Health

Best Practice Case Study: 04

Improving Access to Quality Healthcare at the Primary Health Care Centers through Telemedicine Services

[A Case Study of Edo State Primary Healthcare]

NIGERIA GOVERNORS' FORUM

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Acronyms

ANPA	Association of Nigerian Physicians in the Americas
HCF	Health Care Facilities
HSRL	Health Sector Reform Law
HSL	Health Scheme Law
ICT	Information Technology
KII	Key Informant Interview
FMoH	Federal Ministry of Health
MDA	Ministries, Departments and Agencies
NDPR	Nigeria Data Protection Regulation
NGF	Nigeria Governors' Forum
NHA	National Health Act
NMA	Nigerian Medical Association
EDSPHCB	Edo State Primary Health Care Board
EDOHIS	Edo State Health Insurance Scheme
SOP	Standard Operating Procedure
SCHMA	State Contributory Healthcare Management Agency
SWOT	Strengths Weaknesses Opportunities Threats
SMoH	State Ministry of Health
SMoJ	State Ministry of Justice
SPHCDA	State Primary Health Care Development Agency
SPHCMB	State Primary Health Care Management Board
WHO	World Health Organization
UHC	Universal Health Coverage

Foreword

Mr. Asishana Okauru Esq.
Director General

The Secretariat

Acknowledgement

The overall success of this case study is in the cooperation and support provided by the Edo State Ministry of Health and the Edo State Primary Health Care Development Agency. All our request for guidance with regards to where to go and how best to navigate the state was provided. Because the telemedicine initiative is implemented at the PHC centers, the executive director of the SPHCDA made it a duty to engage with our team on a daily basis providing opportunity for feedback as well as additional guidance.

Our appreciation goes out to the following people.

Dr. Samuel Alli	Commissioner for Health
Dr. Omosigho Izedonmwen	Executive Director SPHCDA
Prof. Patricia Ucheoma Ukaigwe	Provost School of Nursing & State Telemedicine lead
Dr. Philips Osehobo	Member, Association of Nigeria Physicians in the Americas (ANPA) & Telemedicine Consulting Physician from Atlanta
Mrs Charity Osa-Agbonlahor	PHC Personnel & Telemedicine coordinator
Mr Nosa	

We want to state equivocally that there was no interference of any sort by the any of the state actors and our research was carried based on its original design and this report is a reflection of the outcome of the research.

Abstract

Background

The challenge of making healthcare affordable and accessible to every Nigerian regardless of their geographical or financial situation is the major obstacle towards Nigeria's attainment of Universal Health Coverage (UHC). An existing technological innovation globally potentiated by the Covid-19 pandemic and has revolutionized the world of healthcare, is one innovative solution that has demonstrated a huge potential to contribute to the attainment of UHC in Nigeria. The introduction of telemedicine in the Primary Health Care (PHC) service delivery of the state with the goal of making healthcare more accessible and affordable to every resident of Edo State is indeed the right step in the right direction. The health sector in Edo State was faced with a multitude of challenges some of which still exist. But recent efforts by the state government and the healthcare actors has resulted in an unprecedent turn around with the required political commitment injected in the health sector resulting in an increased budgetary allocation (the highest in the states' history), human capital development of health workers, health facility infrastructure makeovers and upgrades, digitalization and automation of government processes including that of the health sector, and many more.

Goal of Case Study

This study is aimed at understanding the context, challenges, outcomes and potential impact of telemedicine use in the Edo State primary health care system.

The attainment of the goal will aid the understanding of our team in the use and practice of telemedicine within the broader context of Nigeria heath sector. Research questions bordering on what is being done and how different is it from what has been done in other places, sustainability of the initiative beyond current government, merits and demerits of the initiative and how they outweigh one another, the broader impact of the initiative to the Nigeria health system etc. will be answered at the end of the study.

Method

We are undertaking a descriptive research for this case study with a combination of approaches deployed to answer key research questions. We will be conducting our primary research through the application of structured questionnaire, Key Informant Interviews (KII), participant/non-participant observation as well a secondary research using the desk review approach.

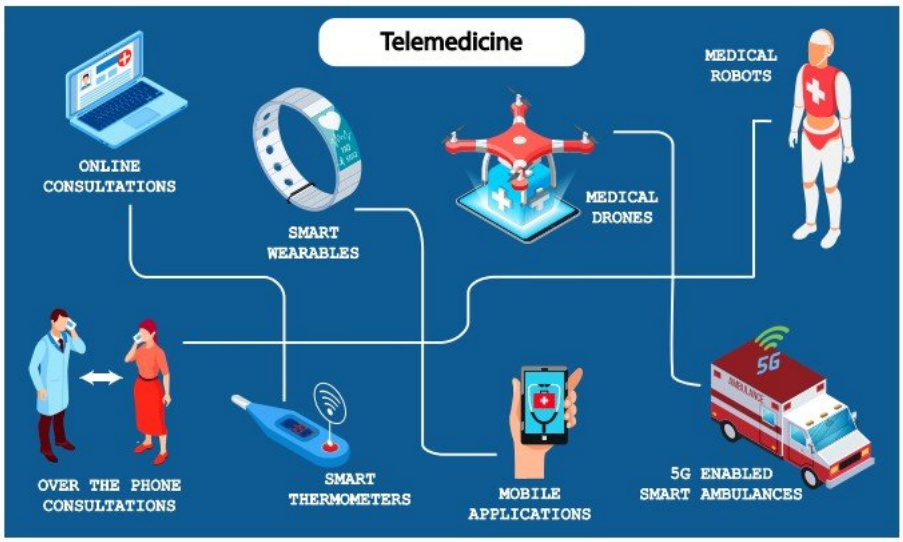
Result

Telemedicine has been shown from several studies to have a significant value in closing the distance between the healthcare service provider and the patient. The ongoing attempt by the Edo State government to leverage telemedicine to bring specialist healthcare closer to its people can be said to be on track in achieving same. The impact of the intervention cannot be measured at this stage going by the scale and reach of the project. The initiative started in June 2022 and has made small but progressive attempt in improving the quality of lives of Edo citizens. Out of 192 wards across 18 LGAs in the state only 2 wards in one LGA were included in the trial phase and an additional 8 telemedicine centers in 8 wards across 2 metropolitan LGAs are in the process of activation.

Conclusion

The Best Practice documentation initiative of the Nigeria Governors' Forum Secretariat aimed at identifying novel and impact driven solutions in the health sector across the 36 states and the FCT, facilitated this research for the global good of all Nigerians as part of the general effort to advance quality health governance in Nigeria. The Edo state telemedicine initiative will go a long way to improving the quality of healthcare for the residents of the state and also serve as a veritable template for emulation by other states

Introduction



Though Telemedicine has been around for a while now, it has managed to garner attention only since the last decade or so. Telemedicine has allowed doctors and patients to get closer than ever, improving the healthcare process and making it smoother.[i] The need and implementation of telehealth services escalated with the Coronavirus Disease 2019 (COVID-19) pandemic.[ii]

Telemedicine provides a solution to the problems of accessing healthcare, especially among rural populace or in developing countries such as Nigeria, where the lack of availability of information for medical management and physical barriers such as geographic isolation prevent patients from reaching healthcare practitioners to meet their needs.

