



# Sustainable Local Software & Innovation Ecosystems: 3 Stories from the Field



Jan Flowers  
USA



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UGANDA

11 December 2018

Global Digital Health Forum, Washington, DC

**Moderator: Michael Downey, DIAL Open Source Center**



# IMAGINE ...

## a world without sustainable digital development projects.

Today, technology is fundamental in critical roles in all sectors across the planet.

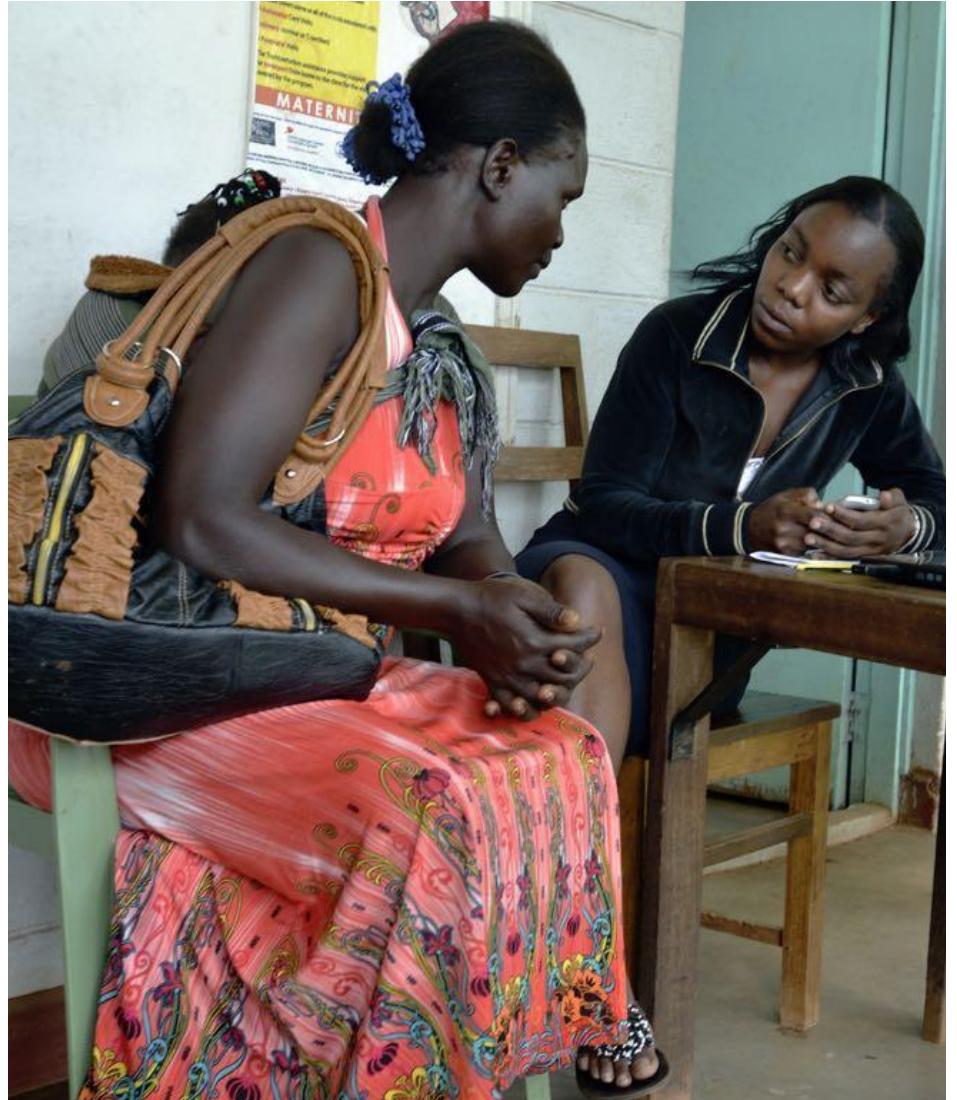
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**Small business loans & financial management**



**Charities connecting with beneficiaries**



**Patient record management in hospitals and clinics**

# SUSTAIN?

- Hedge against **burnout of personnel**
- Survive organizational **strategic shifts**
- Catalyze **more resources** for projects
- Minimize **single points of failure**
- Balance **shiny new things & long-term**

Today's global climate of **international development funding cuts**, along with growing **challenges in sustainability** of FOSS projects generally, means it's time to focus on **co-investment in shared resources** for those projects...

the mission of the  
DIAL Open Source Center.

Learn more: <http://osc.dial.community>

# 4 Sustainability Goals for Digital Development

DIAL Open Source Center's vision for technology development projects



Learn more: <http://osc.dial.community>

# Questions & Answers

1 GRAB A NOTECARD

2 WRITE A QUESTION

3 PASS IT TO MODERATOR



# THIS HOUR:

- **Rosalind Parkes-Ratanshi**  
MAKARERE UNIVERSITY, KAMPALA, UGANDA
- **Damola Olajide**  
PALLADIUM GROUP, ABUJA, NIGERIA
- **Jan Flowers**  
UNIVERSITY OF WASHINGTON, SEATTLE, USA
- **Q&A - Discussion**



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Ugandan Academy  
for Health Innovation  
and Impact

# How can we best drive health innovation in Uganda?



**Infectious Diseases Institute**  
College of Health Sciences, Makerere University,  
Uganda  
Investing In The Future – Impacting Real Lives



INFECTIOUS  
DISEASES  
INSTITUTE

# Ugandan Academy of Health Innovation and Impact

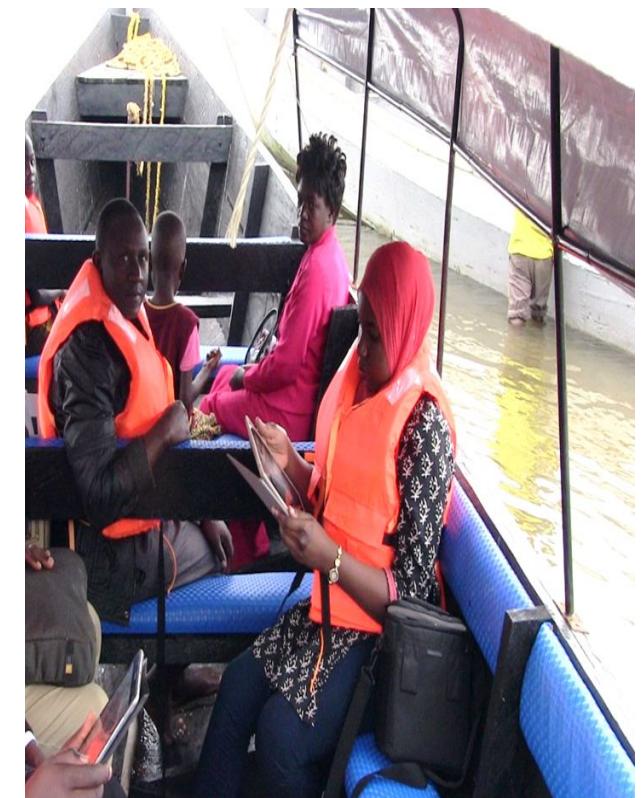
Formed in 2015 after an MOU between the following partners:

- Ugandan Ministry of Health
- Infectious Diseases Institute
- Janssen, the pharmaceutical companies of Johnson & Johnson
- The Johnson & Johnson Corporate Citizenship Trust



# Ugandan Academy of Health Innovation and Impact

***Vision: Sustainable health care accessible to all in Uganda***



***Mission:*** to improve **health outcomes** through **innovations** in clinical care, capacity building, systems strengthening and research, which inform policy and practice, with a strong emphasis on HIV and TB

# Connect for Life

The Ugandan Academy is a flagship implementation of the Janssen Connect for Life™ program.



The aim of the Connect for Life™ program is to sustainably improve disease prevention and outcomes in underserved populations based on local partnership, expertise and evidence, by catalyzing initiatives in applied research, capacity building and clinical management.

# Infectious Diseases Institute, Makerere University

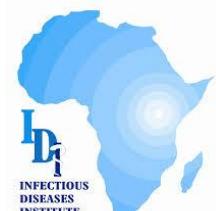


The Academy is housed within the Infectious Diseases Institute (IDI), Kampala which is an integral part of the College of Health Sciences at Makerere University.

IDI currently provides health care and treatment services to more than 25% of people in HIV/AIDS and tuberculosis care nationally.



That is around 300,000 people across Uganda.



