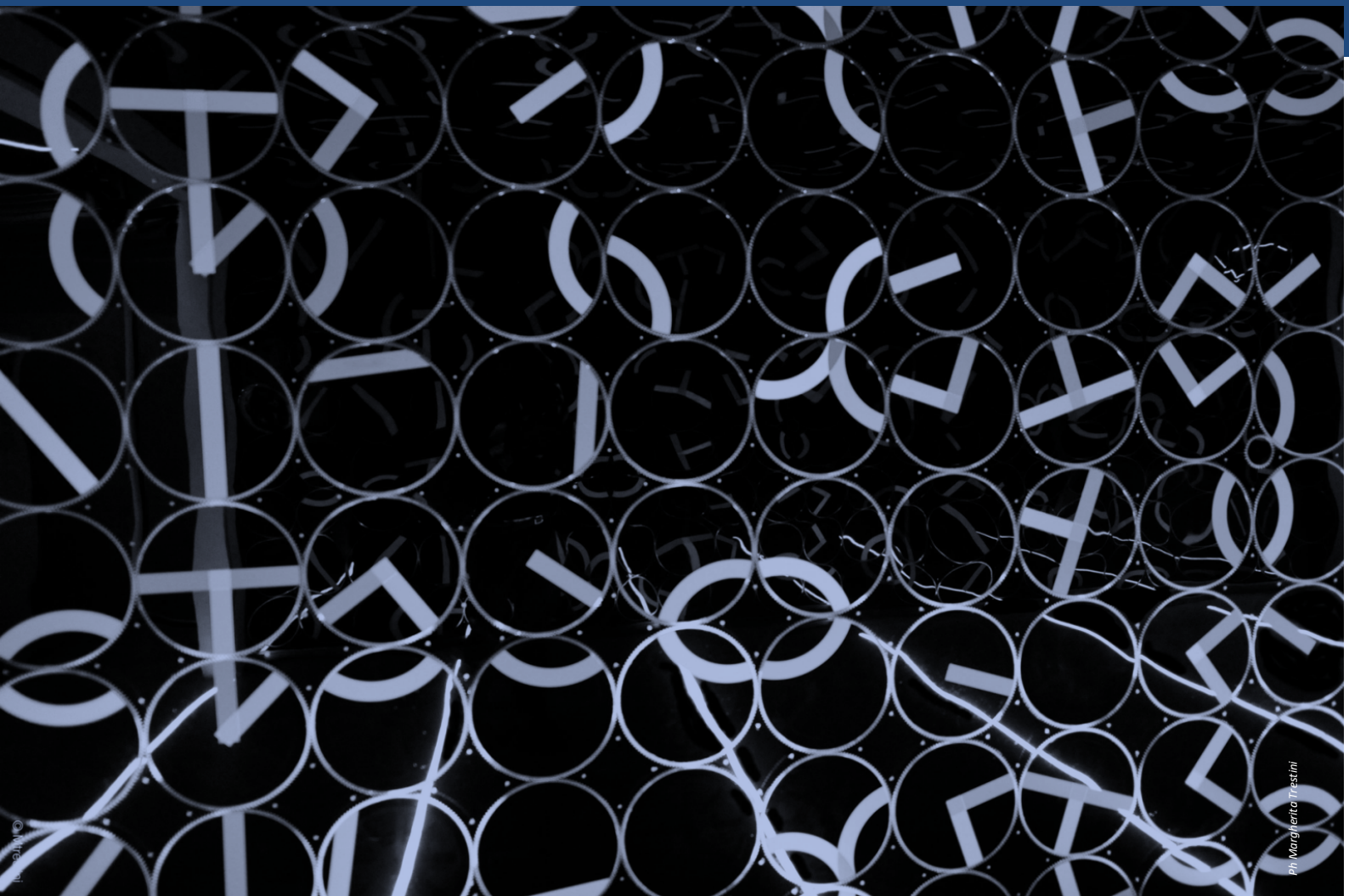


# Primary Health Care Innovation in Nigeria – In Depth Interviews (IDIs) Report

by the Pro-Poor Growth and Promotion of Employment in Nigeria Programme-  
SEDIN

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## 1. Acronyms

CesTII	Centre for Innovation Indicators
CHAI	Clinton Health Access Initiative
CHEW	Community Health Extension Worker
DOI	Diffusion of Innovation
EPI	Expanded Programme on Immunisation
GDP	Gross Domestic Product
HIV	Human Immunodeficiency Virus
LGA	Local Government Authority
MDCN	Medical and Dental Council of Nigeria
MDGs	Millennium Development Goals
NACETEM	National Centre for Technology Management
NARD	Nigerian Association of Resident Doctors
OECD	Organisation for Economic Co-operation and Development
PHC	Primary Health Care
PRIMASYS	Primary Health Care Systems
WHO	World Health Organisation

## 2. Executive Summary

As much as there are many challenges in the Nigerian PHC, great strides have been made since its launch in August of 1987. The Primary Healthcare has brought services close to the people. In addition, it offers basic services such as immunization, pre-and post-natal services to the people. The services are affordable to the general public. The challenges faced by the PHC can be classified or categorized into main types. These two main types are:

- **“Attitudinal” Challenges.** These are the type of challenges brought about by the attitude of governments at both federal and the state level as well as the general public’s attitude towards the Nigeria PHC.
- **Financial and Infrastructural Challenges.** These are the type of challenges by the failure or lack of proper infrastructure and financing.

Among the “Attitudinal” Challenges, the key ones include:

- ✓ Lack of awareness and knowledge of PHC role to the general public is a major issue
- ✓ Lack of adequate funding from the Federal Government
- ✓ Lack of trust from the general population
- ✓ Cultural barriers, i.e., people preferring traditional medicine over PHC services
- ✓ Public perception and poor attitude towards PHC believing that the staff is not adequately

trained

In addition, some of the Financial and Infrastructural Challenges issues such as:

- ✓ Lack of adequate funding from the government
- ✓ Unreliable electricity
- ✓ Poor road network denying access to some PHC facilities especially during the rainy seasons
- ✓ Lack of adequately trained personnel
- ✓ Lack of medicine and other medical essentials

Among the major issues mentioned by most respondents, lack of adequate funding from the government is one of the most mentioned challenges facing the Nigerian Primary Health Care System. As such, this has led to poor remunerations, consequently affecting PHC staff morale.