The World Health Organization defines telemedicine as "the delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of healthcare providers, all in the interests of advancing the health of individuals and their communities".[iii] This can range from the use of phones for calls and text messages to apps and other technologies to improve welfare. Other terminologies related to the concept are E-health, telehealth, telecare etc. Although there are minute differences between these terms, they all fall within the same ambit.[iv]

Telemedicine is proving invaluable as the trend of the medical profession grows increasingly towards specialties and sub-specialties. Now a patient visiting a general practitioner can consult a specialist via telecommunication facilities, saving both considerable amount of time and money for quality medical care as opposed to the increasingly outdated method of transporting the patient to the specialist for a face-to-face visit.[v]

This innovative approach to healthcare service delivery is without its challenges particularly in a country such as Nigeria. Some of the challenges of telemedicine in Nigeria, include slow growth or usage of telemedicine, lack of connectivity to rural communities, lack of adequate knowledge of technological devices, the cost implications of the use of telemedicine, cultural factors, data security issues, ethical considerations, and the big elephant in the room which is regulatory uncertainty.[vi]

The NGF Secretariat health sector case study on Telemedicine in Edo State will unravel the progress made in overcoming the challenges and how the state actors have been able to turn around the obstacles to the benefit of the populace and the overall quality of the healthcare sector in Edo State. This case study will be the fourth in the Best Practice Case Study series and second case study from the south-south geopolitical zone of Nigeria. It is the resolve of the NGF Secretariat that the outcome of this telemedicine best practice will inform further engagements bordering on the outcome of this study for wider adoption and deployment across the other states.

Background

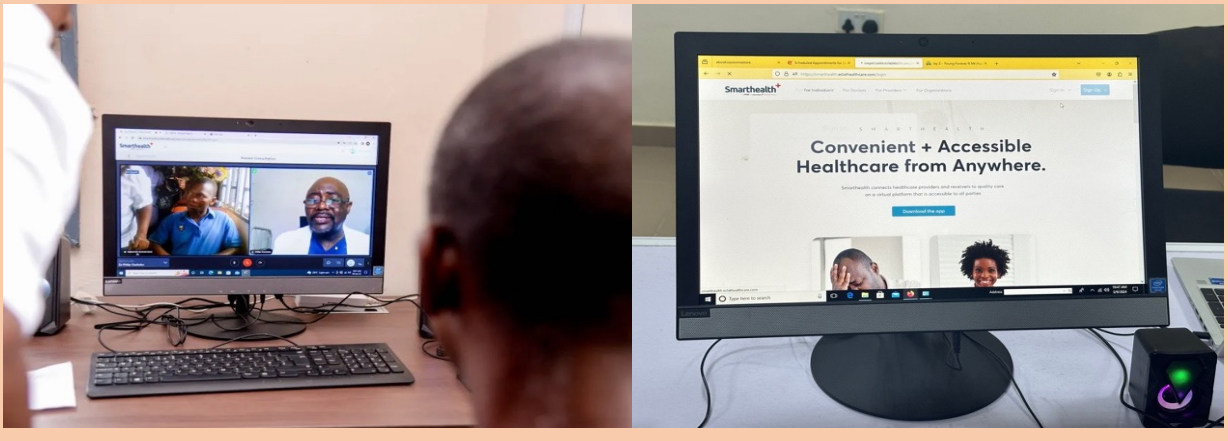
The accelerated development of information and communication technology have led many healthcare systems around the world to recognize the suitability of remote health service provision as a solution to the chronic shortages of doctors and as a means of promoting more equitable access to healthcare. Primary healthcare is the first point of contact between patients and healthcare providers. It is a vital component of the healthcare system, and it plays a critical role in promoting health and preventing diseases.

Telemedicine is a subset of telehealth, which distributes health services using information and communication technologies (ICT). Telemedicine supports and promotes long-distance healthcare, and such innovations can reduce routine physical interaction and direct hospitalization while significantly enhancing the delivery of high-quality healthcare services.[vii] In some developed and developing nations, telemedicine is a practical growing component of health information systems.[viii] However, most sub-Saharan African countries, including Nigeria, lack evidence on proper telemedicine use in healthcare delivery.[ix]

The objectives of telemedicine and its applications are to enhance citizen's equality in the availability of various medical services and healthcare despite geographical and economic barriers, to reduce direct and indirect cost (loss of production or income) to patients and the healthcare industry, to save travel time and costs for both practitioners and patients from one geographical location to another, and to improve consultation and co-operation among various units of healthcare in both special cases and primary care by bridging the distance between practitioners and specialists.[x]

Edo State lies roughly between longitude 06° 04'E and 06° 43'E and latitude 05° 44'N and 07°'N of the equator. It is bounded in the south by Delta State, in the west by Ondo State, in the north by Kogi State and in the east by Kogi and Anambra States. Edo occupies a total land area of 19,794 square kilometers and a total population of 2.16 million in 1991, of which 50.13 percent were males.

The health landscape in Edo State over the last decade has been marked with several public health incidences characterized by high morbidity, and in a few cases of mortality. These incidences have in some instances put Edo State in the spotlight resulting in the questioning of the health sector. Questions about what role is played and how is it played by the various actors in the sector who are responsible directly and indirectly for the health of the Edo people. A desk review of several literatures provided context to the numerous challenges bedeviling the health sector in Edo State in the past couple of years. Chief amongst these challenges is the low political commitment to the health sector which then manifested in multi-dimensional ways such as poor welfare for health personnel resulting in the mass exodus of health professional to other countries, deplorable healthcare infrastructure, disparity in urban-rural service delivery quality and many more.



The Problem

The people living in remote rural and poorer areas have limited access to basic healthcare. Geographic isolation, the scarcity of physicians and hospitals, and difficulties of travel to larger cities where such care is available are among the factors limiting this access. Governments at federal, state and local levels, have been making healthcare in these remote rural areas their focal point over the years so as to enable citizens in both rural and urban areas to have equal access to medical services and clinical healthcare despite the geographic isolation barriers but this effort has only been partly successful.[xi]

Edo State, Nigeria, faces several healthcare challenges that impact the quality and accessibility of medical services. Many healthcare facilities in the state are outdated, under-equipped, or in disrepair. This has hampered the delivery of quality healthcare services to its populace. The significant shortage of doctors and nurses due to mass emigration ('japa') of Nigerians resulted to overworked staff, further disparity in urban/rural health workforce and long waiting times for patients is a common symptom in Edo state like many other states in Nigeria.

