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# **Evidence of using Satellite communication technology to extend MCH services to rural areas? Findings of a qualitative study from Nigeria.**

Space 4 Health Working Group  
8th Africa Space Generation Workshop  
20-21 Nov 2024

Dr Bassey Ebenso



# Structure

1

Overview of IPP Nigeria programme

2

Phases of the evaluation

3

Key findings: Contextual drivers and impacts digital technology on MCH services and outcomes

4

Discussion: for policy and practice

# The EXTEND project...

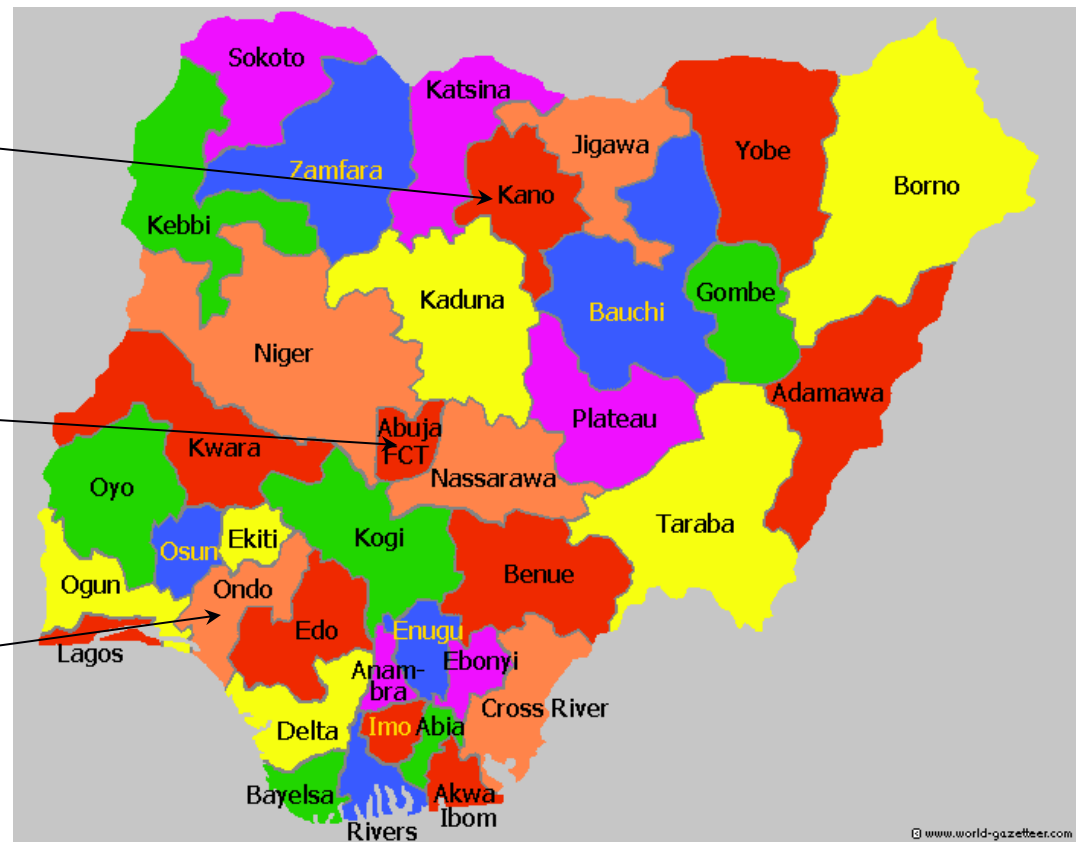
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- 2-year technology introduction project implemented at scale in 3 states of Nigeria
- Improvement in quality of maternal, newborn and child health (MNCH) services,

Kano State in the North

Federal Capital Territory in  
Central Nigeria

Ondo State in the West





# The EXTEND project...

- UK Space Agency's International Partnership Programme
- Address challenges to providing healthcare in LMICs,
- as a pathway to improving health systems functions+ outcomes