As much as COVID-19 was an epidemic that caused catastrophe global, and also greatly affected Nigeria as well, **it was however viewed to have had a positive impact on technological innovation adoption**. Some of the respondents mentioned that from Covid-19 many facilities received equipment that otherwise they would not have received if it was not for the Covid-19 epidemic. Today, the equipment is still in use in those facilities hence improving service delivery. As such, technological innovation in the Nigerian PHC falls into three phases. These three phases are Pre-Covid Era, Covid Era and Post-Covid Era. The Pre-Covid Era was characterized by slow innovation adoption, while the Covid Era and Post-Covid Era have seen innovation pick a pace. However, despite this picking up of pace, some of the respondents we spoke to felt that more needed to be done.

When it comes to the general awareness of technological innovation, **the awareness of technological innovation in the Nigerian PHC is low**. With few of the respondents interviewed have heard about the use of these types of innovations. However, the awareness is on the rudimentary use of innovation, with some mentioning the use of applications to store patients' data for retrieval by other medical personnel, it is therefore true to say that there is rudimentary awareness of some of the new innovations in the Nigerian PHC.

- Additionally, the **innovations are mainly by the private sector** as opposed to the public sector. It is important to mention that the term **technological innovation among the respondents is mostly associated with the use of computers in record keeping** among other things.
- The use of computers is perceived as a solution provider and of paramount importance. Respondents feel that the use of computers in managing some of the services of the PHC will greatly change record keeping such as those of births and deaths and also allow for access and sharing of information i.e., between doctors, nurses and other Healthcare Workers. In addition, the use of computers and digital technologies in the Nigerian PHC was tantamount to automation.
- Apart from the use of computers at the PHC level, the respondents are also aware that **telemedicine** is a way of providing medical services to patients remotely. Some of the respondents are aware of telemedicine providers but mainly in the private sector.
- The respondents felt that innovations using **mobile phones** would be more appropriate since many people had cell phones. Some of the innovations using mobile phones are Health education to the public in addition to providing follow-up services and appointments. However, the use of mobile phone-based solutions will also meet some challenges. Some of the challenges mentioned that could hinder the adoption of mobile phone-based innovation technologies are:
  - ✓ Lack of reliable electricity and mobile network
  - ✓ Patients' illiteracy due to low levels of education
  - ✓ Cost of using it

All in all, the respondents felt that the challenges can be mitigated and it was possible to have mobile phone-based solutions as long as there is good planning, motivation and sacrifice.

The respondents feel that the **use of technological innovation is inevitable in the Nigerian PHC** because of the following factors:

- It is a global phenomenon which has many benefits and will play a great role in future
- It will help in service delivery by allowing workers to work seamlessly
- Going digital is perceived as automation of operations which will greatly boost service delivery at the PHC level.
- Technology can help one work remotely
- Technology would help in removing quarks in the PHC

There are many areas where there are opportunities in the Nigerian PHC i.e., the use of technology, starting with the use of basic hardware such as computers and other communication devices

- ✓ The adoption of technology is preferred because it will operations easier
- ✓ Telemedicine, Mobile Health, Use of Social Media
- ✓ Record Keeping, SMS, Inventory control
- ✓ To grow local talents and speed up innovation adoption at the PHC levels, there is a need to identify and encourage innovators by financing them
- ✓ Training of the PHC staff which will help in ensuring that the PHC is efficient in such a way that people do bypass to go other either secondary or federal level facilities and consequently reduce pressure
- ✓ Financiers. Since lack of funding is a major challenge, there are opportunities to fund innovations and other development in the Nigerian PHC.
- ✓ Provision of amenities
  - Introduce the use of Smart Cards for patients, so that when they come to the facility, they carry it. The smart card needs to be unique to its user.
  - Use of other technologies such as Drones and Robotics

One of the respondents mentioned **a government digital intervention in the PHC service** although it faced many challenges and had to stop with an aim of continuity if the challenges faced were sorted out. The intended Nigerian Government innovation is known as EMR: Electronic Medical Recording. It was launched in 2022 and was intended to work in-house for each PHC facility aiming at removing the use of paper. In addition, the EMR was to help in the adoption of digital solutions. Furthermore, the EMR would also help in the creation and maintenance of patients' database at the PHC level. **However, this innovation faced serious challenges.** The challenges included a lack of trained personnel, lack of electricity, lack of consistent and reliable network connection, logistics, and security of the hardware that included computers and tablets. The government is still working out on the EMR by trying to solve barriers faced by the initial launch.

### 3. Background Information

#### Qualitative Research Phase: the background

This qualitative research is the first phase of the primary research on Primary Health Care Innovation in Nigeria. This qualitative phase has been carried out to ascertain some of the insights discovered in the secondary research phase (See Primary Health Care Innovation in Nigeria - Desk Research Report), carried out in late 2022.

From the desk research, we found out that the Nigerian PHC system lacks adequate health personnel. In addition, the state of the PHC facilities is wanting. Whereas it is assumed that deploying technology might help the matter and fill in the gap for the country to meet its Millennium Development Goals (MDGs), without primary research, the desk research did not answer that question adequately.

The desk research highlighted that there is some infrastructure on the ground, in Nigeria, to support innovative ideas. Moreover, in other developing countries, where technology has been



used, there has been improvement in primary healthcare delivery. It is therefore credible to assume that technological innovation can be used to advance PHC in Nigeria on different fronts. For example:

- ✓ In training
- ✓ Patient Management and Monitoring
- ✓ Disease Surveillance
- ✓ In reaching remote patients
- ✓ In delivering essentials such as drugs

The above assumptions were aimed at coming up with ideas of how the Nigeria Primary Healthcare (PHC) could benefit from technological innovation to mitigate many challenges the system is facing today. The aim of the qualitative research was therefore to better define the innovation scenario in Nigeria to design the most appropriate approach to gather more data in the subsequent phases, namely the semi-structured interviews and the quantitative research. This is a report of the 1st phase; aka qualitative research.

### Qualitative Research Phase: the objectives

The main objective of the qualitative phase was to gain insights from well-informed experts on the primary healthcare innovation dynamics in Nigeria: needs, driving and restraining forces.

- ✓ The driving forces for change in order to understand the needs that may foster the adoption of innovative business/digital solutions in the primary health care in Nigeria
- ✓ Hypothetically, the needs may be:
  - ✓ Overwhelming patients' requests,
  - ✓ Maximize scarce resources,
  - ✓ Need for increased productivity,
  - ✓ Competitive advantage,
  - ✓ Access to funds and grants
  - ✓ Other drivers and needs
- ✓ Restraining forces, the obstacles for change which are expected to prevent new business/digital solutions to be adopted (e.g., lack of awareness, low tech skills, lack of electricity/internet connection, lack of time to inform themselves and deploy, associated costs)
- ✓ Existing adopted solutions in the market, emerging solutions and gaps to be filled in

In summary, the overall objective of the qualitative and the project as a whole is:

To gain in depth understanding of the:

- ✓ Enablers and inhibitors for change
- ✓ Levers for change



Assess possibilities of adopting emerging technologies such as Artificial intelligence (AI), Drone Technology, Big Data among other technological solutions

### Qualitative Research Phase: methodology and sample

Prototipi carried out 15 in-depth interviews (IDIs) lasting about one hour. All the interviews were carried out by a trained moderator using a discussion guide. The IDIs were carried out

involved health care sector experts in Nigeria. Below is a complete anonymized list of all those who have been interviewed.