# Academy projects

Demonstration projects implemented by IDI

Open call for proposals by other organisations

	2015/16	2016/17	2017/18	2018/19	2019/20
Board					
Secretariat					
Projects					
Research demo					
Capacity development demo					
clinical management demo					
Research 2					
Capacity development 2					
Clinical management 2					
Research 3					
Capacity development 3					
Clinical management 3					
Masters and PhD programme					
Janssen global health fellow					

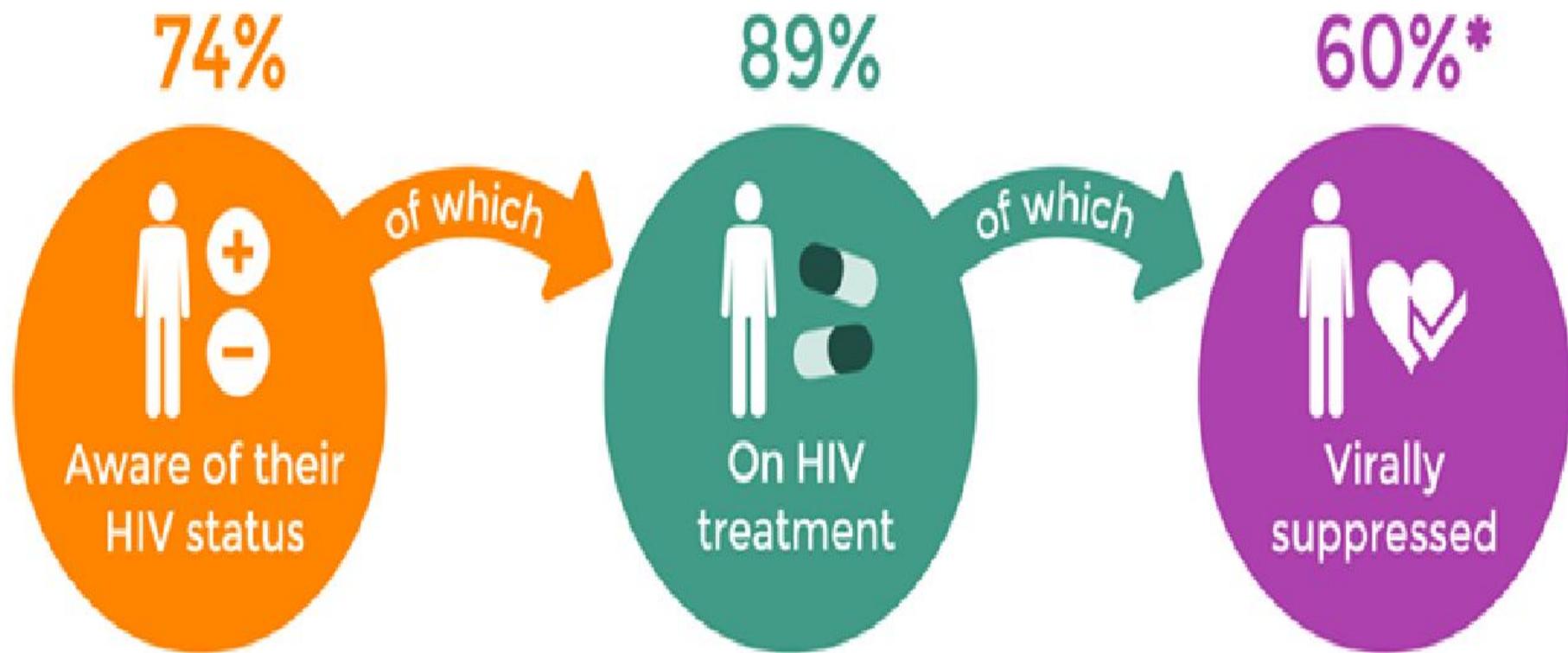
# Ongoing need for HIV interventions

- The burden of HIV is greatest in sub-Saharan Africa
- Treatment gap is estimated at 15 million people
- In Uganda, the HIV prevalence is around 7%
- Over 1.1 million on treatment
- Approximately 300,000 PLHIV not on ART

# Challenges – HIV Cascade of Care

UGANDA

Progress towards 90/90/90 targets among adults aged 15-59



Source: UAIDS data 2017, \*Ugandan Ministry of Health (2017)

# Ugandan Academy – HIV Cascade of care

- Using app to link HIV positive patients to care e-CBS



- Call for life projects  
–support for viral suppression

- Lost to follow up tracing

# Call for Life Projects

Implementation of interactive voice response / SMS mhealth platform for HIV and TB

## Patient supportive

Uses simple mobile phones

- Adherence reminders
- Visit reminders
- Health tips and information
- Symptom management support



## Health Care Professional supportive

- Web services for patient management

# Call for Life Projects

Call for Life using is based on motech software by Janssen, the Pharmaceutical Companies of Johnson and Johnson adapted for Uganda by the Academy



We have successfully linked Call for Life to OpenMRS for HMIS integration

# Call for Life Projects

## **Call for life randomized control trial (RCT) daily support**

- To assess quality of life of PLHIV ART in key populations

## **Call for life Lite** in stable patients

- Weekly support at 3 sites for PLHIV stable on ART

## **Call for Life Youth**

- RCT in young PLHIV starting ART in rural Uganda daily support

## **Call for Life TB**

- Pilot study on daily support for patients and also a caregiver

# Call for Life Projects

- Currently 3250 patient completing approx. 4000 calls per week
- 97% chose IVR over SMS

## Next steps

- Further data interrogation  
*(see poster 34 on health tips)*
- sustainability options
- widening user case



# Call for Life patient voices

*'It is hard to get a doctor who cares so much for you, they ask if you have any health complaints or you report the symptom, the next day they respond and ask you what the problem is. It is very good because we are cared for. It is good because no matter where you are, if you report a symptom they respond the following day'.*

(focus group discussion, male discordant positive partner, 49 years old, accessing CFL at Kasangati Health centre).

*'Consultation with the doctor is done on phone. The whole process of saving money for transport, making a line to see the doctor, is no more. But now, we do direct consultations which helps us a lot'.*

(foucs group discussion, male discordant positive partner, 46 years old, accessing CFL at Kasangati health centre).

# Challenges – Burden of HIV

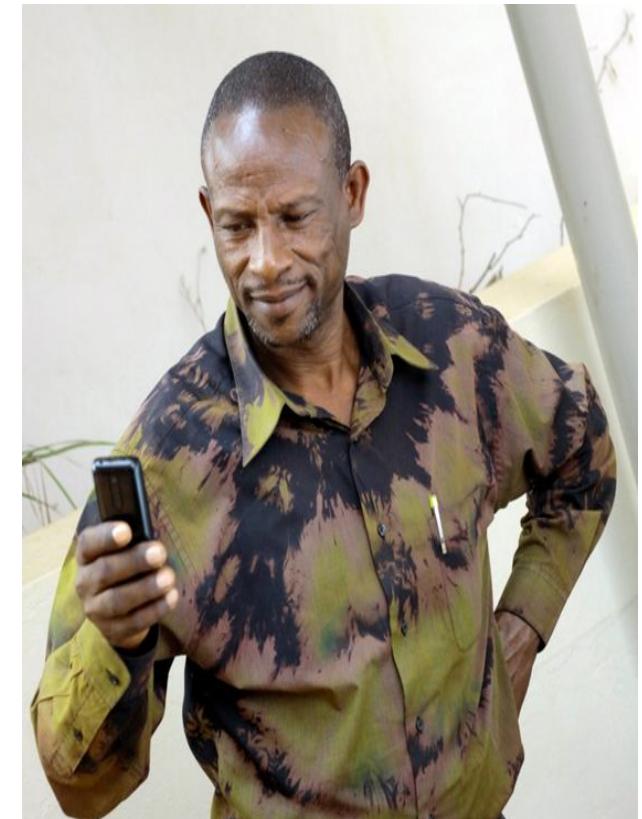
- Health centres are overcrowded
- Health care worker fatigue
- HIV care is absorbing resources leaving other primary care conditions behind