Chronic  
infrastructure  
deficits

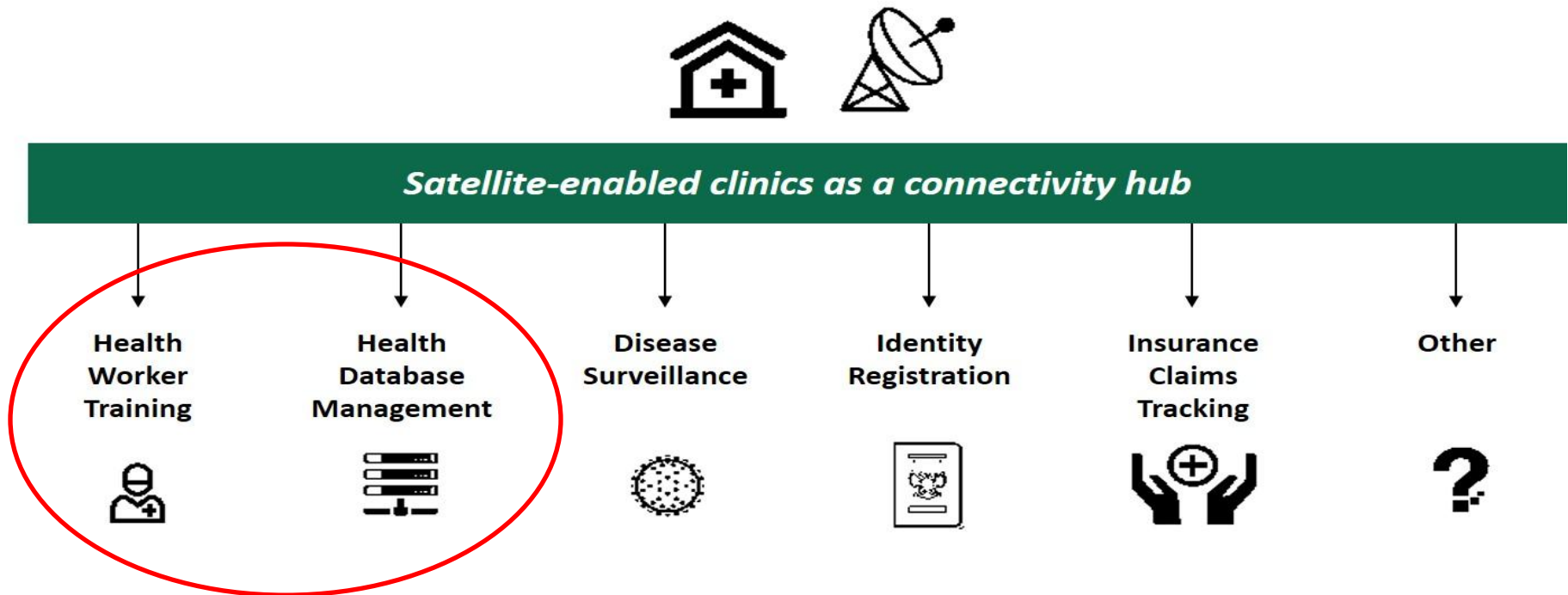
Shortages of  
trained health  
professionals

Deficient data  
management  
(paper-based)

Attracting frontline  
health workers to  
work in remote  
areas

# Technology solution adopted (1)

**Connectivity as a Solution:** *connectivity hubs which can support several use cases, enabling the provision of Connectivity as a Service*



*This setup allows satellite providers to sell Connectivity as a Service and develop multiple revenue streams without a proportional increase in cost*

# Digital health applications deployed (2)



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## Video training of health staff

- series of videos with quizzes
- Deployed via open source App - OppiaMobile app
- On tablet computers

## Data digitization tool

- Electronic medical record (EMR)
- incorporated data on patient registration, vital signs, diagnosis, treatment, case review and administrative task support

# An international multisectoral partnership



## Inmarsat

A global satellite communications company that operates a range of satellites in geosynchronous orbit with experience of operating across Africa