#	Respondent Type	Sample
1	A PHC Board Member, Ogun State	1
2	An Entrepreneur, Innovator and a Pharmacist in Lagos State	1
3	A Lagos State PHC Doctor	1
4	An Ogun State PHC Doctor	1
5	A PHC Board Member, Edo State	1
6	Business Owner of a national wide Nigerian PHC and General Hospitals Drug Supply Contractor	1
7	Member of Niger State PHC Board	1
8	A Journalist, Lawyer and Researcher	1
9	A Professor at Lagos State University	1
10	A Member of PHC Board, Plateau State	1
11	A Doctor and Member of PHC Board, Edo State	1
12	A Doctor and Member of PHC, Lagos State	1
13	Departmental Head at Lagos State University Teaching Hospital	1
14	Senior Staff Amadec, NGO in Lagos	1
15	An Entrepreneur, Innovator and a Pharmacist in Lagos State	1
	Total	15

*Table 1 IDIs respondents list*

Each interview was recorded and transcribed. This report is based on those interviews. It has been ensured that the verbatims remain as original as they were said by the respondents.

## 4. Key Findings

### 4.1 Advantages and benefits of the Nigerian PHC

As described in the Desk Research Report, in August 1987, the Nigerian Federal Government launched the Primary Health Care plan (PHC) with and of improving the country's Primary Health Care. The objectives of the PHC were:

1. Improve collection and monitoring of health data
2. Improve personnel development in the healthcare
3. Ensure the provision of essential drug availability
4. Improve immunization programs
5. Promote treatment of epidemic diseases
6. Improve food supply and nutrition
7. Improve material and child care, and family planning
8. Educate people on prevailing health problems and the methods of preventing and controlling them.

**Ibrahim Babangida, the country's president back then said that the PHC was intended to be the cornerstone of health policy. Furthermore, PHC introduction was intended to**

**affect the entire national population. Therefore, PHC would lead to:**

- ✓ acceleration of the health care personnel development;
- ✓ improvement of collection and monitoring of health data;
- ✓ ensure availability of essential drugs in all areas of the country;
- ✓ implementation of an Expanded Programme on Immunization (EPI);
- ✓ improved nutrition throughout the country;
- ✓ promotion of health awareness;
- ✓ development of a national family health program;
- ✓ widespread promotion of oral rehydration therapy for the treatment of diarrheal disease in infants and children.

**At this stage, it was worth asking our experts, what have been the PHC advantages and benefits to the people of Nigeria to date?**

Below is feedback from some of the experts. The following quote summarizes it well:

*“The advantage of primary healthcare in Nigeria is that healthcare is being accessed directly from the grassroots. Minor illnesses are being taken care of at the primary healthcare. Then, there are also children’s vaccinations at the healthcare centre. Likewise, there are also family planning commodities at the primary healthcare centre which are easily accessible over there and it is very free, that’s with respect to the private hospitals that charge a huge amount of money for them to access all these medical services and also, in primary healthcare centre there is also free delivery. When you go to primary healthcare centres delivery is taken for free in as much you are one of their patients and you go there routinely for your antenatal care.”* A PHC Board Member, Ogun State

**In a nutshell, the Nigerian PHC:**

- ✓ Offers accessibility and proximity, making PHC the closest health intervention to the people

*“You know primary healthcare is like the closest hospital to people.”* A Doctor and Member of PHC, Lagos State

*“People are meant to go to primary healthcare centre to make any general complain, any complaints aside surgery, even be able to take deliveries there. So that any care they have for people.”* Departmental Head at Lagos State University Teaching Hospital

*“General hospitals are all located in places that they have a number of hands and they are far from people. So primary health centres are close. Some are even on the street where 4, 5 streets are connected to. They can walk there and they would take care of them.”* Senior Staff Amadec, NGO in Lagos

- ✓ Affordable to all people
 

*“People just walk there and complain, take their drugs and then they go home and they don’t even have to pay a lot of money. Then availability, distance - if it’s very close to people”*  
An Entrepreneur, Innovator and a Pharmacist in Lagos State

*“They don’t pay much. It’s cheap because they have healthcare at the grassroots. I think delivery is free at all Lagos state health centres.”* A Lagos State PHC Doctor

- ✓ PHC services are available for emergencies

*“They are actually there again in case of emergency, they are the first people to attend to you and refer you. So, they know when to refer and when not to refer. That’s just the truth. Primary should be the first point of contact in any health organogram - the primary health*



*facility before the secondary which is the general hospital. So, if the disease is beyond there they refer and the advantage is that they refer.”* Member of Niger State PHC Board

- ✓ PHC offers door-to-door family planning services

*“And also, family planning is rendered at outreach services to people in their community, right at their doorstep if they are so busy and they can come to the health centre”.* A PHC Board Member, Edo State

### Some states like Lagos have greatly improved their PHC System

- ✓ They have doctors in almost all PHC facilities

*“In every health centre in Lagos state, we have doctors there. We have qualified nurses there as well, qualified midwives. Lagos state in the whole states in Nigeria would have a pass mark. The idea is that the whole country should be located with a primary or healthcare scheme.”* A Lagos State PHC Doctor

- ✓ They have increased the number of PHC facilities

*“I have seen new centres erected like my community where I come from. I'm from Ebute-metta. I think about 3 years ago, 4 years ago such is built around Otumara. Otumara is like rural area in Ebute-metta. You can imagine the place where they don't have health facilities and the education level is so low and so you have brought it close to them. So, it makes access easy for them. I know other areas too, there has been improvement in the primary health facility”* A Lagos State PHC Doctor

**Despite the many challenges the Nigeria Primary Healthcare system is meeting many of its mandates, consequently meeting some of the objectives envisioned by Babangida's administration. Well, there is a lot to be improved.**

*“In the sense that we have really tried as a state and as a country. Are we there yet? I would say no because we can do better. There are areas in which we can improve on. And those areas we can improve on we can do better”* A Member of PHC Board from Plateau State

### Challenges of the Nigerian PHC

The qualitative research confirmed what was identified at the desk research stage: the Nigerian Healthcare System in totality as well as the PHC has many challenges. One of the respondents summarized it below.