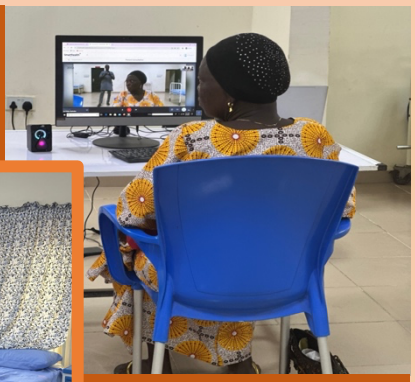
According to the World Health Report 2008, Primary Health Care, now more than ever, health systems in developing countries have not responded adequately to people's needs. The report argues that health systems are failing, because they have not kept abreast of the challenges of a changing world.[xii] In Nigeria, primary healthcare is characterized by a shortage of healthcare providers, lack of infrastructure, and inadequate funding. Telemedicine has the potential to address some of these challenges and improve primary healthcare in Nigeria.

A prominent feature of primary health service delivery failure in Edo State is the unavailability of specialist care and a weak referral system for better care. Considering the increasingly low ratio of doctors to patient, PHC centers only have the nurses, community health works and in some cases health environmentalist providing healthcare to the people. And where the need for specialist care arises to quickly avert complications, patients are left to deal with the associated cost of referrals to the secondary facility which equally cannot guarantee the availability of a specialist care also for the same reason of mass emigration of Nigeria doctors. These operational challenges are further aggravated by high cost of accessing care and poor quality of drugs.

What is described in the previous paragraph, might not be obtainable in 100% of healthcare facilities in Edo State but certainly exist in most of the rural and in some cases semi-urban facilities. The metropolitan facilities are in a better situation because of the convergence of the available doctors and specialist in the metropolitan LGAs.

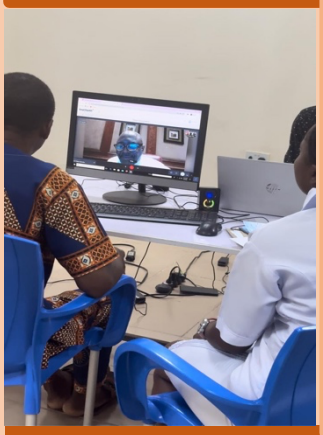
This case study will look at how Edo State and its partners are using telemedicine to address some of the challenges the patients experience to access affordable and quality care and how the government actors plan to scale and sustain this beyond the current government.

Accessible Service



Quality Care

Affordable Healthcare



Primary Health Care

Findings

In the course of the research for the telemedicine services at the primary health care centers in Edo state, we made several findings that informed the basis for this report. We therefore documented the most critical findings necessary for aiding the readers decision making on the opportunity presented by the innovation. We have outlined the findings below with detail recall of our findings from Key Informant interviews, direct observation, and secondary research.

Table 1: List of Findings

S/N	CATEGORRY	FINDINGS
1	Case study related	Legal framework for telemedicine use in Edo State
2		Technical Requirements for telemedicine
3		Implementation history of telemedicine in Edo State
4		Scope of service
5		Scale-up plan for telemedicine practice and use in Edo state
6		Personnel requirement for delivery of telemedicine clinic service
7		Availability of guidelines and operational tools
8	General	Efforts at telemedicine practice in Nigeria
9		Technological solutions for Telehealth

1. Legal framework for telemedicine use in Edo State

It is noteworthy that there is neither a specific enactment legislated to regulate telemedicine nor a specially formed body or agency to regulate telemedicine-related matters in Nigeria. However, there are a few legislation that sparingly regulate telemedicine. Some of these laws and regulations include;

- 1999 Constitution of the Federal Republic of Nigeria,
- National Health Act 2014, Code of Medical Ethics 2008,
- National Information Technology Development Agency (NITDA) Act 2007,
- Nigerian Telecommunications Act 2003,
- Medical and Dental Practitioners Act Cap M8 LFN 2004,
- Nigeria Data Protection Act 2023,
- Standards Organization of Nigeria Act 2015, Federal Competition and
- Consumer Protection Act 2018 amongst others
- Nigeria Evidence Act 2011.[xiii]

During our rreview of this case study, the Edo state government did not have any legal framework for the operationalization of the telemedicine services. It is therefore important for the state government to ensure such legal framework is in place to address the following.

Lack of Clarity: The absence of specific telemedicine regulations can lead to uncertainty among healthcare providers and patients regarding legal standards and liabilities.

Potential for Innovation: The evolving nature of telemedicine allows for adaptive legal frameworks that can accommodate technological advancements and innovative healthcare solutions.

Patient Protection: As telemedicine gains popularity, there is a need for regulations that specifically address patient rights, informed consent, and data security to ensure their protection.

Interstate Practice: Telemedicine enables healthcare providers to offer services across state boundaries. A comprehensive legal framework can address licensing and regulatory issues

associated with interstate practice.[xiv]

Navigating telemedicine in Nigeria requires an understanding of the existing legal landscape and a recognition of the need for tailored regulations. As the healthcare sector continues to embrace digital transformation, policymakers, healthcare professionals, and legal experts must collaborate to develop a robust legal framework that ensures the delivery of safe, effective, and accessible telemedicine services for all Nigerians. Stay informed about updates in legislation to align your telemedicine practices with the evolving legal standards in the country.[xv]

2. Technical Requirements for Telemedicine

This case study guided our understanding of the requirement for the setup of a telemedicine operation in a primary health care center. For a successful deployment of telemedicine services at PHC centers in Edo State, a minimum requirement of softwares, hardwares and infrastrauctures are needed for an efficient and effective use of the innovative solution to achieve its goal of providing quality care to residents of Edo state regardless of their geographic location. In Edo State, the telemedicine solution we experienced had a combination of different requirements which we have outlined in the table below.

Table 2: List of technological and infrrastructural requirements for telemedicine services

S/N	COMPONENT AREA	COMPONENT REQUIREMENT
1	Software	Telemedicine software
2		Patient health record software
3	Hardware	Desktop or laptop computer
4		Web camera
5		Blue tooth speaker
6	Infrastructure	National Grid supply of electricity
7		Backup generator or solar
8		Broadband connectivity

Telemedicine software: This is a desktop, mobile, or web platform for providing remote medical care, i.e. providing care when the patient and the doctor are not in the same room. It allows physicians to examine and treat patients whenever the need arises regardless of the location and other physical limitations. Audio calls, video meetings, and in-app text messages are the most common ways to communicate via telemedicine software.[xvi] The Edo SPHCB has acquired a third party software for this purpose annd it is what is currently in use in the PHCs providing the telemedicine services.