# Academy activities – burden of HIV

## Call for Life

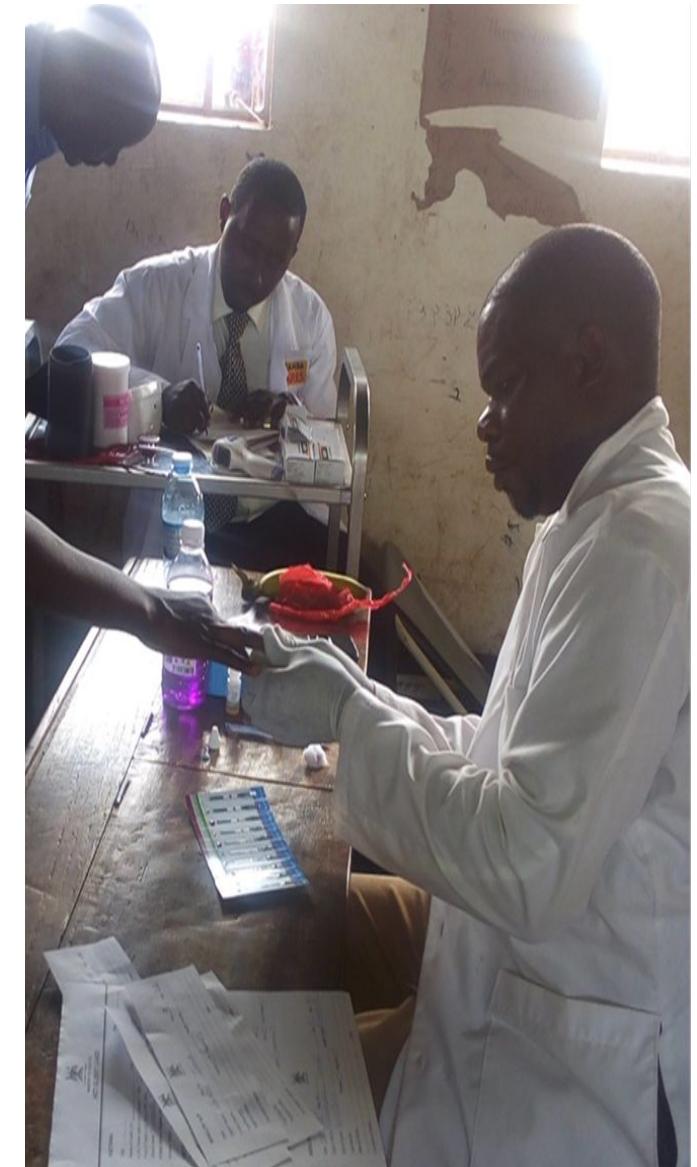
- appointment reminders
- symptom reporting



Community drug  
distribution point  
application (CDDP App)

# Ugandan Academy – supporting health care workers

- May not have received formal training
- New knowledge and guidelines
- Need for continuous professional education and development
- Practical skills are needed for newly qualified staff



# Ugandan Academy – supporting health care workers



- E-learning website
- MOH accredited interactive case based presentations
- Call centre with advice for HCW about ART

“The interactive format was excellent in such a way that it is not boring and fun to follow”.

*Academy staff demonstrating the Academy e-learning platform*

# Challenges – HIV prevention

- 46,000 new infections annually in 2017
- Most at risk populations continue to struggle to engage with care and testing



# Ugandan Academy – HIV prevention

Health information for key populations in the Call for Life including youth



Female, 23years, Call for Life study,  
Kasangati

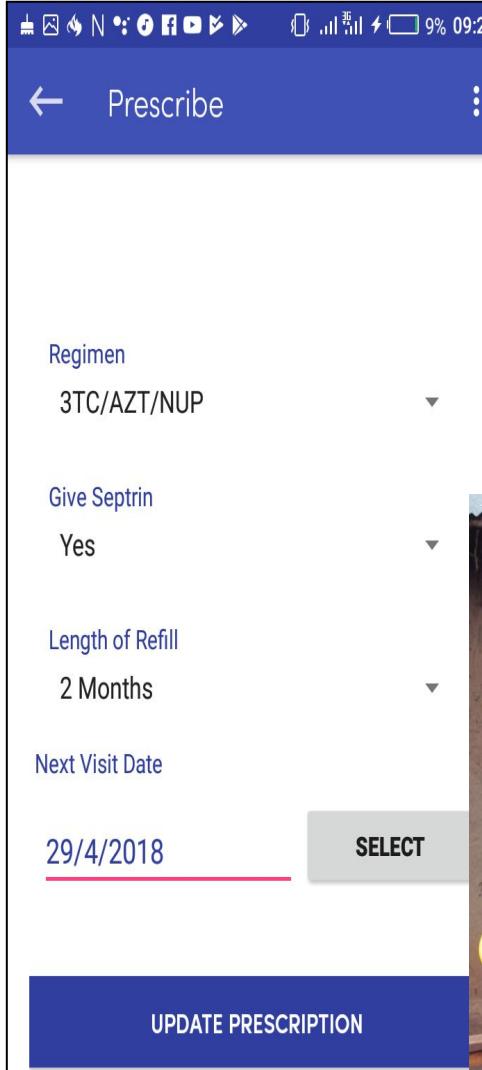
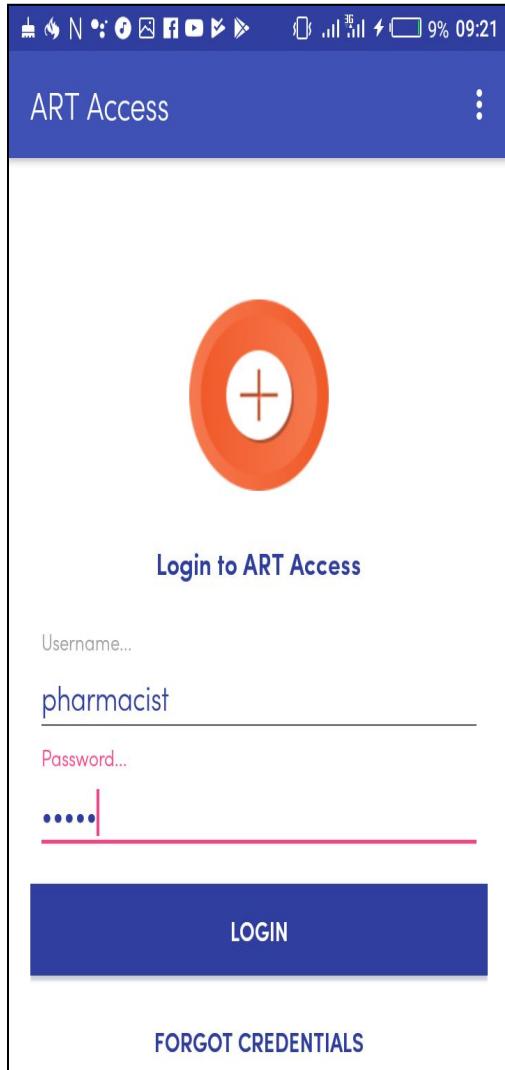
*Before I had multiple sexual partners but now ever since I was taught I realized that it's my life that I am wasting then I stopped. Even if a man comes to me with money I still say no. But before I used not to refuse, I would think "after all I am already infected".*

# Challenges – Access to medication

- Low levels of drug supply leading to monthly refills and sometimes weekly ART refill visits
- High burden of care due to high repeat attenders
- Long queues at health centres
- Frequent stock outs of ART



# Ugandan Academy – Access to medication



- ART Access App  
*(Appy Hour)*
- Community drug distribution app



- Community peer support groups

# Other innovations



# Engagement with the wider community



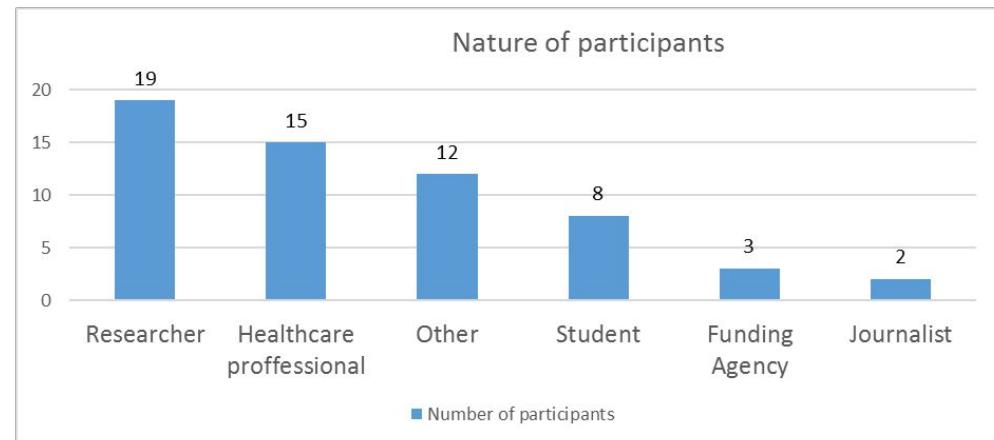
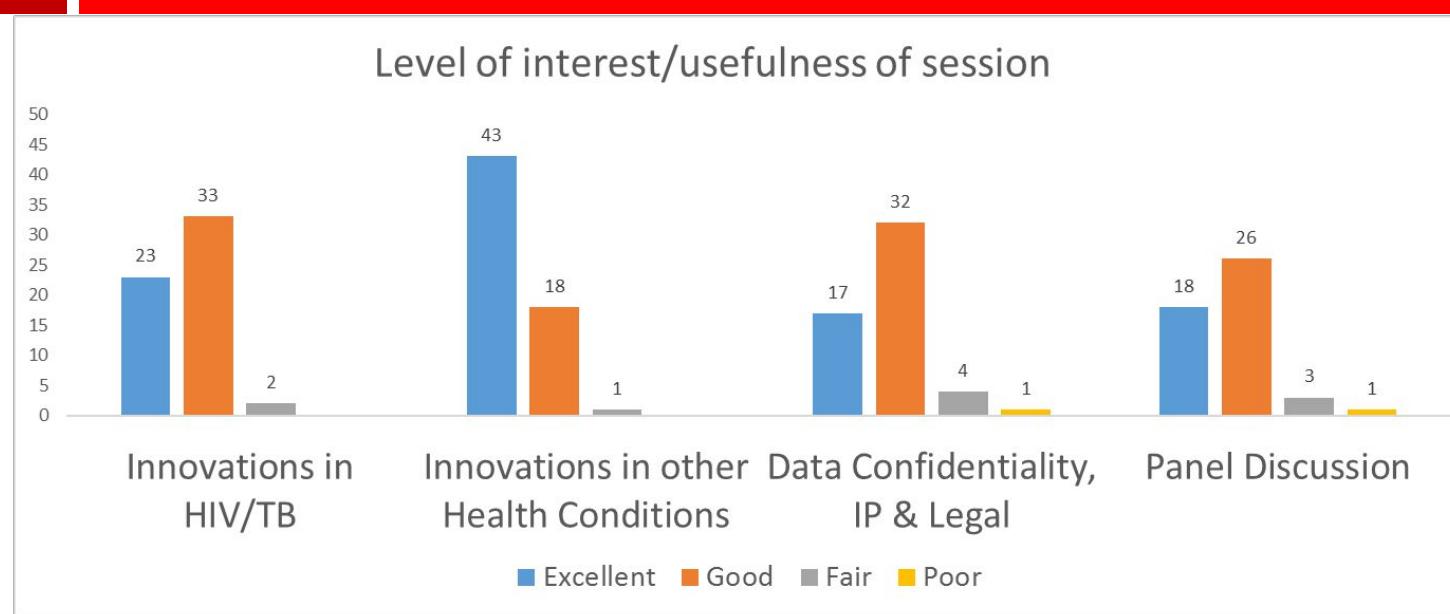
## First Ugandan Health Innovations Conference