*“There are quite a lot. I'm sure you are conversant with the Nigerian health sector and at least you're a user. I want to believe you've used any of the health sectors at least once in a while. There are quite a lot of hiccups, manpower, finances, accessibility, and all sorts. These are part of the major problems that we have, infrastructure, quite a lot”* A national wide Nigerian PHC and General Hospitals Drug Supply Contractor

The challenges came out promptly during the qualitative interviews. Analyzing the feedback from the field, they can be classified into the following two main types:

- ✓ **Attitudinal Challenges.** These are the type of challenges brought about by the attitude of governments at both federal and the state level as well as the general public's attitude towards the Nigeria PHC.
- ✓ **Financial and Infrastructural Challenges:** These are the type of challenges by the failure or lack of proper infrastructure and financing.

### Attitudinal Challenges:

- ✓ Lack of Awareness by the members of the public is a key challenge

*“One of the challenges we notice in our primary health centre; people have assumed it does not exist. People don't take it as primary as they should be. Somebody who is supposed to go to the primary health facility is going to the secondary facility, which is the general hospital. We would still imagine having someone come to the general hospital, secondary health institution to complain about a headache, to complain about fever. That is purely the job of a primary health centre.”* A Doctor and Member of PHC Board, Edo State

- ✓ Staff Laxity i.e. lack of medical personnel when they are supposed to be on duty

*“Yes, people walk in and see a doctor, if they are on duty. If they are not there and if there are challenges, people don't take their work well. They are very lackadaisical about their work, so they don't even come.”* An Entrepreneur, Innovator and a Pharmacist in Lagos State

- ✓ Poor perception resulting in lack of confidence by the general public in the Nigerian PHC. The general public does not trust that they will meet qualified medical personnel therefore they will not get adequate care.

*“There are several challenges facing primary healthcare. One of the challenges is that most people don't really like accessing primary healthcare because they believe they won't receive adequate care there.”* Member of Niger State PHC Board

*“People don't have the confidence. People feel the staffs are not competent enough. They feel the staff strength is not enough to cater and the awareness about it is so low, is so poor.”* An Ogun State PHC Doctor

*“The workers don't know what they do there. They don't know their duties. – I would say ignorance on the part of the workers”.* A Journalist, Lawyer and Researcher

- ✓ Perceived lack of commitment and poor training of the PHC workers *“Lack of awareness. Most people don't know the duties of a primary health centre.”* A Journalist, Lawyer and Researcher

*“I said ignorance on the part of the workers. It doesn't seem like they know what they are doing or maybe they are not trained well.”* Senior Staff Amadec, NGO in Lagos.

- ✓ More confidence in traditional Medicine than modern medicine

*“Many of our people believe in this traditional medicine and instead of them to embrace what the government put in place or what the government have for them a lot of them would say no let me go and get this herb.”* A Professor at Lagos State University

*“Some people would argue with you based on some fact and some in a country where like I said, put so many taboos to the country. Somebody just called me yesterday that he had a stroke. I asked, how come? Where are you? He said at home. I said go to the hospital. He said they said he should not take any injections. Can you imagine? and he has a stroke.”* A Member of PHC Board, Plateau State

*“You could imagine someone as educated as a lawyer would rather go to a traditional birth attendant registering her pregnancy there instead of the primary health institution close to her. You know who has prescribed that each ward should have a primary health centre in place. I feel we have more of the traditional birth attendant around us than the primary healthcare institution. So, people would rather go to that woman whom they know very well.”* A Doctor and Member of PHC Board, Edo State

- ✓ Lack of support from the government

*“... people in power don't prioritize our health sector when the primary health sectors happen to be the first intervention to the people and the area you need to go to before any other thing.”* Senior Staff Amadec, NGO in Lagos

*“Then also, governments are not really doing enough for health workers in the primary healthcare. Most of the amenities that are meant to be available in a primary healthcare are not really available in the primary healthcare centres. For example, in some healthcare centres, most of the people in the communities believe that when they get to the primary healthcare centres, they are expected to be given free medications which are not readily available.”* A Member of PHC Board, Plateau State

### Infrastructural Challenges:

- ✓ Lack of funding is one of the most mentioned challenges in the Nigerian Primary Health Care System

*“For challenges, number one I would say funding.”* A Journalist, Lawyer and Researcher

- ✓ The impact of poor funding results in poor remuneration, leading to poor staff motivation and a bad relationship between management and staff

*“As long as the healthcare system is poorly funded, things would remain as it is, the status quo. Manpower is the problem. People are in the "Japa syndrome", poor enumeration. You know there are many things. Poor staff motivation, poor communication between the management and staff. There is a myriad of issues.”* A Doctor and Member of PHC, Lagos State

- ✓ Lack of enough facilities, not only at the PHC level but all levels

*“A big part of the challenge is inadequate healthcare facilities. We still need more of those primary healthcare centers”* A PHC Board Member, Edo State

*“The health centres need to be available within a short walking distance from most people. The average Nigerian should be able to walk within 20 to 30 minutes to get to the primary healthcare centre close to them. So, they are inadequate number of primary healthcare centres facilities.”* Member of Niger State PHC Board

- ✓ Lack of enough medical personnel

*“So, staffing doctors is an issue. That's a general issue in the country”* Senior Staff Amadec, NGO in Lagos

*“... inadequate trained medical staffs”* Senior Staff Amadec, NGO in Lagos

✓ Lack of enough medicine

*“Another challenge of primary healthcare would be along the facilities like making sure that enough medications are available when the patients are seen when drugs are easily available and at a reasonable cost for people to be able to afford.”* Departmental Head at Lagos State University Teaching Hospital

✓ Unreliable Electricity

*“Primary healthcare is facing problems which I would say lack of energy that is electricity. And you know when you talk about electricity you know what that means in this sector of the world. In Nigeria and in Africa certainly our government is not helping matters as to helping all these primary health sectors.”* An Ogun State PHC Doctor

*“Electricity is another issue, yes things like that but funding is the most challenging thing. The government is doing their best. We know that the budget does not beyond 4% for healthcare as long as it has been.”* A Doctor and Member of PHC, Lagos State

✓ Bad Roads Infrastructure making some facilities inaccessible especially during rainy seasons

*“Access to healthcare and there are a lot of places that are not well motorable. There are a lot of places where we don't have very good access roads, or access to the nearest health facility and even within Lagos some places are troubled with flooding and when it floods usually in the rainy season, accessing health facilities can be difficult.”* Business Owner, of a national wide Nigerian PHC and General Hospitals Drug Supply Contractor

## 4.2 Technology in the Nigerian PHC

### Impact of COVID-19 on the Nigerian PHC Innovation

Whereas, the COVID-19 epidemic caused havoc globally and devastated elements of the Nigerian economy, health wise, the respondents felt that Covid helped the Nigerian PHC greatly. This is due to the huge amount of investment and donations made and the PHC got some equipment. This has helped improve service delivery. The respondent believed that if it was not for COVID-19, most of the PHC facilities would not be as well equipped as they are today.