Patient health record software: The most important documents for a patient are an electronic health record (EHR) and electronic medical record (EMR). According to HIPAA requirements, third parties are prohibited from accessing a patient's EMR and EHR. Only the owner and doctors can view it. Integrating EHR software with telemedicine boosts efficiency by eliminating manual data transfer. This seamless connection ensures instant access to patient information during virtual consultations, reducing administrative burdens and enhancing overall healthcare delivery. The integration results in a seamless clinical workflow, incorporating telemedicine into existing processes. Patient data is automatically retrieved during virtual visits, ensuring informed consultations and facilitating easy documentation. [xvii]

Desktop or laptop computer: A laptop, though it often doesn't have the same power as a desktop, gives you mobility options that a desktop doesn't. It is expected that the desktop or laptop to be used must equally have minimum requirements for smooth transmission of video, audio and data. The minimum requirement include but not limited to;

- Processing Speed: To help keep things simple, choose a computer that has at least 2 GHz processing speed or higher. Ideally an Intel processor. Select the most recent processor version.

- Memory (RAM): You can think of RAM as short term memory. RAM is a very important factor in your computer's overall performance. The more RAM the better. Choose a computer with a minimum of 8 GB of RAM.
- Hard Drive: Another material factor in performance is the type of hard drive. When purchasing a computer, choose one with a Solid State Hard Drive (also referred to as an SSD). SSD hard drives in computers will be much smaller (usually starting at 128 GB) than traditional hard drives. Although it sounds small, it will be enough for your everyday use.[xviii]
- Monitors: We recommend large monitors 27 inches or larger depending on available space and resources. However, when using a laptop a minimum of 13-inch monitor will be adequate but for the purpose of having a better view, it is recommend purchasing a monitor and connectig it to the laptop.

Web camera: As videoconferencing is typically the core component of telehealth, it needs to be backed up by hardware such as a camera and microphone. Video quality is an important aspect of a successful telehealth visit.[xix] A high-quality video guarantees an accurate evaluation of your patient while also enhancing the professional image of the serice provider. If the specialist requires it, such as dermatology or other fields where a physical examination is required, it is wise to invest in a high-quality webcam for such meetings. We recommend getting a good web camera. They are relatively inexpensive. We recommend the Logitech HD Pro C920 because of its quality and hardware video processing.

External speaker: Many telehealth providers undervalue the importance of audio, but clear high-definition audio capability can significantly improve patient satisfaction with telehealth. Most laptops, tablets, and desktop computers feature internal speakers, but external speakers are needed when device volume isn't loud enough. Headsets and headphones with an attached mic are comfortable and hands-free alternatives to speakers, especially for those who wish to drown out any background noise that could prove distracting.

National Grid supply of electricity: For the entire telemedicine infrastructural framework to become fully operational, there is the need for uninterrupted and quality supply of power from the national grid from both ends of the divide (that is at the physician end and also at the patient end). All of the devices and innfrastructure rrequired for telemedicine are dependant on electricity. This requirement demonstrates some of the barriers for actualization of telemedicine in all parts of Edo State particularly the already disadvantaged locations.

To overcome this challenge, the State government made available a backup electricity infrastructure through a renewable energy source to supply electricity for the telemedicine service and also for the entire healthcare facility.. This additional investment requirement for electricity on one hand increases the cost of the setting up telemedicine services in Edo state but on the other hand reduces the cost associated with care and loss of lives.

Backup supply of electricity: During our field observation of telemedicine servic delivery in a PHC facility, we observed that the facility did not at the time have electricity supply from the grid and was relying on the backup supply from solar energy. However, at the time of commencement of the telemedicinne clinic service, the backup supply also failed due to absence of adequate sunlight needed to generate electricity. As a result, another backup supply using generator was activated resulting in further delay of the telemedicine clinic service. With electrricity from the national grid being the primary source, the electricity from the generator then becomes the tertiary souce following the solar infrastructure.

Broadband connectivity: Access to high-speed broadband internet continues to be a barrier for many rural telehealth programs. Lack of connectivity can hinder the implementation and expansion of telehealth programs that require live-video connections between patients and providers. Dropped calls and delays in video feeds can interrupt care delivery and lead to patient dissatisfaction with telehealth. The amount and speed of the internet connection will determine the video quality and amount and speed of data

transfer. A basic business broadband connection should be sufficient at about 50-100 Mbps (megabits per second); simultaneous use will require more bandwidth.[xx]

To meet up with this requirement component, the Edo state government initiated the deployment of fibre optics ifrastructure to 50 PHC facilities across the state. At the time of our field observation, 5-10 PHCs were almost completed and ready for activation. So to bridge the gap, wifi dongles were used to provide internet connectivity and before a strong internet connectivity was obtained, another wifi dongle having a better network from the first dongle was utilized.

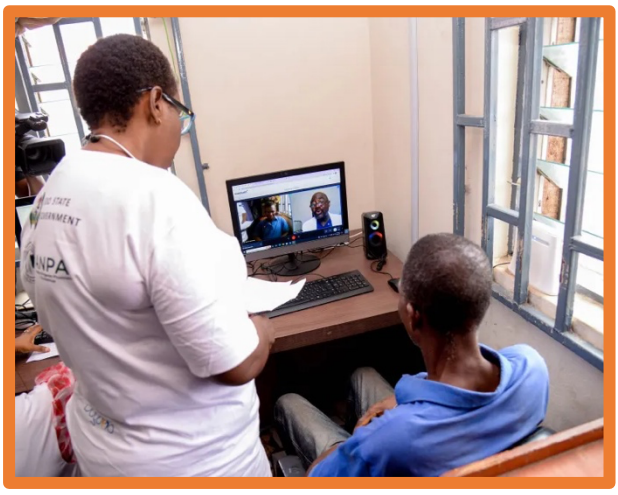
It is pertinent to note that the applicability of the telemedicine innovation to bridge existing gap in healthcare service delivery requires significant investment in technology, infrastructure and personnel skill upgrade, and this requirement cannot be achieved without the political commitment of the executive governor.

3. Implementation history

The implementation of the telemedicine clinic as a PHC service is currently implemented under a pilot initiative led by external partners but with full government buy-in and participation. The telemedicine service started as an effort by the Association of Nigerian Physicians in the Americas (ANPA) (Nigerian doctors in diaspora) to sustain their yearly medical mission to Edo State. We will break this implementation history into 2 phases, so there is a clear understanding of the inception, progression and current status of the implementation.