### Student engagement

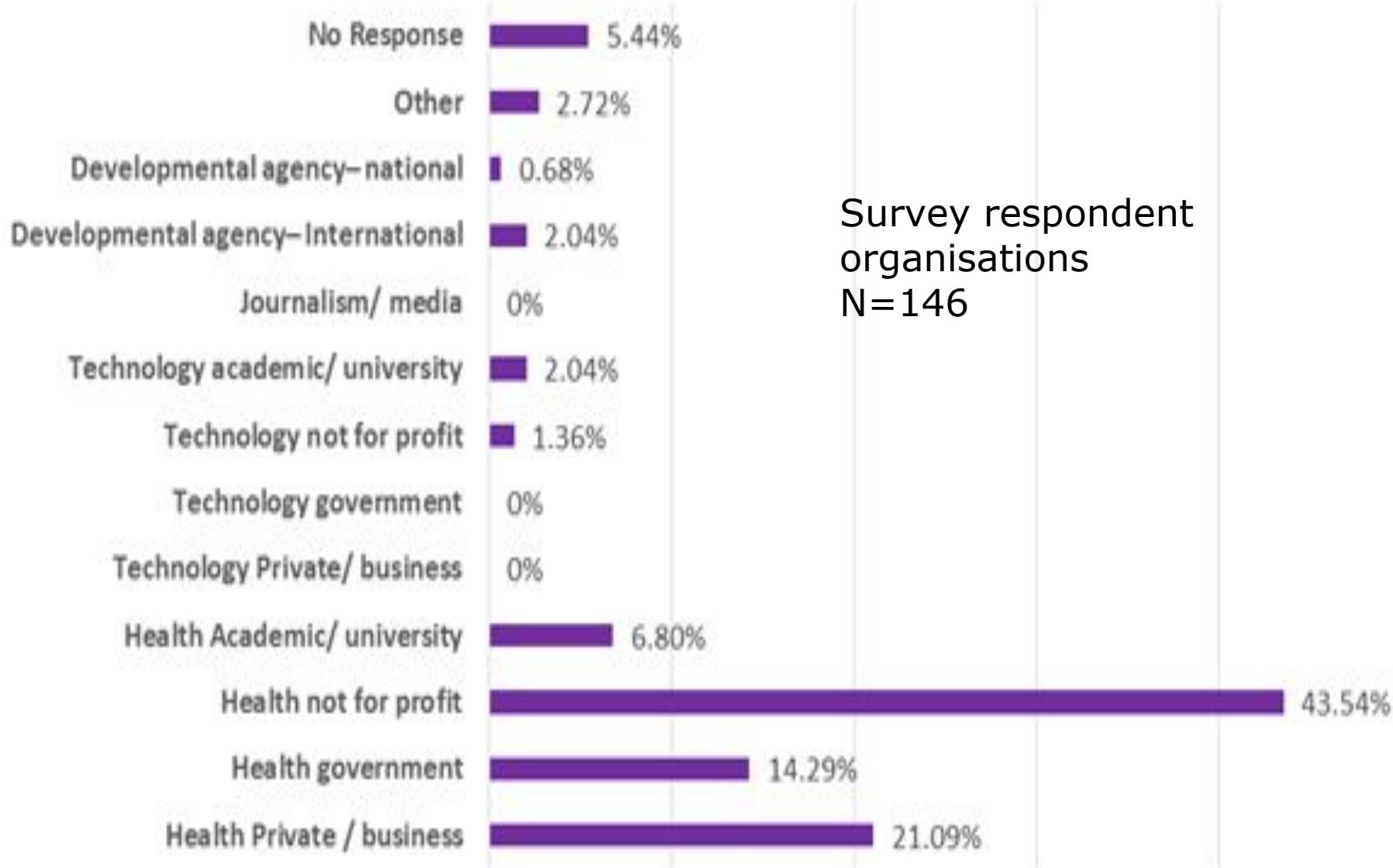


### Other Conference talks

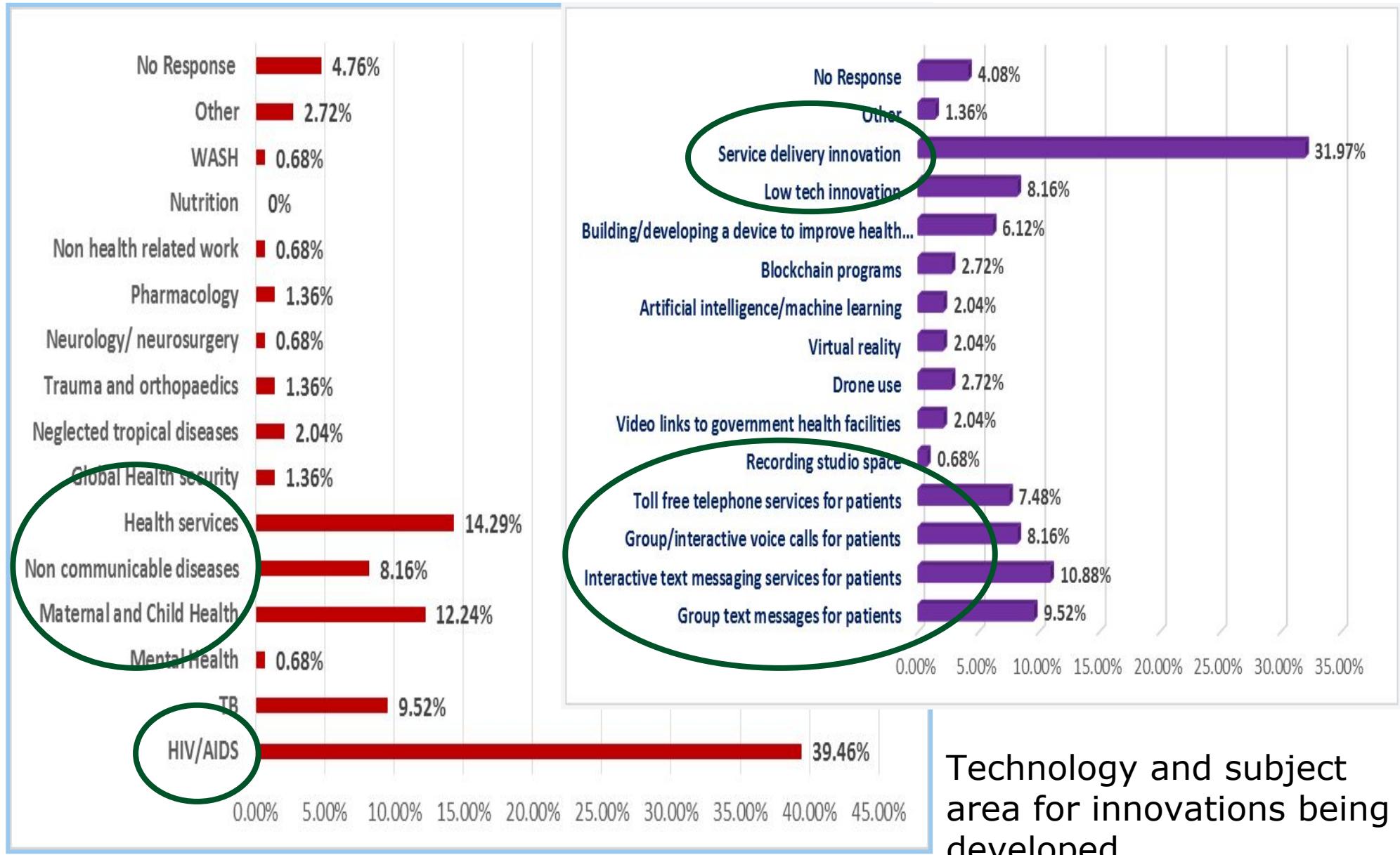
# Conference feedback



# Innovations Stakeholder survey



# Innovations Stakeholder survey



# 2019 Uganda Health Innovations Conference



MAKERERE UNIVERSITY



Ugandan Academy  
for Health Innovation  
and Impact

## Call for Abstracts

**Health Innovations Conference**  
**March 19-20, 2019, The Kampala Serena Hotel**

### THEME:

Sustainable health for all: Harnessing the Fourth Industrial Revolution (4IR)

### TRACKS

- Accelerating innovations into practice
- No people left behind; lo-tech and the 'Last Mile'
- People, Processes and Products
- Arts for health and social change

We welcome abstracts in line with the conference tracks, which will be selected for poster or oral presentations.