*“Of course, you can't leave COVID-19 out. Many of those equipment, of those COVID-19 related devices that were brought in then, before how many PHC have them before? How many PHC have them? But you know during Covid we had private bodies, we had international bodies donating massively all these equipment to the federal government and after covid-19, you can't just keep them redundant. There were all donated to different hospitals and some PHCs benefitted from that equipment. So, you cannot compare the services before they had those devices and now that they had those devices. Like those beds that were used then, those beds that were used and several other equipments that were used then were all donated to hospitals across board.”* A Member of the PHC Board, Plateau State

Covid-19 accelerated innovation in the Nigeria Health System as a whole including the PHC. During the Covid period, health facilities had to be equipped to deal with the epidemic. After the pandemic slowed down, the equipment are still in place and are still in use.

*“I think post-COVID, they are more innovations. Okay, let me just say since it falls under innovation. I think we are more self-conscious of our health post-COVID than we were pre-*

*Covid. Pre-COVID we were very relaxed. Everybody was relaxed. We were just doing things the way we felt but with the imminent danger that COVID posed.” An Ogun State PHC Doctor*

*“I said in the past 20 years if we say we've been on 30%, in the last 2, 3 years we can just say okay we've added maybe 7% or 10% more to the 30% that we had before making something around 35%, 37% improvement.” Business Owner, of a national wide Nigerian PHC and General Hospitals Drug Supply Contractor*

*“It is like they use to say that they are analogues, it's only recently that people start to upgrade themselves to ICT computers in those areas. Smartphone not everybody can afford and operate it. so you can see the challenges that we are facing and deep down as it may I think that we can sub-mount that by integrating and educating the staff” Senior Staff Amadec, NGO in Lagos*

The innovation in the PHC falls into phases. These three phases are:

- ✓ Pre-COVID Phase
- ✓ COVID Phase and,
- ✓ Post-COVID Phase

Pre-Covid Era: These are the years before the onset of the COVID-19 which were characterized by the slow adoption of innovation in the Nigerian Primary Health Care System. Covid Era: There was a lot of investment and innovation in the Nigerian PHC. The investment and innovations during the Covid Phase have been and are still operational at this current phase; post-COVID phase

*“Yes, let's say pre-Covid. Pre-Covid years we can say it's just a little improvement in the health sector, it's just a little improvement in the PHC. But post-Covid - Covid came and it threw up a lot of challenges in the medical world, particularly in Nigeria. You know messing up the development in capacity to combat it. I won't compare PHC of the last 3 or 4 years with the PHC in the years before Covid. You know even at that time many of the hospitals are used as isolation centres and it has to be upgraded to be able to make use of them. And after COVID those equipment are still there and those hospitals have inherited those equipment and they are using it right now in offering services to people and the populace. So, I won't compare the primary health centre of 3 years ago with pre-COVID” Business Owner, of a national wide Nigerian PHC and General Hospitals Drug Supply Contractor*

*“At least there have been improvements. I've been to a couple of some few days ago and you can see them making use of a computer. You can see them making use of all these new orthopedic beds, and new computer beds. You can see them making use of those equipment that were used then during the Covid at that time now. They are using it now as I said. At least there's a little bit of improvement but not really that much, especially now that the federal and the state government are experiencing what do we call it. Is it brain drain?” Business Owner, of a national wide Nigerian PHC and General Hospitals Drug Supply Contractor*

Despite the perceived speeding up of innovation adoption in the Nigerian PHC, some respondents felt that things could be done better and there should be some level of use of technology.

*“I don't know why we are not taking advantage of technology even at this level. I don't know, why are we still doing things manually? That is not how it should be. We are not taking advantage of technology, why are we doing everything manually? If you go there, you want to register, you can see a doctor. Everything is done manually at this stage, the 21st century.” A Journalist, Lawyer and Researcher*



## Existing Technological Innovation Awareness

Awareness of technological innovation in the Nigerian PHC is low. However, some of the respondents had heard about the use of these types of innovations. One of the respondents was aware of the use of Google Drive solution to store information which both doctors and nurses could retrieve when they needed it.

*“The one that is available that we know is that you have to store information and some doctors and nurses would access it when you come they would just go to Google and some of them would be able to get it and at such that one if you store it there and you go for a conference, you can rub minds with your colleagues when you go for a conference that I came across this thing and when you bring it out it would be easy to recall and you discuss with your colleagues and to rub with your colleagues there and there. And you can use that as a platform for information.”* A Professor at Lagos State University

One respondent was very conversant with what was happening in the technological innovation at the PHC level:

*“Medplus, then like I said, Talamus, one called O health, Tremendous, there are few, there are many others. You can just literally go there and you find quite numbers.”* A Doctor and Member of PHC, Lagos State

**Most of the respondents associated the term “technological innovation” with the use of computers in record keeping among other things.** The respondents felt that computerization of the operations of the PHC is of paramount importance. They felt that the use of computers in managing some of the services of the PHC will greatly change record keeping such as those of births and deaths and also allow for access and sharing of information i.e., between doctors, nurses and other healthcare workers. In addition, the use of computers and digital technologies in the Nigerian PHC was tantamount to automation.

*“Computerization of the whole operations of the PHC would have been really great. Computerization of the whole - where we have death and birth record, all the records of patients electronically, where you can easily have the history of all the patients. Probably you've been using Alimosho primary health centre, right now you are at Ikeja and one is able to access your record of Alimosho down to Ikeja or probably you are formally at Ondo state. You can't tell people not to migrate and medical record is important when expending treatment to patient. First and foremost, if we have full automation of primary health centers, I think it would be of great essence, a great improvement to general health services provided at that level.”* A Doctor and Member of the PHC Board, Edo State

Respondents understood the term **telemedicine and some said that it was a remote way of treating people.**

*“Telemedicine is a general name. I'm just giving you an instance now, do you understand me? For example, some Apps are under telemedicine. The way I understand telemedicine, people have created Apps and people just go on those Apps. Telemedicine is like a remote way of treating people. People have created Apps, you download on your phone, talk to a doctor; speak to a pharmacist, that's what I understand about telemedicine.”* An Entrepreneur, Innovator and a Pharmacist in Lagos State

The **adoption of technology at the PHC level is really small and mainly done by the private PHCs** which have adopted technology in private clinics.