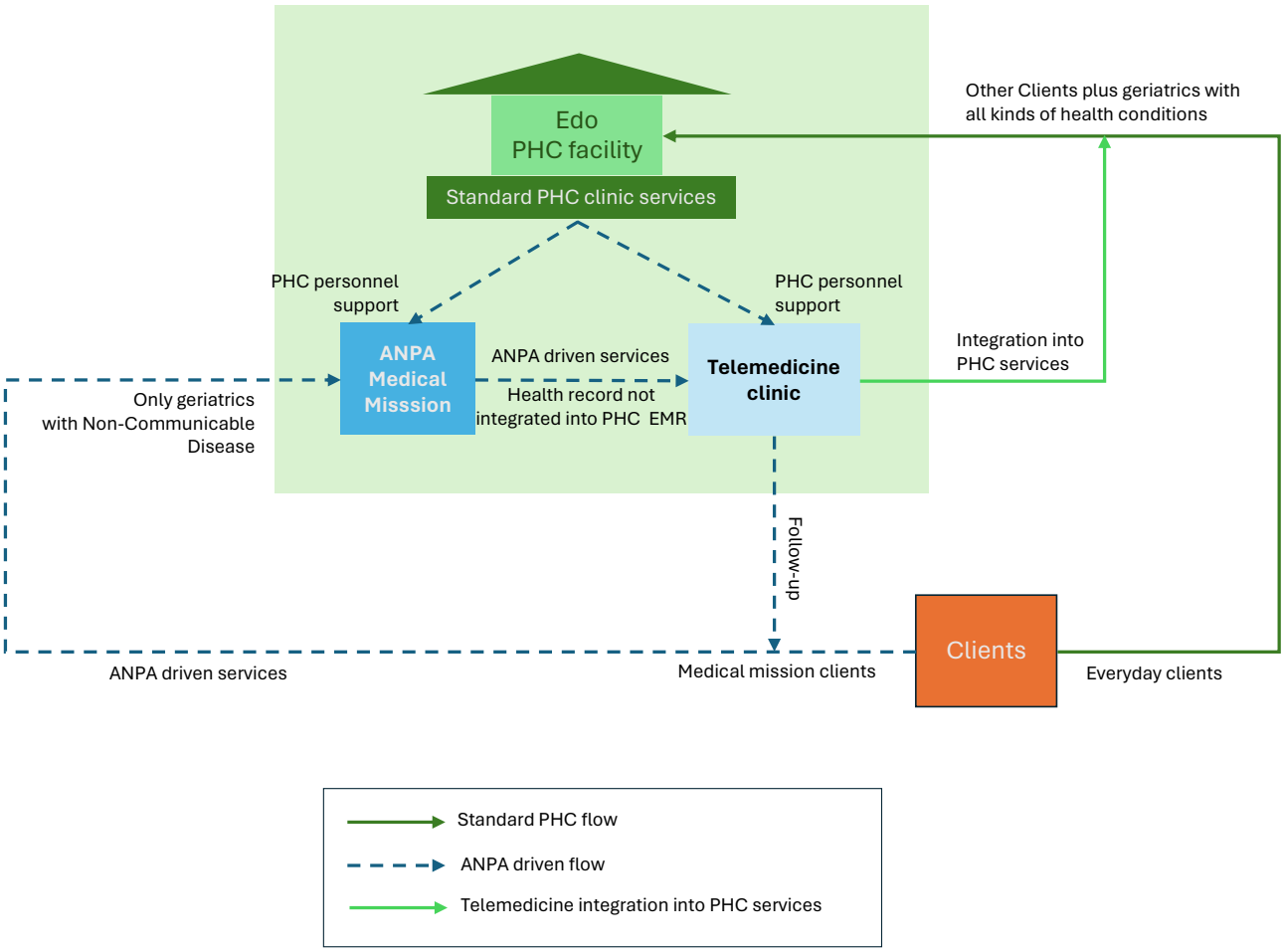
Phase 1 (trial & pilot): This phase started after several medical missions were conducted by ANPA in Edo State after which the need to ensure there is continum of care for the patients seen, treated and given free medications. The Telemedicine clinics started in 2 locations Oredo and Ugbour PHCs with the clinic days rotated between the two locations. These two PHCs were chosen as pilot locations because of their proximity to the city center and also they accounted for the most patients seen during the medical missions. They are also centrally accessibility to other clients from nearby locations.

The telemedicine started off in April 2022 as a trial during one of the medical missions and it lasted for 5 days although the mission lasted 10 days. The test afforded the team the opportunity to understand the opportunities and limitations of the innovation within a unique geography such as that of Edo State. Subsequently, the clinic continued every week (on Wednesday) and later to every month mostly weekends. The team from ANPA driving this consisted of Dr Philips Osehobo, Prof. Patricia Ukaigwe and other doctors in diaspora. Our interview with Prof. Patricia revealed that the COVID-19 pandemic motivated their adoption of telemedicine based off their experience of remote consulting during the pandemic in the United States of America. The team from the medical missioon has continued to work with the state goverrnment in order to see how the telemedicine initiative by ANPA can be sustained and scaled-up.



Some of the findings documented here were derived from the experience of the team implementing the telemedicine clinic service as well as our direct field observations.

Figure 1: Showing flow of implementation of the telemedicine by the ANPA team



The schematic above basically describes the relationship between the ANPA medical mission and the PHC facilities where they operated and how they implemented the telemedicine clinic as a stand alone service for a selected group of clients who benefited from the medical mission. The decision to utilize the medical mission client record for the telemedicine clinic particularly at the trial and pilot phases was done deliberately to understand the challenges and lessons from implementing the telemedicine service and hitherto use the learning to improve on future scale-up. The schematic also shows what the flow should look like when eventually the telemedicine service is fully integrated into the PHC service schedule. It is important to note that the medical mission supported all clients attended to with drugs following the telemedicine consultation. The free drug gesture by the ANPA medical mission commenced before the telemedicine services and it has continued even during the trial and pilots phases of the telemedicine services.

Phase 2 (Process & current status): In this phase, significant progress had been made and scale-up of the telemedicine services had commenced. PHCs like Opkeno and Arogba were added to the already 2 operational sites. The state government at this point, had fully committed to the inclusion of telemedicine in the schedule of PHC services in Edo State. Additionally, the state government during this phase commenced significant investment in the renovation and rebuilding of PHCs across the state. This was apparent during our field visits.

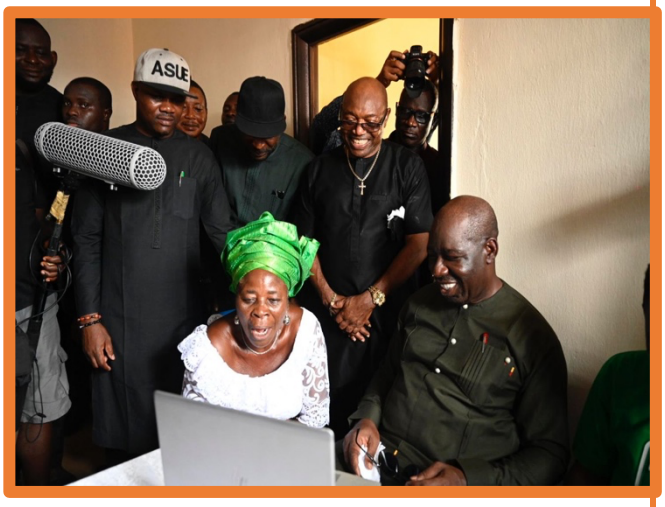
Likewise, huge investments were being made to connect about 50-80 PHCs with broadband connectivity through fibre optics infrastructure, also the PHCs were equipped with computer devices in the form of desktops in order for them to effectively and efficiently operationalize the digitization of service provision in the PHCs. The PHCs visited were setup with local area network so that the process within the PHCs were

automated with the already deployed Electronic Health Record system. The last component described is critical to the success of the telemedicine service. This strategic move by the Edo state government will completely eliminate any use of papers thereby providing seamless and timely health service to the populace.