## InStrat

A Nigerian mobile health company, operates and leverages appropriate technologies to foster improved healthcare outcomes in Africa



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## Nuffield Centre for International Health and Development:

has a long commitment to health systems in Nigeria with strong local links



- Pregnant women and their families
- Wider community



## 3 Nigerian Universities

- Bayero University, Kano, University of Abuja and University of Lagos,



- The Federal Ministry of Health (FMoH)
- 3 States MoH in Ondo, Kano and the FCT

# The EXTEND project



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## **Univ. of Lagos:**

Dr. Babasola Okusanya

Dr David Akeju

Dr. Kehinde Okunade

Dr. Gbenga Ajepe

## **Univ. of Leeds:**

Dr Bassey Ebenso (PI)

Dr Matthew Allsop

Dr Joe Hicks

Prof. Tolib Mirzoev

Extending health services to rural areas of Nigeria (*March 2017–2019*)

## **AKTH, Kano:**

Prof Jamilu Turkru

Prof. Isa Abubakar

Dr. Manir K. Abdullahi

## **Univ. of Abuja:**

Dr. Godwin Akaba

Dr. Osasuyi Dirisu

Dr. Ramsay Yalma

# The EXTEND project...

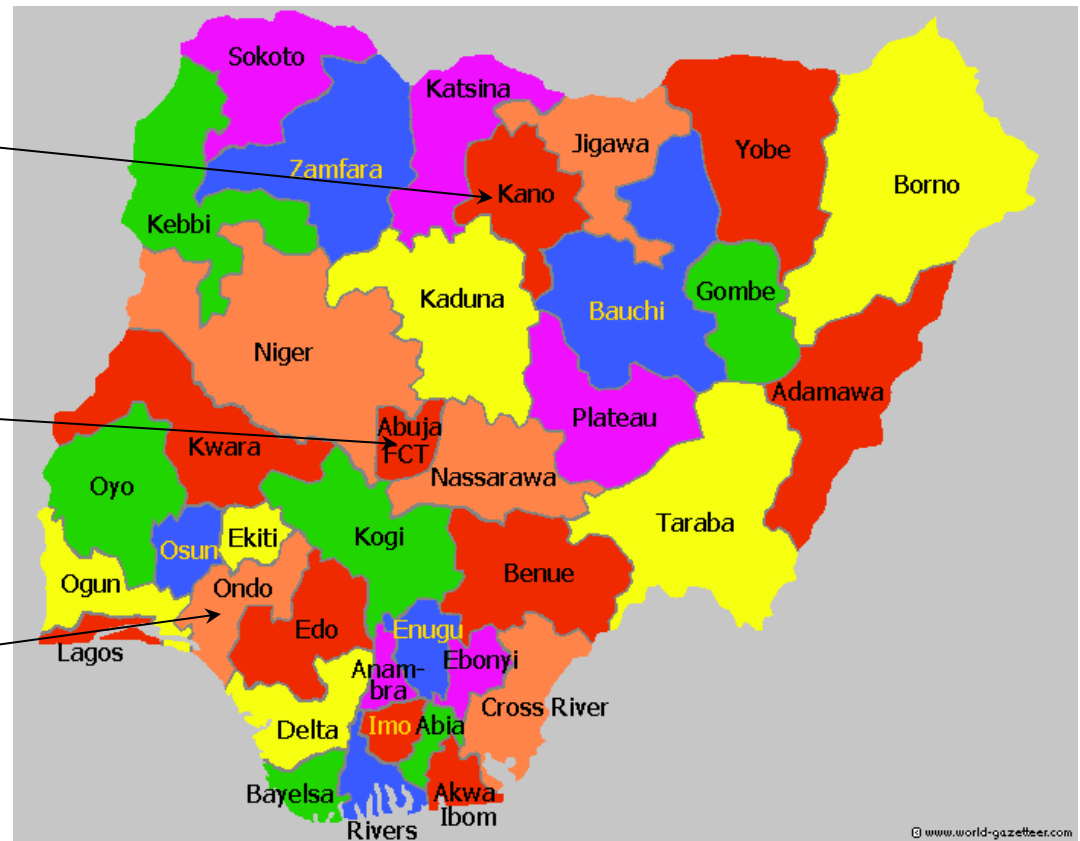
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- AIM** - identify contextual drivers of acceptability and use of digital interventions deployed,
- ii) assess impacts of digital interventions on different levels of the health system.
  - iii) Mechanisms of impact