- Each abstract should include a title, author names and affiliation.
- The abstract text should not exceed 300 words with font 11 and 1.5 spacing.
- Abstracts may include a table or figure.
- Previously presented or published abstracts should not be submitted.

Submit abstracts to <http://grants.theacademy.co.ug/en/> starting December 15, 2018

The deadline to submit abstracts is January 15, 2019.



For more details, call +256 312 211449/465 | Email us at [theacademy@idi.co.ug](mailto:theacademy@idi.co.ug) | Visit [www.theacademy.co.ug](http://www.theacademy.co.ug)

The Ugandan Academy for Health Innovation and Impact,  
Infectious Diseases Institute, College of Health Sciences, Makerere University

# Lessons learnt so far

- New technologies e.g. mHealth, POCT etc are a great opportunity for RLS
- They may allow leap-frogging in efficiencies (e.g. massive scale up of mobile money in East Africa, HIV testing scale up across Africa)
- Population seems positive towards technology (less fatigue)
- Infrastructure issues are still a barrier to implementation
- Systems being developed need lots of conservatism
- **Desire for knowledge and engagement amongst the health community is very high**

# Academy Partners & Funders



*Johnson & Johnson*  
CORPORATE  
CITIZENSHIP  
TRUST



Ambasáid na hÉireann  
Embassy of Ireland



# Thank you for Listening



*For further questions or comments, please contact: [office@idi.co.ug](mailto:office@idi.co.ug)*

Visit us on:

WEB: [idi.mak.ac.ug](http://idi.mak.ac.ug)



**Infectious Diseases Institute**  
College of Health Sciences, Makerere University,  
Uganda  
Investing In The Future – Impacting Real Lives



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# *Building Sustainable Regional ICT Capacity through the West African Health Informatics Team (WAHIT)*

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*Damola Olajide, WAHIT Team Lead  
11 December 2018*



**USAID**



**HP+**  
HEALTH POLICY PLUS

# West African Health Informatics Team



WAHIT is a **regional team of software developers and informatics experts** based in WAHO.



WAHIT provides **technical assistance** to countries within the region while **building local** software engineering capacity to support long-term sustainability of HIS in the region.

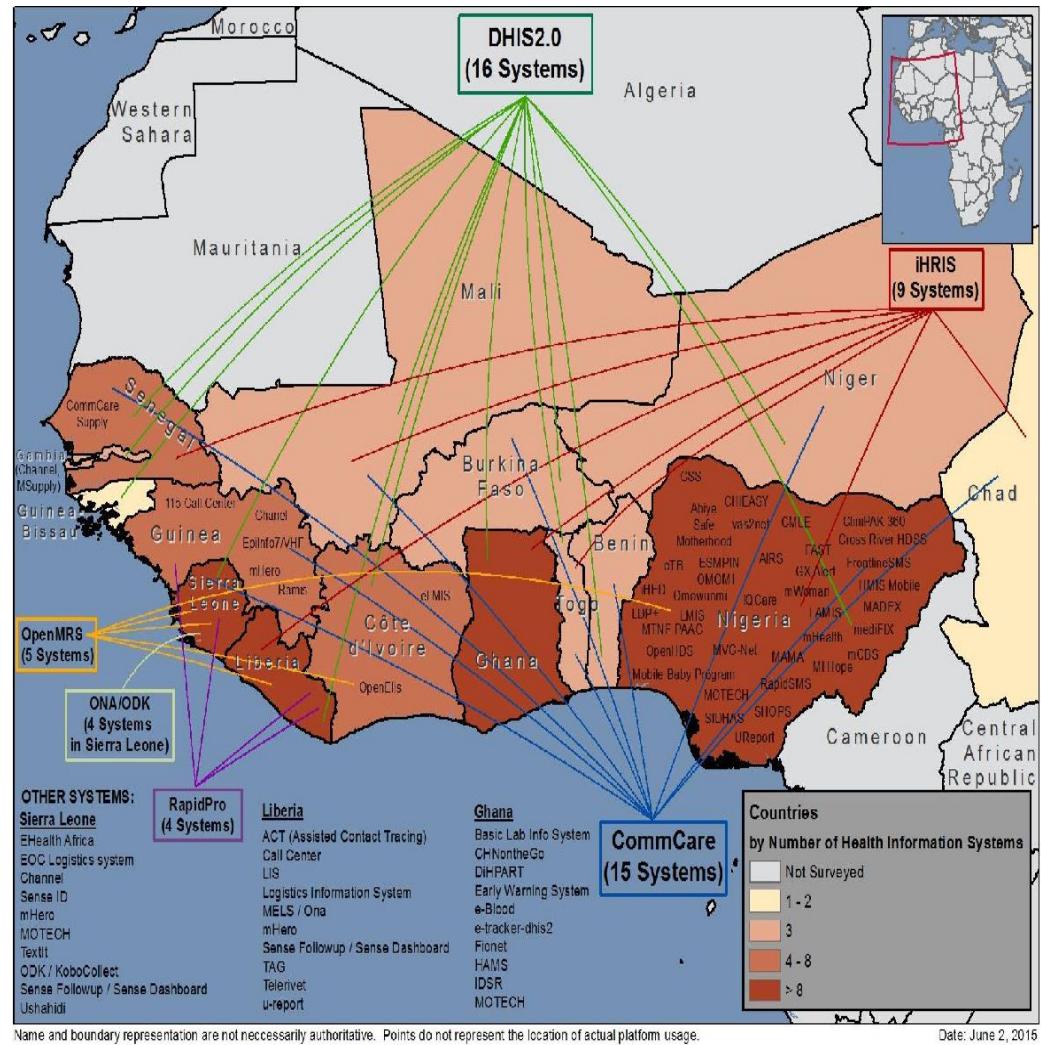


Just as we need competent field epidemiologists to analyze data and respond to outbreaks, **we need skilled health informatics professionals** to support and maintain the infrastructures and systems that support our work in HIS.



WAHIT was born from lessons learned during the 2015 Ebola epidemic and the following 2015 National HIS Summit in Accra

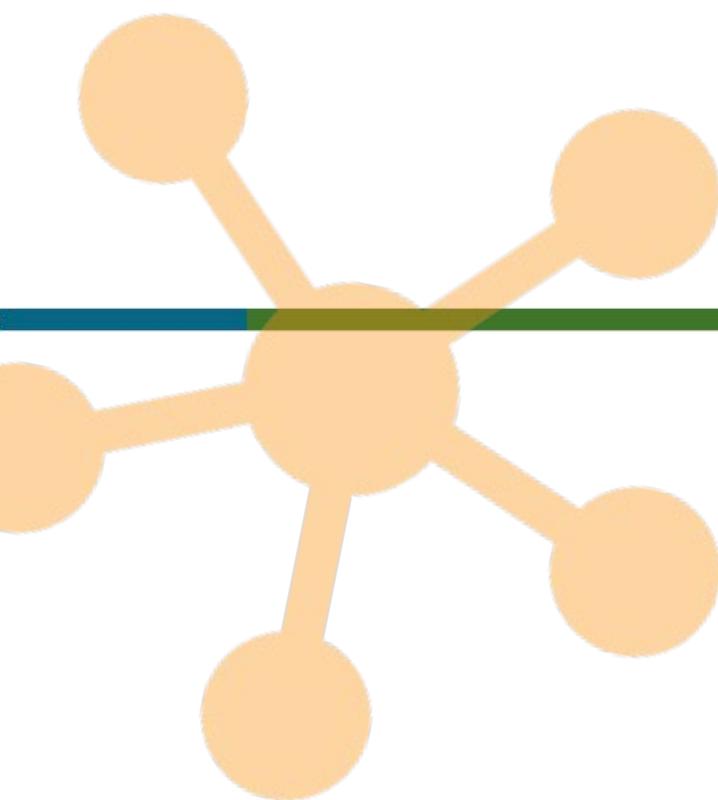
- Throughout the region disconnected and duplicative systems kept data in silos
  - Effective systems with timely access to relevant high-quality information could have allowed a timelier response
  - Local capacity building of HIS technical staff was needed



Name and boundary representation are not necessarily authoritative. Points do not represent the location of actual platform usage.