A major ingredient for a state-wide scale-up and for the sustainable implementation of the telemedicine in Edo state, is the training of local doctors to use this innovative technology to bridge the gap in quality of care and service delivery to the ordinary citizen of edo State. Following our visit, the State government launched additional 10 operational sites (Oluku, Ovbiogie, Evbuotubu, Ugbor, Ikhueniro, Central Clinic Ukpenu, Idogbo, Ugbekun, Egua-Edaeken, and Aruogba) for the provision of telemedicine as a PHC service.

4. Scope of Service

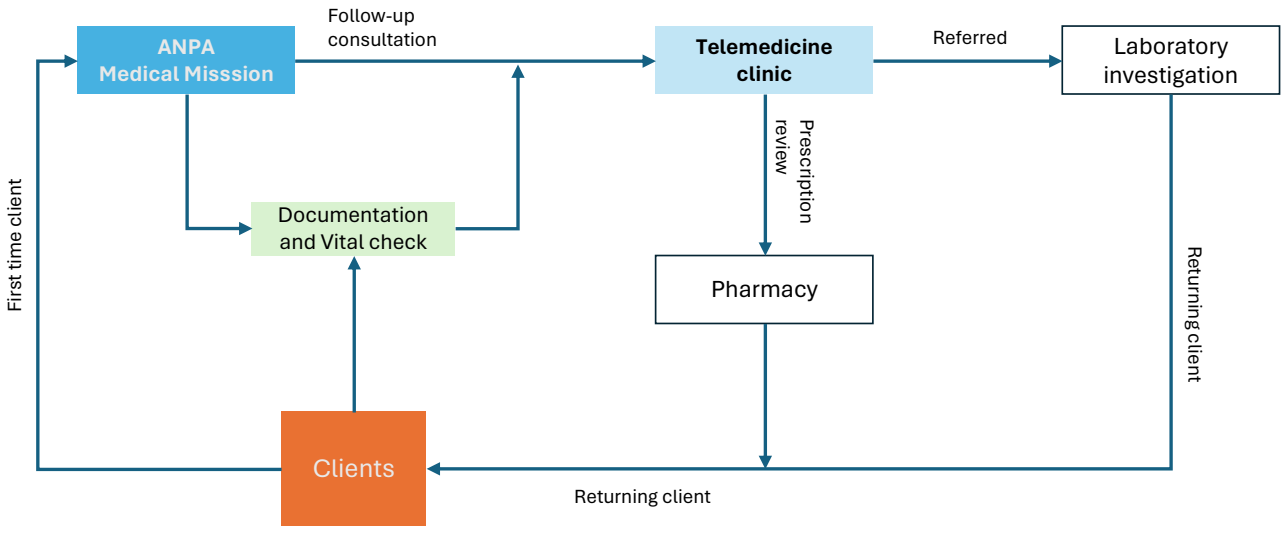
The medical mission in alignment with the state government agreed for the coverage and scope of the telemedicine clinics at the pilot phase to prioritize the elderly in the community. The age category of clients was 60 years and above. By this, it then means that the common illnessess or disease conditions afflicting people of that age category were largely of non-communicable origin. Illnesses such as hypertension, osteoarthritis, skin conditions etc were treated during each consultation. When clients arrive at the scheduled PHC facility for telemedicine consultation , they do necessary documentation includig taking of their vitals in readiness for the virtual consultation.



The clients are attended to based on first come first serve basis. They then go into a room prepared for the telemedicine clinc. They undergo their virtual consultation with Dr Philips who is in Atlanta USA. The consultation is done with the presence of one or two nurses who support Dr Philips in conducting any physical examination of the client. They also document the recommendation for laboratory investigation or review of prescription.

Noteworthy, is the opportunity for this current scope of telemedicine service in Edo state to evolve to cover all other age categories as well as specialty. The potential for the service to impact the overall quality of PHC service delivery is enormous. Schedule telemedicine clinic sessions for obsterics and gynaecology

Figure 2: Showing client flow during telemedicine consultation



5. Scale-up plan for telemedicine practice and use in Edo state

The Edo State Primary Health Care Development Agency is the government organ in the driving seat of all the telemedicine engagments in the state. The healthcare access for all agenda of the governor which includes modernization of the PHC centers, digitization and automation of healthcare processes, the provision of alternative power supply (solar) for all PHC centers, recruitment of healthcare personnel and most importantly, an unprecedented increase in budgetary allocation for health; all culminate into an enabling environment needed for the telemedicine intiative to strive.

The scale-up plan for the telemedicine initiative is led by the SmoH, from our informants, we learnt that the target is to activate as many as 80 PHCs with telemedicine services before the tenure of the current government expires. We did not see any for of plan to this effect but we were well informed that fibre optics infrastructure to these facilities were already in advanced stage (we saw some earthing work to this effect), likewise the procurement of hardwares have comenced but not concluded (these were also seen druing our visit), the digitization and automation of PHCs have also reached advanced stage (we saw the infrastructure in active use during our visit to ugbour PHC) and many more. The above outlined activites and many more are some of the efforts for the scale-up of the telemedicine services in PHCs but also for the overall enhancememt of PHC services across the state.

The launch of the telemedicine initiative on June 2nd 2022 by the state government and ANPA marked the commencement of the pilot phase with only two PHC centers in the metropolis and a commitment by the governor to extend it to hard-to-reach communities across the state. The goal is to have the telemedicine service operation in all 192 model PHCs per ward when fully functional.

6. Personnel requirements for delivery of telemedicine clinic service

The concept of developing a successful and sustainable telemedicine program is a significant undertaking that includes purchasing and deploying a telemedicine platform, testing and training all clinical and support staff, creating documentation for clinician and patients participating in the program, and finally creating a support structure to troubleshoot and resolve any technical challenges that might occur during a telemedicine encounter.[xxi]

The introduction of telemedicine into the primary healthcare service delivery framework will bring about a shift in health care delivery from in-person to telemedicine visits particularly where only follow-up consultations are required. This changes will require the health workforce to quickly adapt to new workflows. Multiple types of workers are involved in implementing telehealth technology, such as using the technology to provide clinical care or providing support services to connect patients and providers in virtual interactions.[xxii] For any healthhcare worker to be involved in the provision of telemedicine service there should be established standards and requirements that guarantees the capability of the personnel to effectively deliver professional healthcare service within a new technology-based ecosystem, that was not part of their medical trainings. Therefore, a care selection of personnel with the right skill and mind set is as important as the telemedicine idea for the successful implementation and sustainance of a telemedicine service across the Edo State.