*“Yes, and some private hospitals are also introducing, they are even using **WhatsApp video calls** to WhatsApp their patient for follow-up and maybe things that don't necessarily need a physical presence in the hospital or the health facility.”* A Member of the PHC Board, Plateau State

One of the respondents, an entrepreneur, who is also an innovator from the private sector said that they were **in the process of developing an app** to help people access pharmacists and doctors.

*“Yes, we even have an App that we are developing. My pharmacy, we are developing and it's for that particular stuff, the name of the app is Junah Sunita App”* An Entrepreneur, Innovator and a Pharmacist in Lagos State

*“Once we develop it, it would be like people can just go there, speak with a pharmacist, and complain, a pharmacist would talk to them. Some doctors can talk to them. Aside from that, you would be able to purchase drugs from the App. Aside from that you would be able to monitor your drug usage in the App. So, there are lots of benefits there to just say a few.”* An Entrepreneur, Innovator and a Pharmacist in Lagos State

According to the respondents, among the digital innovation that would work very well in Nigeria's PHC is **telemedicine or phone-related innovations**. This is because a lot of people have mobile phones.

*“A lot of people would benefit and it would be better for us. A lot of people have phones even in rural areas. They can just access their phones, get to know what is wrong, visit pharmacies around, get their medications, and not necessarily have to get to the hospital. I think I would talk to him about that and a lot of other things.”* Departmental Head at Lagos State University Teaching Hospital

*“People have access to their mobile phones and some people are on the internet so mobile technology is possible and some are in place so that can be leveraged upon.”* A PHC Board Member, Ogun State

*“Yes, almost every home in Nigeria has a phone within him/her. Somebody in the home would have a phone. We can distribute numbers on several social media around, these are the numbers you can call that people in Ebute or Ikeja call 055. Once you call our customer care would attend to you, would tell you what to do. Then too, as I told you earlier, some of our mothers too who sell pepper, some of them we are trying to make them feel the phone is part of you, it has come to stay. So, on their phones too their children would help them at home as well. They have links on their phones too. Links that would be a particular province, each local government and environment or community.”* A Professor at Lagos State University

According to the experts interviewed, mobile and digital solutions can be used in:

- ✓ Health education to the public
- ✓ Provide follow-up services and appointments

*“Yeah, but we can use digital means, technology to provide health education, to provide follow-up services - you don't need to come to the health center, you can get follow-up and if you keep your follow-up appointment you can get follow-up especially.”* A PHC Board Member, Ogun State

*“In the area of follow-up, consultation; let's say somebody is travelling and cannot come to the health center for a follow-up to check their blood pressure, they can check their blood pressure and send their result - the value to the doctor via telemedicine platform and then then maybe”* A PHC Board Member, Ogun State

**However, this could not be without challenges. Using mobile phone applications maybe hindered by:**

- ✓ Lack of reliable electricity and mobile network

*“All these things I'm talking and thinking, if there's no power, if there's no electricity for 2 days, 3 days and people have not charged their phone, how are they going to do that?” A Professor at Lagos State University*

- ✓ Patients' illiteracy due to low levels of education
- ✓ Cost of using it

*“For primary care again, there are some kinds of patients we see in the primary healthcare centre, many of them are not literate and not very financially buoyant, they are not money spinners. I cannot judge but when it comes to primary healthcare centres, sometimes you tell a patient “Please do this test”, it cost a thousand naira, they say doctor please, “pity me, I do get money for test just treat me”. It's been like that, you understand. Socioeconomic status, literacy, and level of education come to play and for many of them, technology may be a disadvantage for them especially if they are not very well exposed and very literate but for others, it's the one-day problem. But most of the people we see in the PHCs are not rich, they are not.” Business Owner, of a national wide Nigerian PHC and General Hospitals Drug Supply Contractor*

*“Like I said, if you're thinking of business, you see our kind of patients they are the ones that would tell you “Doctor I no get money”. So, you consider that.” A Professor at Lagos State University*

If the above challenges can be mitigated, then it is doable if there is good planning, motivation and sacrifice.

*“I don't know how that it's going to happen in the PHC system but it's doable with the right planning and the right motivation and some sacrifice.” A Journalist, Lawyer and Researcher*

One of the ways that the issues of unreliable electricity are sorted out is the use of solar energy:

*“Well since we have solar here and there it is a key to ICT. Look if you want us to go places it is still this ICT, this is what is being used all over the world. Definitely, if you want to use this ICT there must be solar energy. If they want to install solar panels in rural area there must be platforms, you can raise panels for solar energy but ICT is number one let him look for the ICT.” Departmental Head at Lagos State University Teaching Hospital*

## Perceived benefits of digital innovation

The respondents we spoke to felt that there were so many advantages and benefits of the use of technologies such as digital among others in the Nigeria PHC. Below are some of the perceived advantages and benefits of adopting technological innovation in the Nigeria PHC.

- ✓ It is a global phenomenon which has many benefits and will play a great role in future

*“Right now, the world is going digital and if the world is going digital, we know the essence of why the world is going digital.” A Doctor and Member of the PHC Board, Edo State*

- ✓ It will help in service delivery by allowing workers to work seamlessly

*“So that workers can work seamlessly, everything can be done automatedly.” Member of Niger State PHC Board*

*“A lot of people need healthcare. A lot of people suffer mostly in Nigeria, so if there are*

*innovations it would be welcomed.” A Doctor and Member of PHC, Lagos State*

- ✓ Going digital is perceived as automation of operations which will greatly boost service delivery at the PHC level

*“So of course, with the coming in of automation operation, if services are provided at the PHC level, of course, it's going to really boost the services provided. It's really going to make things better, make things work out and it's really going to uplift Nigeria's medical sector because in trying to meet the first world, the provisions of health services. of course, it has a role to play. It has a very big role to play, very big role to play.” Member of Niger State PHC Board*

- ✓ Technology can help one work remotely

*“It would be a lot of change. You can stay in your house and you can stay anywhere in your village you can connect through your phone and pass the information without being there. Your subordinate would be in the office this is what you need to do and all that and it is done. It is automated. With ICT everything is automated. Where you talked about artificial intelligence.” A Professor at Lagos State University*

*You may not be in the office you may be elsewhere and they need some information and you have to give them through your laptop or whatever information you have to pass it without you being there. Unlike we have to be there physically until we are seen but with ICT of course in a twinkle of the eye, everything is done. Like I said that is why we now said ICT is artificial intelligence when it is connected to everything like that the world would progress.” A Professor at Lagos State University*

- ✓ Technology would help in removing quacks in the PHC

*“Primary health sector is where we have a lot of quacks there is no doubt about that and if the government just fold its hand doing nothing you would see a lot of death happening in that area and the government need to fund, need to put officers that would ensure that things are properly done in the primary health sector using technology.” An Entrepreneur, Innovator and a Pharmacist in Lagos State.*