Kano State in the North

Federal Capital Territory in Central Nigeria

Ondo State in the West



# Theory of change model for the project (1)



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Programme theory: Availability of Frontline Health Workers, combined with health system interventions (VTR, digitization of data + availability of satellite communication infrastructure) implemented within a favourable environment at individual, organisational and system levels, will improve standards of healthcare provision, utilization of maternal, newborn and child health (MNCH) services and ultimately MNCH health outcomes in Nigeria.

CONTEXT at micro, meso and macro levels (politics, finance, health system organization, culture)

INPUTS → PROCESSES → OUTPUTS → OUTCOMES AND IMPACTS

Availability of FHWs to be involved in e-Health project



Availability of tablet computers loaded with SIM cards, videos, and textual content.



Availability of SatCom link + solar batteries for power supply



Supportive policy and financial environment for adopting eHealth tools

- Provide supportive supervision to HWs, and link training to annual performance evaluation review (APER)
- Deploy CliniPAK and VTR Apps onto tablet computers.
- Provide HWs with login to access training content
- Connect technologically deprived health facilities to satellite link
- Stimulate stakeholder participation in project to ensure adoption of e-Health innovations

- Improved supervision and moral support of health workers
- Improved FHWs post-training scores
- Improved data generation, management and transmission to district health information system
- Health facilities are more effective and efficient in providing health services to clients
- Improved stakeholder participation in project

- Increased staff motivation and job satisfaction
- Increased staff confidence to perform health roles
- Greater use of accurate and reliable data for health systems management and decision-making
- Improved standards of care (as per national treatment guidelines) leading to increased use of PHCs by clients
- Reduced maternal and child morbidity and mortality
- Increased adoption of eHealth innovations in health and non-health sectors

# Key assumptions underlying the project's success...



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- Secure financial support for project's 2-year duration (2017-19) and will be extended for another two years thereafter (up to 2021)
- Health workers will not be re-deployed during the project period.
- Implementing health systems interventions will stimulate technology acceptance and use.

# Study design and methods



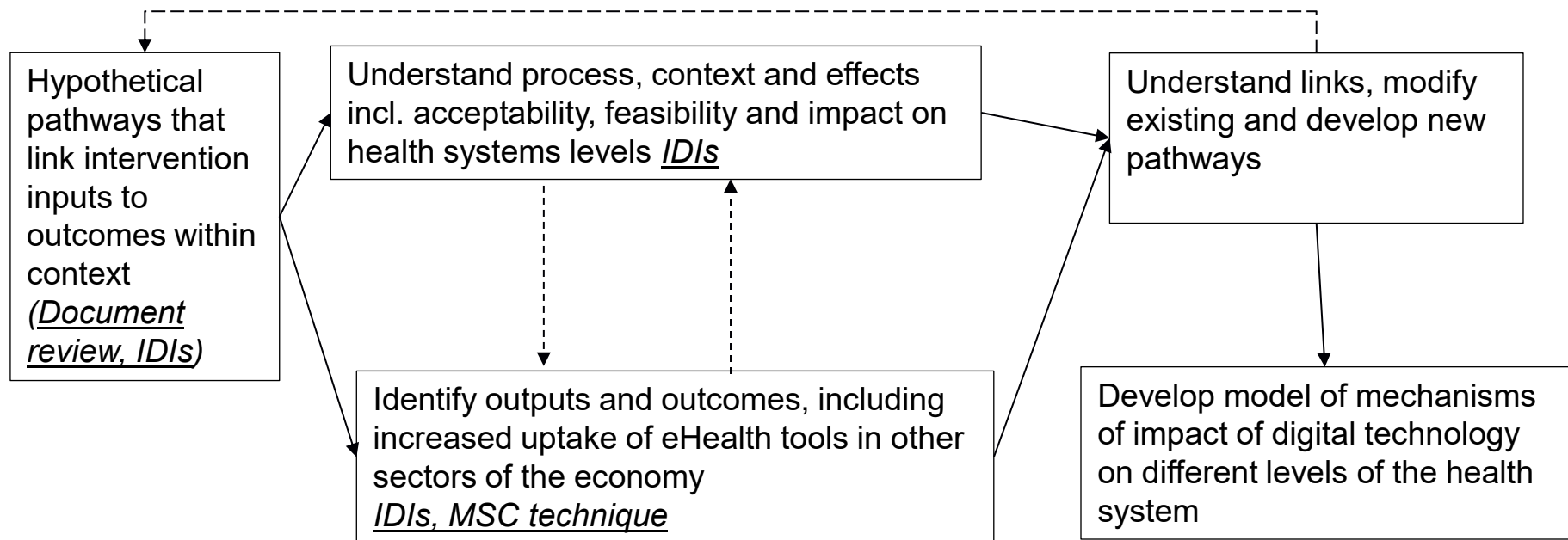
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## 1) *Baseline*