We did not come across or sight any such standardized document for the identification, selection, onboarding and evaluation of any category of healthcare personnel partaking in the provision of telemedicine services at the pilot phase or even as a plan for the scale-up phase. The understanding that this laudable initiative will be integrated into the main frame of healthcare service delivery in Edo state should drive commitments and engagements aimed at guaranteeing its overall success and sustainability with subsequent change in government. In the course of conducting our desk review, we came across some minimum requirements that we consider valueable for any healthcare personnel to having before partaking

in the telemedicine service provision and also as a guide for the health administrators in the development of their telemedicine workforce.

Digital Literacy: In the world of telemedicine, digital literacy is the cornerstone skill. Healthcare professionals must be proficient in using various technological tools and platforms to deliver care remotely. This includes familiarity with electronic health records (EHR) systems, teleconferencing software, and mobile health apps. Being digitally literate enables healthcare providers to efficiently access patient data, communicate with patients, and monitor their health status from a distance.

Effective Communication: Telemedicine relies heavily on effective communication skills. Healthcare providers must be able to establish clear and empathetic communication with patients through virtual channels. This includes active listening, asking pertinent questions, and providing explanations in a way that patients can easily understand. Additionally, healthcare professionals should be skilled in using non-verbal cues and expressions to convey empathy and reassurance.

Telehealth Etiquette: Telehealth etiquette involves adhering to professional conduct and ethical standards in remote healthcare settings. Healthcare providers should maintain privacy and confidentiality, just as they would in a traditional clinical setting. Understanding and complying with telehealth regulations and laws is essential. Moreover, being punctual for virtual appointments and effectively managing time during telehealth consultations is crucial for providing quality care.

Clinical Competence: While telemedicine allows healthcare providers to diagnose and treat patients remotely, clinical competence remains paramount. Healthcare professionals must possess the knowledge and skills required to make accurate assessments and decisions. Continuous medical education and staying updated on the latest medical advancements are essential. Telemedicine does not replace clinical expertise but extends its reach.

Patient-Centered Care: Telemedicine places a strong emphasis on patient-centered care. Healthcare providers must prioritize the patient's needs, preferences, and comfort during virtual consultations. This includes fostering a trusting and compassionate relationship with patients, addressing their concerns, and involving them in treatment decisions. Providing patient-centered care enhances patient satisfaction and outcomes in telehealth settings.

https://usmlepreps.com/blog/news_content/215-top-5-skills-for-telemedicine-preparing-for-the-future-of-healthcare#:~:text=Digital%20literacy%2C%20effective%20communication%2C%20telehealth,path%20to%20success%20in%20telemedicine.

7. Availability of guidelines and operational tools

The implementation of telemedicine at the PHC level in Edo State has gained significant traction with several centers activated and a telemedicine hub established. Selection and training of health personnel have also been conducted for these facilities. At the time of our visit to the state, we found that there was no operational framework for the telemedicine implementation within the PHC service delivery framework. In the same vain, we couldn't find any SOP or guideline necessary for standardization of telemedicine operations across the designated centers to be provide the service.

Our research perspective of this finding could be explained by the fact that the main actors in the telemedicine operations are largely external to the business of primary health care service delivery. This in itself should be a problem. But as part of the transitioning and scale-up plan from the APNA medical mission driven service to an integrated PHC service delivery component driven by government, the development of an operational framework following a consensus buy-in by stakeholder should have taken

place before expansion to more centers. It is pertinent to note that a key sustainability component for the telemedicine service at the PHC is the involvement of secondary and tertiry facilities. While the doctors in diaspora are very much available to support the telemedicine services, the local doctors should have been engaged well before hand and part of the pilot phase. This way it, the eventual take over by government and integration into the entire health care service delivery framework becomes seamless and secured.

The development of telemedicine guidelines and SOPs within the wider operational framework for healthcare service delivery in Edo State has to carry along other collaborating health sector players such as the HMB, SHIS, non-state actors iwhich includes NGOs, CBOs and develoment actors. The synergy requires that doctors and in particular specialists who are only available at secondary and tertiary healthcare facilities are able to schedule telemedicine clinic days based on the number of PHC centers allocated to them. This also means an entire redesign of task shifting for the state health workforce across the State.

Telemedicine will continue to grow and be adopted by more healthcare practitioners and patients in a wide variety of forms not just in the traditional clinical environments, and practice guidelines will be a key factor in fostering this growth. Creation of guidelines is important to players and regulators as well as increasingly they are adopting and integrating them into regulations and policies.[xxiii]

8. Efforts at telemedicine practice in Nigeria

For this case study, several literatures were reviewed as a secondary sources of information, we realized that other states in Nigeria have tried to implement telemedicine in the broad context of telehealth. Although, the efforts are all aimed at improving access to affordable health care, the objectives and approach varied from one another. Interestingly, we found one thing in common across the states with ongoing and past telemedicine initiatives, they all had non-state actors who provided support or facilitated the implementation. This is an indication of how important collaborations can be and how it can impact program outcomes. One of the literatures reviewed provided some context to past efforts at implementing telehealth in Nigeria. See extract of that literature below.

> *..the idea isn't novel to Nigeria, as it had already emerged in the late 20th century with notable endeavours such as the HealthNet project in 1980. Another noteworthy telemedicine endeavour was in 2007 when the Federal Ministry of Health and the National Space Research and Development Agency (NASRDA) commenced action for launching a sub-network and remote terminal approach to healthcare, which began in March 2007 and was commissioned in January 2008. Despite this length of time, the concept gained little attention until 2020 due to the COVID-19 pandemic, which allowed for social distancing in various areas, including healthcare.*
>
> https://lawpavilion.com/blog/the-superficial-state-of-telemedicine-in-the-nigerian-legal-parlance/

A more recent telehealth initiative is Abia state's input in progressing the Universal Health Coverage mandate of the Federal Government of Nigeria, anchored on the e-Health policy of Nigeria, after its adoption at the 58th NCH in Sokoto in 2016, of which Abia became the pioneer state for the Project.[xxiv] A Call Center manned by Medical Doctors provided remote clinical healthcare support services to PHC providers in local communities in the state. The call center through the local healthcare worker offer, prompt consultations, health information and education to people in the comfort, convenience, and confidentiality of their own spaces, homes, offices, and shops. A summary result of a study conducted on the Abia initiative is sared below.