*“How would they do this? They need to employ and put people that will mend and regulate by way of recognizing and registering this health sector and linking them up on ICT. When someone is lapsing somewhere you can easily observe and easily notice it. It would not be like advanced something, it would be like Google or like what we call CCTV to monitor these people. Once that is done, they would improve in the primary health sector.” A PHC Board Member, Ogun State.*

### 4.3 Nigeria PHC Technological Innovations Barriers to Entry, Potential Opportunities and Decision-Making Process

#### Barriers to entry

Based on a trial of the government to try a new technology known as **EMR: Electronic Medical Recording**. Sometimes in the year 2022, this new digital intervention was intended to work inhouse for each PHC facility and removing the use of paper within facilities had serious challenges such as lack of trained personnel, lack of electricity, lack of consistent and reliable network connection, logistics, security of the hardware that included computers and tablets. This is a clear indication that technological innovation within the PHC requires improvement of infrastructure to work with the required efficacy. The Aim of the innovation was:

- ✓ To make the in-facility process seamless
- ✓ Move away from using paper and adopt digital solutions
- ✓ Develop patients' database i.e., their medical history

*Like I said, the government was introducing an electronic making medical recording system where they would give tablets to the health workers. It's an in-facility; in-house facility mode of operation such that the government is trying to move away from paper to digital, using electronic medical system. Instead of the doctor or health worker documenting in paper and file, the patients now have their details and their history and their health records in electronic format stored in computer and tablets. They are still on it. They have not stopped it but some places have that challenge. Like I said, I don't work in all the PHCs in Lagos. So, I don't know what they did in other places, I'm just?"* A Doctor and Member of PHC, Lagos State

### Electronic Medical Recording (EMR) Case study

A case study of the adoption of technology in the PHC by the government though slow has taken place in some areas and was done in a few PHC facilities.

- ✓ Description of the innovation and how it was supposed to work. It was meant to reduce paperwork for patients at the Nigeria PHCs.

*"Sometimes last year, I think the government were trying to introduce an EMR system into the PHC but it didn't kick off in many of the PHCs. EMR is electronic medical recording. You know when you come to the health facility, you pick up a card and then the record officers enter your details, give you a number, open a file for you and then with that file you go to the nurses and then the nurses check your vitals. And after checking your vitals - your height, your weight, for your child. Then they go see the doctor. The doctor documents it in the file, and sends your prescription to the lab. The lab does the test; sends it back to the doctor. The doctor writes a prescription, sends it to the pharmacist. All that is supposed to be incorporated into an electronic database where the medical record officers - CHEWS (Community health extension workers). The nurses, laboratory, and pharmacist don't have to be working with paper. They can just enter all those details in electronic format using soft wares."* A Doctor and Member of PHC, Lagos State

- ✓ When and where the innovation was attempted:

*"They were introducing that sometime last year, in fact sometime in June. June July last year (2022) they started that early enough last year but at some point, it didn't kick off because of security, because of power, because of logistics issues."?"* A Doctor and Member of PHC, Lagos State

*"They are still on it. They have not stopped it but some places have that challenge. Like I said, I don't work in all the PHCs in Lagos. So, I don't know what they did in other places"* A Doctor and Member of PHC, Lagos State.

- ✓ Which company had the tender for the EMR project for PHC

*"I think that company was called Talamus. There's one company they call Talamus. They were the ones that were trying to come in then. I don't know if they're still there; you know this period is election. So, I cannot say but I know there was one company called Talamus, they were the ones trying to bring the EMR system into the PHC system. I do not know any other company working with the PHC people."* A Doctor and Member of PHC, Lagos State

- ✓ Challenges included a lack of reliable communication network

*"The government was trying to provide computers and also tablets, you know these phone tablets, the one bigger than the regular. They were trying to do that but at some point, it didn't kick off in some areas, I think because of network issues with the network internet providers. I*



*think they were trying to use MTN. Some places have good network with MTN, some did not have good network with MTN.” A Doctor and Member of PHC, Lagos State*

*Yeah. What were they doing at that time? I think, even generally with our mobile phones we realize that in this part of Lagos the internet is not good in "soso" network, you know that kind of thing but in also this part of Lagos the network is not good, I have to use my other line, you know that kind of thing. So I think there was a challenge like that where we were not getting good... I think there were trying to use a modem to provide internet and internet service provider using modem but I think there was an issue of network compatibility in that area, so they had to change it.” A Doctor and Member of PHC, Lagos State.*

- ✓ Other challenges to this innovation included a lack of reliable electricity and security of the equipment

*“Security was an issue because you provide such sophisticated electronic gadgets to a PHC that does not have electricity 24 hours, that does not have security 24 hours. How do you guarantee the safety and the security of that equipment?” A Doctor and Member of PHC, Lagos State*

- ✓ The project is still ongoing with the government working on solutions to mitigate the challenges

*“They were trying to build infrastructure to beef up the security in the PHCs by putting barricades, barbed wires, burglary proofs in PHCs that do not have such protection. Because when you introduce systems, expensive equipment like tablets, and UPS systems, you need solar if there's no light in the PHCs, how is it going to run? There's a lot involved in this. So, I think they're working on it, I don't know. I hope they all succeed really.” A Doctor and Member of PHC, Lagos State*

Therefore, based on this attempt by the government is a clear indication that **there are many barriers to entry when it comes to technological innovation intended for the Nigerian Primary Health Care System**. Key Barriers to the adoption of innovative technologies in the PHC are:

- ✓ Unreliable electricity even in urban areas, adoption of technology at the PHC has been slow if it has been done at all

*“More so that the rural areas where we have this primary health care are situated virtually there is no electricity and you know when you want to sell most of this medicine, vaccines to impart to people they would need to back it up with electricity. And even in the cities, major cities in Nigeria electricity is epileptic except you want to back it up with standby generating or plant that is the problem.” Member of Niger State PHC Board*

- ✓ Some respondents felt that the slow adoption of modern devices and technologies was because the country was not ready for such innovation

*“I don't think we are ready, and if we are ready, maybe people have not yet invested in them. Maybe they've even invested in them and they did not take the initiative very important. I guess so.” An Entrepreneur, Innovator and a Pharmacist in Lagos State*

## Potential opportunities

There are many areas where there are opportunities in the Nigerian PHC i.e., the use of technology, starting with ICT.

