to understand recommendations, quickly localize and configure the logic that goes into their apps
- Countries own the logic and can take it to another platform or vendor if needed
- Invest in building capacity around a standard and not specific platforms. Invest in Academics
- Lowers barrier to local tech partners to participate in building their country's digital health systems

Digital Square is supported by:

Digital Square is an initiative led and designed by the United States Agency for International Development, the Bill & Melinda Gates Foundation, and a consortium of other donors.