Date: June 2, 2019

2016



# **THE WAHIT MODEL**

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# WAHIT strengthens HIS capacity at **regional level** by:



Developing high level partnership among stakeholders



Working through ECOWAS to institutionalize capacity at a regional level



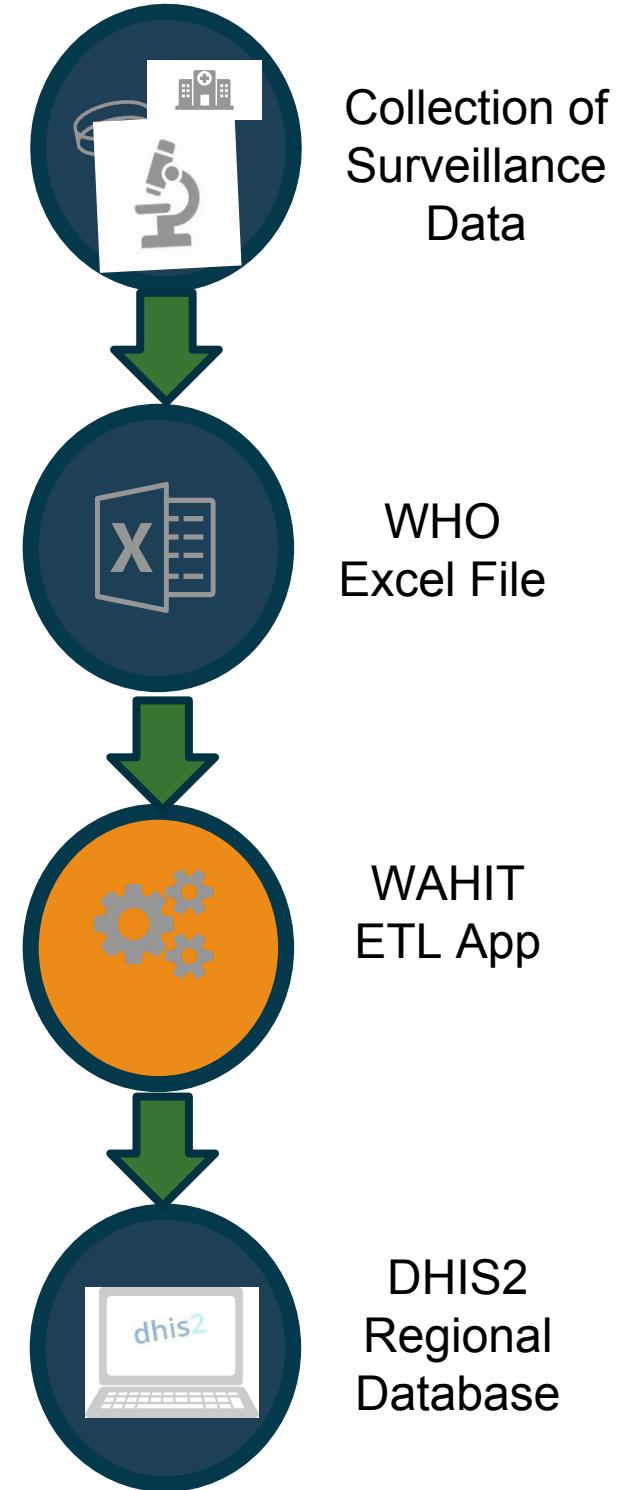
Leveraging existing investments in HIS



Building internal WAHO capacity to support regional level initiatives

# WAHIT has implemented several interventions at a **regional level**:

- ▷ Automated reporting of IDSR weekly reporting to WAHO by leveraging existing country processes
- ▷ Data management trainings to “One Health” data managers
- ▷ Trainings on advanced DHIS2
- ▷ Regional server administration training



# WAHIT strengthens HIS capacity at **country level** by:



Direct and continuous technical assistance on HIT and HIS



Short- & medium-term visits to work with country teams to enable easier skills building



Frequent regional meetings and trainings of national HIS officers. This enables regional experience sharing



Continuous follow-up with member states on existing and emerging issues through common communication channels

WAHIT has supported capacity development and technical assistance in **several countries**, including:

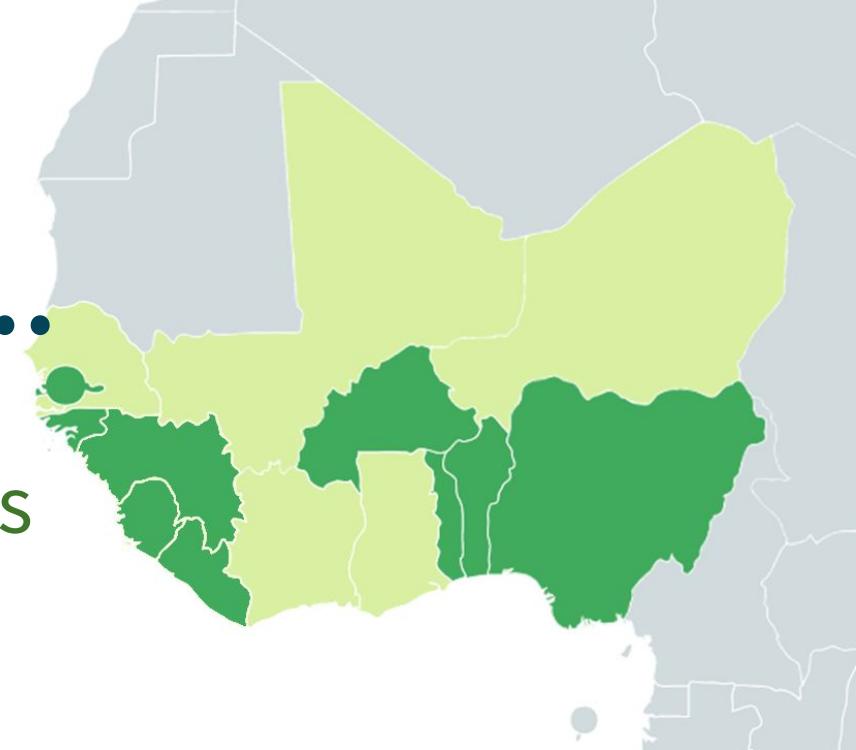
- ▷ **Togo:** Deployment of two physical servers and related services for the Ministry of Health
- ▷ **Burkina Faso:** Training on Windows Server 2012 administration. Training on Web dev, Mobile dev, WebAPI
- ▷ **Benin:** Transfer of server hosting national HMIS platform to in-country data center
- ▷ **The Gambia, Sierra Leone, Guinea:** Installation and configuration of the WHO Data Quality Review Module within DHIS2
- ▷ **Nigeria:** Assessment and diagnosis of the national DHIS 2 platform

# In one year, WAHIT has...

Trained over 150 HIS experts  
in West Africa

Conducted 10 missions providing  
technical assistance and building capacity

Conducted 3 regional training  
workshops to strengthen capacity on server  
administration, DHIS2 data administration and One  
Health data reporting

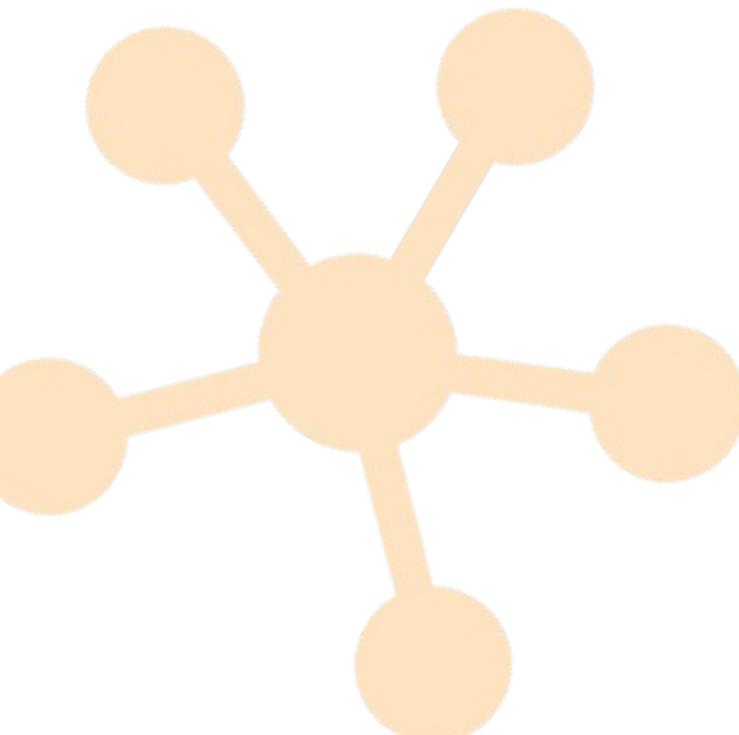


■ Direct TA Recipient  
■ Regional Training Participant

# WAHIT is establishing a regional community for MOH HIS staff to seek needed HIS resources



- ▷ The WAHIT team is connected with MOH HIS staff through a WhatsApp group, where MOH HIS can seek advice from WAHIT and staff from other countries
- ▷ Through WAHIT trainings and events, regional staff come together to share experiences and lessons learned
- ▷ In 2019, WAHIT plans to formalize the community of HIS staff through a formal online community, linking countries with resources they need