## 2) *midline*

## 3) *end-line*

## 4) *Legacy evaluation*



KEY:

Italics

methods and data sources



study progression between phases



examples of links between methods

# 5 methods of data collection



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**Documents  
review**

**In-depth  
Interviews**

**Quantitative  
survey of KAP**

**Most significant  
changes  
interview**

**Secondary data  
analysis**

### Open access

### Protocol

# BMJ Open Impact of using eHealth tools to extend health services to rural areas of Nigeria: protocol for a mixed-method, non-randomised cluster trial

Bassey Ebenso,<sup>1</sup> Matthew John Allsop,<sup>1</sup> Babasola Okusanya,<sup>2</sup> Godwin Akaba,<sup>3</sup> Jamilu Tukur,<sup>4</sup> Kehinde Okunade,<sup>2</sup> David Akeju,<sup>5</sup> Adegbeniga Ajepe,<sup>2</sup> Osasuyi Dirisu,<sup>6</sup> Ramsey Yalma,<sup>3</sup> Abubakar Isa Sadeeq,<sup>4</sup> Okey Okuzu,<sup>7</sup> Tolga Ors,<sup>8</sup> Terence Jagger,<sup>8</sup> Joseph Paul Hicks,<sup>1</sup> Tolib Mirzoev,<sup>1</sup> James Nicholas Newell<sup>1</sup>

**To cite:** Ebenso B, Allsop MJ, Okusanya B, *et al.* Impact of using eHealth tools to extend health services to rural areas of Nigeria: protocol for a mixed-method, non-randomised cluster trial. *BMJ Open* 2018;**8**:e022174. doi:10.1136/

## ABSTRACT

**Introduction** eHealth solutions that use internet and related technologies to deliver and enhance health services and information are emerging as novel approaches to support healthcare delivery in sub-Saharan Africa. Using digital technology in this way can support cost-effectiveness of care delivery and extend the reach

## Strengths and limitations of this study

- This multidisciplinary, mixed-method study, including a non-randomised cluster trial, will shed light on how the processes and context of implementation of eHealth tools influence improvements in health systems function and client outcomes.

## JMIR paper (In press)

Hicks et al

Original Paper

### Acceptability and potential effectiveness of eHealth tools for training primary health workers at scale: a mixed-methods, uncontrolled before and after study from Nigeria

Joe P Hicks<sup>1\*</sup>; Matthew John Allsop<sup>2\*</sup>, BSc, PhD; Godwin O Akaba<sup>3</sup>; Ramsey M Yalma<sup>4</sup>; Osasuyi Dirisu<sup>5</sup>; Babasola Okusanya<sup>6</sup>; Jamilu Tukur<sup>7</sup>; Kehinde Okunade<sup>6</sup>; David Akeju<sup>8</sup>; Adegbenga Ajepe<sup>6</sup>; Okey Okuzu<sup>9</sup>; Tolib Mirzoev<sup>1</sup>; Bassey Ebenso<sup>1</sup>

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## What are the contextual enablers and impacts of using digital technology to extend maternal and child health services to rural areas? Findings of a qualitative study from Nigeria.