- ✓ The adoption of technology is preferred because it will operations easier

*“It's good. Technology is to make life simple, and plan easier. It feels good. It's much needed now in the post-Covid era. It's much needed. The demand would be increasing. Definitely, demand would increase. The terrain may look very rough and difficult maybe but it's growing. People are getting more aware and exposed. Yeah, it's highly needed. It's good.”* A Doctor and Member of the PHC Board, Edo State

✓ Telemedicine, Mobile Health, Use of Social Media

*“We would have incorporated telemedicine, mobile health, the use of social media, make an appointment online. We can check the health centres if it is available, the locations of the health centres. If it is functioning, what time? These are things that technology can do for us while we are seated in our house.”* A Journalist, Lawyer and Researcher

✓ Record Keeping, SMS, Inventory control

*“And they can still introduce ICT like record keeping, texting people, keeping medicine and drugs here and there and I think that yes innovation can take place depending on who is our head.”* Departmental Head at Lagos State University Teaching Hospital

✓ To grow local talents and speed up innovation adoption at the PHC levels, there is a need to identify and encourage innovators by financing them

*“Privately I know somebody that is using his own computer storing, accessing other areas to build himself up. I think that one is an innovation too. If the government can encourage people like that and equip them, finance and as well encourage the, we would go places. The sky is not even the limit for them and you can see a lot of people also joining.”* A Professor at Lagos State University

✓ Training of the PHC staff will help in ensuring that the PHC is efficient in such a way that people do bypass to go other either secondary or federal level facilities and consequently reducing pressure

*“Yes, I spoke of training for the existing staff because they need to. I don't think the staff would be able to do their job effectively if they don't even know what they are doing plus the way the world is changing. The scope of their work is going to continue reducing drastically. Like I said manpower, development of manpower, workforce.”* Senior Staff Amadec, NGO in Lagos.

*“Now, using Lagos as a case study, the plan of the governor is to have the PHC playing as a referral hospital the general hospital and next to the tertiary hospital. So if we have improvement in the manpower obtained at the PHC level, of course they won't be so much pressure on the general hospitals and others.”* A Doctor and Member of PHC, Lagos State

✓ Financiers. Since lack of funding is a major challenge, there are opportunities to fund innovations and other development in the Nigerian PHC.

*“And the other one is finance that has to do with procurement of equipment in the facilities. That's the opportunity for the financial sector to tap into, probably to provide as a form of soft loans or whatever kind of financial package that can work for such an institution and they too would make little money from whatever services that it's rendering.”* Business Owner, of a national wide Nigerian PHC and General Hospitals Drug Supply Contractor

✓ Provision of amenities

*“And then when it comes to amenities as well as infrastructures, of course for manufacturers of hospital equipment. It's an opportunity for them as well to come in, do their supplies and make money as well. So, across board there are a lot of opportunities across board at the PHC.”* Business Owner, of a national wide Nigerian PHC and General Hospitals Drug Supply Contractor

- ✓ Introduce Use of Smart Card for patients, so that when they come to the facility, they carry it. The smart card needs to be unique to its user.

*“The smart card would carry your number alone. So, when they are coming to the hospital they come along with the smart card”* A PHC Board Member, Edo State

- ✓ Use of other technologies such as Drones and Robotics

*“In overseas now I have seen where robots operate x-rays machine and also it would reduce radiation on people, why can we not do it in Nigeria?”* A Professor at Lagos State University

## Decision-Making Process

- ✓ In some instances when one wants to introduce an innovation in the Nigeria PHC, a formal application is a first step.

*“Yes, a formal application. Once formal applications have been made, they would be a meeting for acceptance. Once the application is made, they would be a meeting with people that would on whether or not to proceed with the application being made. But after or not they've decided whether or not to sit, they would now put it out to the employees to inform them if there's a need to and whatever they are bringing forth, we may now be trained and we can proceed from there. So, it still boils down to the management to make those key decisions.”* Departmental Head at Lagos State University Teaching Hospital

- ✓ Decision-Making Process: When it comes to decision-making on whether an innovation will be adopted at the PHC level, the head of the organization makes sure that the management is involved.

*“I get to know about innovations through reading about them. At LASUTH there's a chief medical director that oversees the entire hospital. So, if there's going to be the deployment of any new innovations, it has to come through the hospital management, that's how it works.”* Departmental Head at Lagos State University Teaching Hospital

- ✓ Configuration of a decision-making team at the PHC level. Therefore, decision-making is a group thing that involves departmental heads

*“Every department has access to decision-makers. So, there's no problem with that. There's a hospital management team that consists of the head of each and every department within the hospital”* Departmental Head at Lagos State University Teaching Hospital.

## Success factors for innovation

- ✓ The target group of the innovation, their training on how to use it/ In addition, the innovation intended group must not be ready to adopt it

*“Whether it works or not would depend on people that are actually going to be using it. If you bring a new technology, you have to train people that are going to be using it and if about parastatals of the technology without determining how useful or how accepted it's going to be because if you bring a new technology and the people that want to be using the technology are resistant using it, then you're going to have a problem. So, you have to get them to accept.”* A Journalist, Lawyer and Researcher.

- ✓ Get feedback from the target users

*“Well, decision-makers have to talk to and listen to the end users for it to be able to work*

*because of they don't, then there's going to be a problem” A Professor at Lagos State University*

## 5. Conclusions and Way forward

Since the lack of knowledge on the role of the PHC in Nigeria does make the public bypass it and go to the secondary or tertiary health facilities even for a minor ailment which should be treated at the PHC, there is a need to educate the people. The education of the general public on the role of the PHC would not only provide grassroots health services provision but also would decongest the secondary and tertiary health facilities. In addition, the general public needs to be educated that the PHC health personnel are as trained as those in other levels of the health system in Nigeria. This will help in creating general public trust in the PHC. More education on the use of modern medicine as opposed to traditional medicine is also another area of general public education which would help in creating a positive perception of the PHC system in Nigeria.

As for the lack of adequate funding from the government, there is nothing much that can be done to make the Nigerian government provide more funds. However, there is room for development partners such as WHO, and the UN to channel their funds to ignite technological innovations at the PHC level. In addition, investors can target the private PHC sector with soft loans to help them in the adoption of technological innovations. As for poor road networks, there is nothing private companies can do since that is a prerogative of the government.

However, the use of digital and remote health service provision can help sort out some of the problems. Another area of investment is in mitigating unreliable electricity and communication network. There is huge room for investment in coming up with innovations such as the use of solar-charged medical devices.

There is also room for coming up with training solutions to help the PHC workers access mobile devices. This will help solve the lack of adequately trained personnel.

Adoption of technological innovations is key in:

- Helping in service delivery by allowing workers to work seamlessly
- Automation of operations which will greatly boost service delivery at the PHC level.
- Enabling remote service delivery
- Record Keeping, SMS, Inventory control

Going forward, there are two remaining phases of this study. The two phases currently ongoing are semi-structured interviews and quantitative interviews. These two phases will help in putting numbers behind what has been learned with the desk research and the qualitative phase.

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