Thank you  
Merci  
Obrigado

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# ENSURING AN OPEN SOURCE DIGITAL HEALTH SOLUTION HAS A HEALTHY COMMUNITY

*An OpenMRS case study*

University of Washington  
December 2018  
Global Digital Health Forum



**JAN FLOWERS, MS, CLINICAL FACULTY, RESEARCH SCIENTIST**

*Health Informatics, Health Policy & Law, and Global Health*

Clinical Informatics Research Group (CIRG), BNHI SON, Director of Global Health Informatics

Digital Initiatives Group (DIGI), DGH SOM, Co-Faculty Lead

OpenMRS, Chair of the Board of Directors

OpenELIS, Board Member







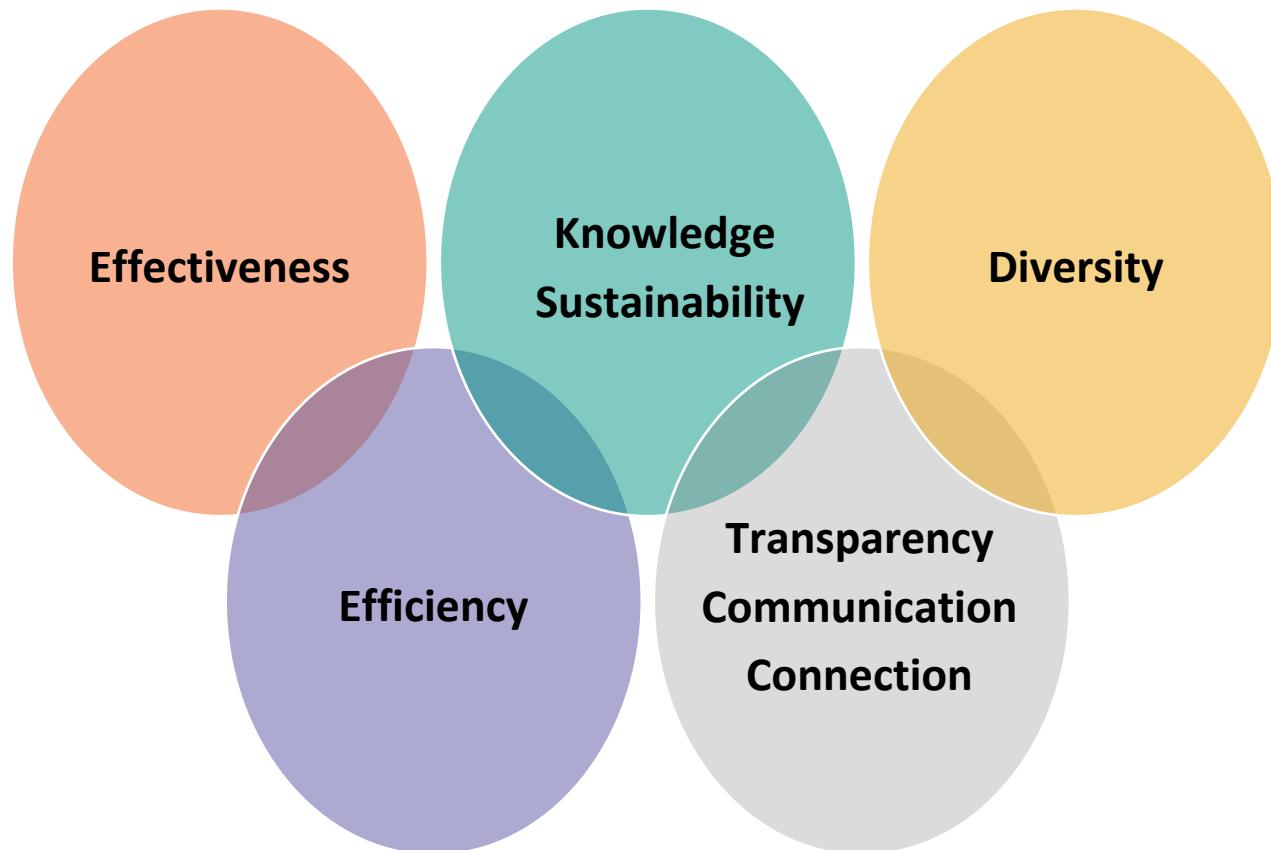
[www.openmrs.org](http://www.openmrs.org)

*The mission of OpenMRS is to improve  
health care delivery in  
resource-constrained environments by  
coordinating a global community that  
creates and implements a robust,  
scalable, user-driven, open source  
medical record system platform.*

# OPENMRS COMMUNITY HEALTH EVALUATION

OpenMRS growth drove creation of framework

Health Evaluation Framework:  
**Measure Community's Ability to Achieve Mission**



Effectiveness			Efficiency		
Measure	Result (Yes = 1, No = 0)	Performance Improvement Plan (PIP)	Measure	Result (Yes = 1, No = 0)	Performance Improvement Plan (PIP)
Does the BOD hold regular meetings, and asynchronous discussions in lieu of meetings when called upon?	Yes (1)		Does the BOD have documented schedule of responsibilities of oversight, review, and decision making throughout the year?	Yes (1)  Reviewed draft presented by ED in January	This schedule should be published on the OpenMRS Wiki as part of the BOD documentation.
Knowledgeable and Sustainable					
Measure	Result (Yes = 1, No = 0)	Performance Improvement Plan (PIP)	Diversity		
Do all BOD members understand the OpenMRS mission and strategy?	Yes (1)		Measure	Result (Yes = 1, No = 0)	Performance Improvement Plan (PIP)
Transparency, Communication, and Connecting					
Measure	Result (Yes = 1, No = 0)	Performance Improvement Plan (PIP)	Is the BOD membership representative of the community?	Some (0.5)  Community-elected member does bring community representation, but we need more.	Specifically recruit outside of US based networks. Plan is to start creating pipeline of potential BOD members from the locations OpenMRS is serving, and to create a mentoring/pathway program for these recruits who may need it for becoming a BOD member.
Are there community reports about meetings, decision making, and oversight of the organization at least once this period?	Some (.5)	Only the community BOD member provides a summary of the BOD meetings on Talk. BOD should provide bi-annual reports to the community.			

Effectiveness	X out of 8
Efficiency	X out of 4
Knowledgeable and Sustainable	X out of 9
Transparency, Communication, and Connectedness	X out of 3
Diversity	X out of 3
<b>Total Score</b>	<b>X out of 27</b>

# ABILITY TO ACHIEVE THE MISSION

- Community Profile
- Activity and Responsiveness
- Resources
- Structures and Processes
- Ecosystem
- Funding

# COMMUNITY PROFILE

- Different Types of Communities
  - Organizational Patterns and Membership
- Why is this important? What are your goals?
- OpenMRS Profile

# ACTIVITY AND RESPONSIVENESS

- # members and organizations involved
- # downloads
- # code commits
- # releases
- # forum posts and other communication forms
- # of implementations
- Are questions responded to quickly in communication channels?
- How welcoming and supportive are the community members?
- Are community members eager to share knowledge and experience?
- How mature are the implementations?

# RESOURCE EVALUATION

- # and skill of core developers
- # of code committers
- # of organizations developing or implementing
  - Important for evaluating contributions (diversity matters for both innovation and sustainability)
  - Important for pool of knowledge and experience
  - Opportunities for collaboration

# DEVELOPER CONTRIBUTIONS (...AND MORE!)

**Seconded to  
Community**  
*~10 contributors*

**Contributions by  
full/part-time  
employees funded by  
an organization to  
work on  
community-defined  
roadmap**



**Implementers**  
*~26 contributors*

**Contributions to  
code-base driven by  
specific  
implementation,  
typically compensated  
by implementation  
project**



**Independent**  
*~131 contributors*

**Contributions based on  
interest / prior  
involvement without  
compensation.**

**Include student  
participants in summer  
coding programs  
sponsored by Google**



Google  
Summer of Code

**Independent Volunteers contributed >50% of the code commits in 2016**

# OpenMRS Code Contributions

Committees in 2017:



**209 developers** from around the globe made **4,250** commits to **112** code repositories in the OpenMRS GitHub organization in 2017.