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*Submitted to Journal:*  
Frontiers in Global Women's Health

*Specialty Section:*  
Maternal Health

# Participating health facilities by location in Nigeria

| Participating states      | Region           | Population (2006 census figures) [17] | Participating local government areas | Facility type distribution by state |                             |             |                     |       |
|---------------------------|------------------|---------------------------------------|--------------------------------------|-------------------------------------|-----------------------------|-------------|---------------------|-------|
|                           |                  |                                       |                                      | Primary Health Centre               | Comprehensive Health Centre | Health Post | Basic Health Centre | Total |
| Ondo state                | Western Nigeria  | 3,460,877 (18 <sup>th</sup> /37)      | Akoko South, Idanre and Odigbo       | 58                                  | 4                           | 0           | 0                   | 62    |
| Kano state                | Northern Nigeria | 9,401,288 (1 <sup>st</sup> /37)       | Dawakin Tofa and Sumaila             | 7                                   | 0                           | 21          | 7                   | 35    |
| Federal Capital Territory | Central Nigeria  | 1,406,239 (37 <sup>th</sup> /37)      | Gwagwalada                           | 26                                  | 2                           | 1           | 0                   | 29    |
| Total facilities          |                  |                                       |                                      | 91                                  | 6                           | 22          | 7                   | 126   |

# Findings: 5 main themes



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From the analysis of documents and interview transcripts:

- 1) contextual enablers of technology adoption by governments,
- 2) drivers of technology acceptance,
- 3) barriers to the use of technology,
- 4) effectiveness and impacts of digital interventions, and
- 5) Increased adoption of eHealth innovations in health sector.

- i) supportive policy environment and
- ii) private-public partnership approach deploying digital innovation.

## **Two principal drivers of technology acceptance:**

- a) perceived ease of use of Apps and digital platform, and
- b) perceived usefulness of technology for improving MCH services

## **Organizational factors were:**

- accessibility to tablet computers in workplace,
- prior training,
- technical and programmatic support during the project, and
- workload issues in health facilities.

## Perceived ease of use:

“Having this video and tablet here [in the facility] contributes enough [to making us use it] and the videos give us more guidance on how to manage some minor illnesses that we didn’t have more knowledge on them before...So it is a welcome development.” (*Facility Manager, Gwagwalada, FCT*)

## Perceived usefulness:

“You know sometimes when you don’t know something [about a topic], and when you continue to receive cases related to that topic, you will be discouraged and doubtful, because you don’t know what to do. But when you already have the solution in your hands [as is the case with VTR], then, you will be confident in what you do, and in the answers, you provide to your clients.” (*FHW in Onikokodiya, Ondo state*)

## Feeling motivated:

“It [i.e. clinical videos] has certainly affected the level of staff confidence, I will like to use myself as an example, I studied biology before qualifying as nurse-midwife and most of these things [about maternity care] were obvious to me...but having watched them again in the videos, I kind of, when I ask questions to clients now, I ask them as a confident professional, I don’t ask like a novice anymore. I ask them like I know what I am doing based on the help I have obtained after watching the video... It has increased my confidence. It has affected my motivation strongly, because each day I report to work, I want to learn new things and there is always something, [a topic] to watch, and it’s motivated me to want to do something, I don’t just sit down anymore waiting to be told my role in the clinic, I now tend to assist in other things when help is needed.” (*Frontline Health Worker in Gwagwalada, FCT*)

## improvement in standard of care:

“Second, is about helping babies to breathe well. We also watch the video to help babies breathe. When I resumed here, I saw the Ambu bag. We tried to use it, but you know, when you don't know [how to use] something, you get confused...but when this videos were introduced, we watched them and saw what we were supposed to do. Now when a woman is on a delivery couch, my staff will be ready here with their sterile Ambu bag on their sterile table waiting in case newborn baby needs to be helped. So, this video has helped us. We have saved so many lives, these very small babies...We are so happy now. I am very happy because even if I am not around, my staff will do it correctly. So, I would say before it wasn't like that, may be the child will come out, will not be breathing well, we will not know what to do but with this video, we now know. We are equipped to help these babies to breathe”. *(Facility Head, Gwagwalada in FCT)*

- **Increasing workload of staff:** associated with using the data management App as they are also expected to maintain hard copy registers for data collection.
- **Lack of time to watch all VTR videos:** Some staff struggle to find time to watch all the videos because of increasing workload/tight schedules (60 videos/Approx. 40hours of viewing required).
- **Slight variations between some data management App indicators and the district health information systems (DHIS-2) variables:**



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# Sights from periodic evaluation:



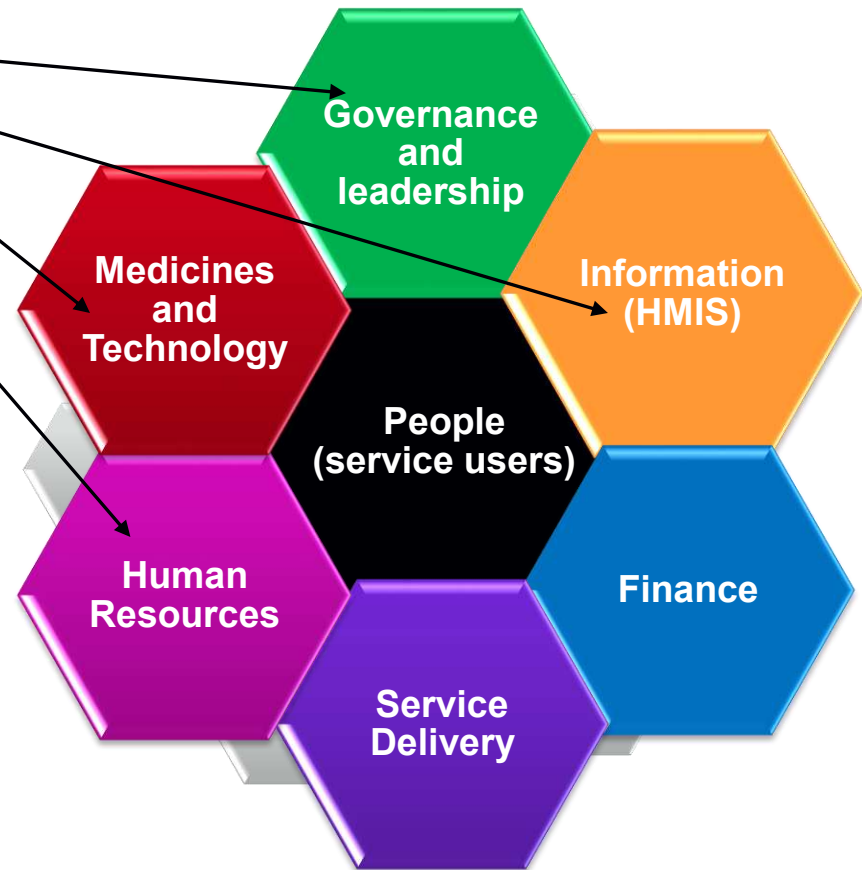
# Digital health tech as health systems strengthening tool



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Simultaneous and sustained implementation of multiple digital health technologies can help:

- Reconfigure health systems to ensure workers enjoy unrestricted access to reliable training content and data to
- Improve decision-making and
- Standards of service delivery and thus increase access for women in rural areas.





# Thank you!



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<https://medicinehealth.leeds.ac.uk/dir-record/research-projects/978/extend>



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