## **OpenMRS Core:**

84 people made 598 commits

## **Core Apps Module:**

20 people made 350 commits

## **Sync 2.0 Module:**

8 people made 191 commits

## **Add-on Index:**

11 people made 142 commits

# OpenMRS Implementations

More than  
**3,037 sites**  
&  
**8.7 million**  
active patients

1,845 sites & 6.3 million active patients reported in 2016

1,149 sites & 5.1 million active patients reported in 2015

Albania	Honduras	Nepal
Argentina	Hungary	Nicaragua
Armenia	India	Nigeria
Australia	Indonesia	Pakistan
Bangladesh	Israel	Peru
Belarus	Japan	Philippines
Bhutan	Jordan	Rwanda
Bolivia	Kazakhstan	Senegal
Botswana	Kenya	Sierra Leone
Brazil	Kiribati	South Africa
Burundi	Kyrgyzstan	Spain
Cambodia	Laos	Sri Lanka
Cameroon	Lesotho	Svalbard
Chile	Liberia	Tajikistan
Colombia	Libya	Tanzania
D.R.C.	Madagascar	Uganda
Ecuador	Malawi	Ukraine
Ethiopia	Malaysia	United States
Gambia	Mali	Vietnam
Georgia	Mexico	Zimbabwe
Ghana	Mozambique	... and more!
Haiti	Myanmar	

# OpenMRS Community Engagement

In 2017, our community members supported the OpenMRS mission through overwhelming community engagement, active development of our software products, and increased support of our implementations around the world. Our annual Implementers' Conference was held in Lilongwe, Malawi from December 12-16 and echoed the enthusiasm from the previous year's meeting! A total of 175 members from 20 countries attended to learn more about how Malawi plans to achieve a nationwide implementation of OpenMRS, as well as share their knowledge, experience, and challenges to fellow developers and implementers.

Here are a few 2017 stats from [OpenMRS Talk](#), our online hub for community interaction:



**29,986**

Total Talk Visits

+8%



**2,816**

Talk Topics Created

+13%



**20,323**

Talk Posts Written

+5%



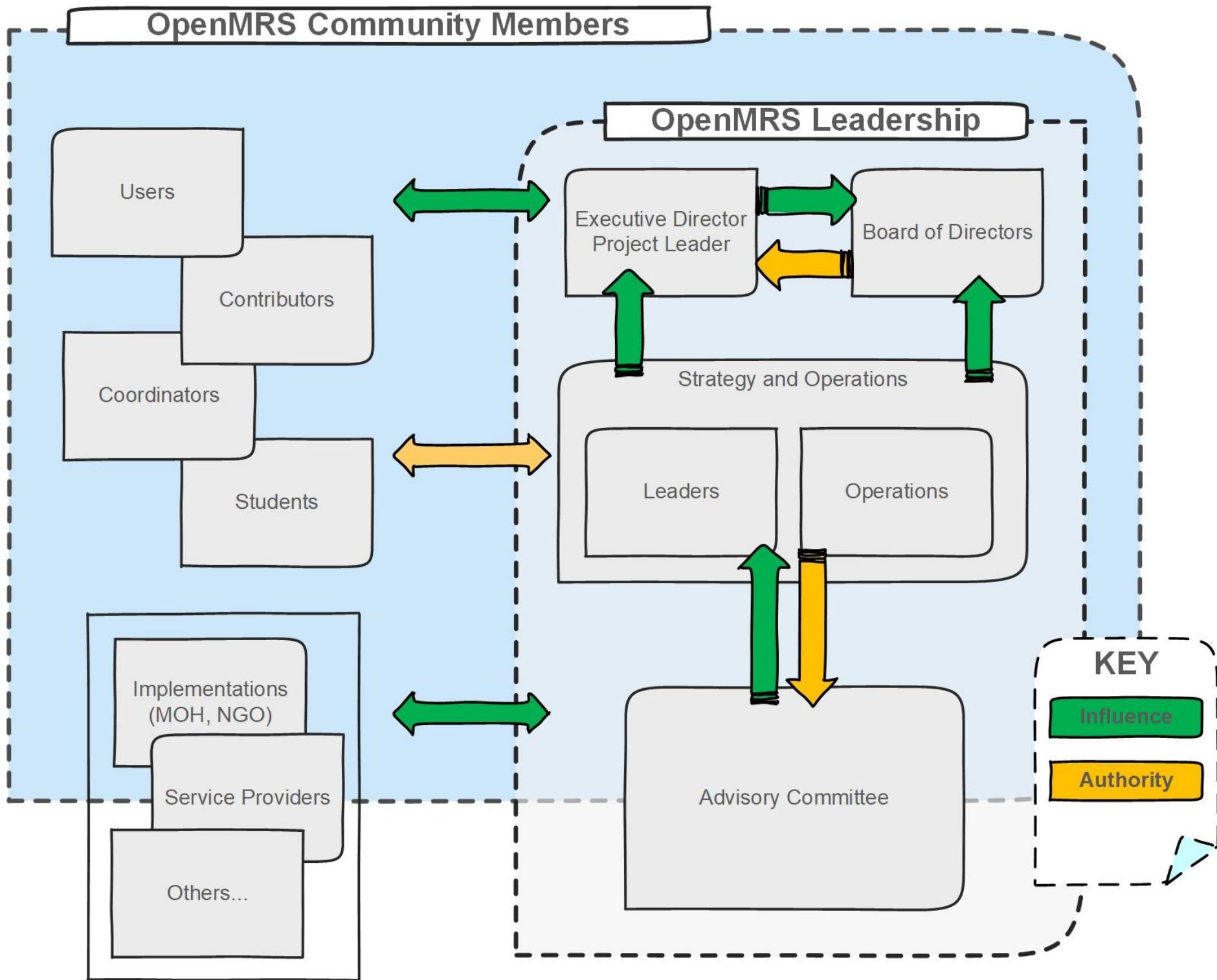
**948**

New Community Members

*Compared  
to 2016*

# STRUCTURE AND PROCESSES

- Development
- Support
- Governance and Decision Making



# A HEALTHY ECOSYSTEM

What ecosystem exists around the community?

Why is this important?

- Distributions
- Service Providers
- Fiscal Sponsorships
- Other Partnerships

# ECOSYSTEM: DISTRIBUTIONS

- What is a distribution?
- Why are these good for a health community?
- When is it bad?
- How many is too many?
- OpenMRS Distributions

General Purpose and Targeted Distributions

	Distribution	Type
	OpenMRS Reference Application	General Purpose
	Bahmni	General Purpose - Hospitals and Large Clinics
	eSaude	Targeted - Mozambique
	Kenya EMR	Targeted - Kenya
	UgandaEMR	Targeted - Uganda

# ECOSYSTEM: SERVICE PROVIDERS

- What Is a Service Provider?
- Why Is This Important?
- OpenMRS Service Provider Program



ThoughtWorks®

# ECOSYSTEM: FISCAL SPONSORSHIPS

- What is this?
- Why is it good for the community?
- Evaluating the Fiscal Sponsor
- OpenMRS and Bahmni



# ECOSYSTEM: OTHER PARTNERSHIPS

- What other partnerships might improve community health?
  - Relationships with donors
  - Relationships with other open source communities
  - Educational Institutes
- OpenMRS Advisory Committee
- OpenMRS and Andela

# FUNDING

- Level of funding, budget, and spend down
- Diversity of funding
- Types of spending
  - Management & Operations
  - Growth of Community
  - Investments into Improving Product
- OpenMRS Funding – core, ecosystem, investments into product

## NEXT STEPS

# THANK YOU!

JAN FLOWERS  
[jflow2@uw.edu](mailto:jflow2@uw.edu)

- ❖ Refine the framework
- ❖ Disseminate
- ❖ Include in OpenMRS BOD Bi-Annual and Community Annual Report
- ❖ Does this work with other open source communities
- ❖ Feedback and improve

[Interested? Contact me!](#)

# THANK YOU!

- **Rosalind Parkes-Ratanshi**  
MAKARERE UNIVERSITY, KAMPALA, UGANDA
- **Damola Olajide**  
PALLADIUM GROUP, ABUJA, NIGERIA
- **Jan Flowers**  
UNIVERSITY OF WASHINGTON, SEATTLE, USA
- **Q&A - Discussion**



# Questions, Answers, & Discussion

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- Please bring your question cards up to the moderator! Extra cards on other tables.

**IMAGINE...**

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**“No has a right to sit down and feel hopeless.  
There is too much work to do.”**

— Dorothy Day

**SUSTAINABILITY**



# Sustainable Local Software & Innovation Ecosystems: 3 Stories from the Field



Jan Flowers  
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Damola Olajide  
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11 December 2018

Global Digital Health Forum, Washington, DC

**Moderator: Michael Downey, DIAL Open Source Center**