A study on the Abia State telehealth initiative was conducted in all the seventeen local government areas in the State at the end of a pilot that lasted 12 months. The results: 29,488 incoming calls were related to general health inquiries about basic information, counseling, and support that improved callers' knowledge and attitude towards their health, concerns, and symptoms. Also, 66.8% of all calls (19,382) were for routine health information, complaints on mild everyday symptoms, chronic disease management, and

follow-up care. About 29.6% of total calls (8751) were made by persons seeking information on socially stigmatizing topics and conditions.

There is no information on the full scale implementation of the initiative but we have duobt if the initiative proceeded beyond successive governments particularly because therre was no evidence of our the initiative was integrated into the PHC service delivery framework.

Kaduna State

9. Technological solutions for Telehealth

Additional findings from our desk review but relevant to this case study is the advent of local technology into the global telehealth space. Nigeria has one of the most vibrant technology ecosystem in Africa which could be closely linked to the large youth population and this has impacted the health sector with the development of various innovative technological solutions.

The purpose of technology in healthcare is to provide better care for patients and help achieve health equity. It increases patient safety, decreases medical errors, and strengthens the interaction between patients and healthcare providers. The use of technology increases provider capabilities and patient access while improving the quality of life for some patients and saving the lives of others.

The growing use of technology has made healthcare more accessible than ever. Nigerian telemedicine startups are transforming healthcare delivery by enabling simple access to affordable medical care. These startups provide several services, including virtual doctor consultations, prescription drug deliveries to homes, and online medical consultations. They also offer access to specialists, mental health consultations, and remote monitoring of patients with chronic conditions. Nigerian telemedicine startups are transforming healthcare delivery by enabling simple access to affordable medical care. These startups provide several services, including virtual doctor consultations, prescription drug deliveries to homes, and online medical consultations.[xxv] Some of the Nigeria owned telehealth technology available are listed in the table below.

Table 2: List of Telemedicine startups in Nigeria

S/N	HEALTH TECH STARTUP	DESCRIPTION OF STARTUP
1	Chekker	Chekker works with a lab network of vetted phlebotomists across Nigeria to provide affordable, desirable, and convenient home sample collection to your patients wherever they are.
	Doctor247	Doctor247 startup is a telemedicine platform that enables anyone to speak with a doctor about lifestyle management, women's sexual and reproductive health, or general, pediatric, or mental wellness.
2	CribMD	CribMD startup allows patients with a subscription plan to request doctors for house calls or consultations via telemedicine.
3	Tremendoc	Tremendoc startup provides a round-the-clock, all-encompassing virtual experience that offers accessible and reasonably priced healthcare services. You can have audio and video calls, chat, and consultations with doctors, specialists, therapists, and fertility experts using the Tremendoc app. You can also order surgical, laboratory, and pharmacy services.
4	Mobihealth International	Mobihealth startup, provides quality, affordable healthcareoffers several products and services, including quick online appointments, real-time video consultations, mobile clinics for remote locations, and telehealth cabins.
5	iWello	iWello startup is a startup that allows anyone in Nigeria to consult with doctors through chat, audio, and video calls on the iWello app. The platform enables anyone, regardless of income level, to obtain healthcare for as little as $1 and surgery funding while also ensuring the safety of doctors and healthcare workers.

6	HealthConnect247	HealthConnect247 startup offers access to quality and convenient healthcare 24/7 in English, Igbo, Hausa, Yoruba, and Pidgin. You can consult with doctors via phone calls on the app or its website. You can monitor health-related needs such as blood sugar, oxygen level, weight, and more, similar to the features offered by the DRO Health mobile application.
7	DRO Health	DRO startup Health allows virtual consultations with qualified practitioners, specialists, therapists, and counsellors through chat, audio, and video calls. The app can also be used to request radiology, laboratory, and pharmacy services.
	JEAY Healthcare	JEAY startup provides telemedicine solutions for primary care, mental health, and sexual and reproductive health. Patients can consult a doctor about issues relating to these healthcare services via the platform's video, audio, or messaging options.
	Clafiya	Clafiya startup provides online consultations with physicians and nurses. Clafiya also links users with community health workers who can deliver basic healthcare at their homes or workplaces.

Lessons Learnt

The lessons learnt from this case study are drawn from our first-hand experience during observation of telemedicine practice in the PHC center. There are several challenges observed and documented during some of our interviews, some of these challenges we have discussed as findings but also captured as lessons learnt for the purpose of emphasis and additional context.

Political Commitment

Health remains the only sector with overbearing impact on the growth and economic prosperity of a nation. The current political environment in Edo State is a veritable substrate for healthcare development. And this was observed during our visit to the state. The investment in the health sector transversed all aspects of healthcare service delivery ranging from a world class school of nursing to a healthcare hub with best class infrastructure, upgrades of primary health care center and the telemedicine practice.

> *"Universal Health Coverage is a matter of political commitment."*
> *Director-General of the World Health Organization, Dr Tedros Adhamon*

Evidence has shown that Universal Health Coverage can only be achieved with a strong political commitment which translates into adequate funding and political oversight. It is therefore imperative that states planning to adopt telemedicine as a service delivery approach should ensure high level of political commitment exist before embarking on a telemedicine practice.

Infrastructure (Devices & internet Network)

Unlike the standard PHC service delivery approach, telemedicine practice has several requirements that are intrinsic and extrinsic to its successful operation. Besides the skill sets for technology use being a little above just normal use of phone, the use of the skills in an ethical way is very key to the use of the technology for service delivery. The device requirement was discussed under 'findings' above, the cost of device is one-off and requires basic skills for the maintenance. However, the application that runs on the devices have a recurring cost. Software application such as the EHR and telemedicine apps are third party assets that require monthly or yearly subscription for the telemedicine service to run efficiently.

The broadband internet is an extrinsic component, without which the entire system will not work. It is equally important to ensure that the internet service to be linked to the system are reliable, fast and is cyber protected. Fiber optics broadband is the most reliable supply of internet with fast reliable internet, but it is expensive to setup plus the recurrent subscription cost. Other forms of internet exist but they all have recurring cost plus the fact that they are not as stable and as reliable as the optics fiber.

It is therefore important that a careful review of the various components is made, and adequate funding provision is made to sustain the service.

Power supply

Electricity supply at both ends- provider and clients is very critical to the overall success of the telemedicine practice. Where electricity from the national grid exists, we recommend that a reliable backup supply should be put in place whether as solar or generator. While making this decision on what backup is required, it is important also to consider the associated cost of running some of this alternative. The telemedicine practice as several dependance on extrinsic elements without which it will fail. Very much like the internet, electricity whether as grid or as generator have recurring cost that should be factored into the planning of the telemedicine service.

We recommended a dedicated power bank at the PHC center for powering the telemedicine session otherwise a whole PHC center solution might be the solution. In essence, the grid supply is to the entire PHC center but a dedicated backup at low cost can be provided and only operation when there is a telemedicine session. In summary, a lot of thinking should be invested in the design of an electricity supply that is constant and stable.

Choice of telemedicine:

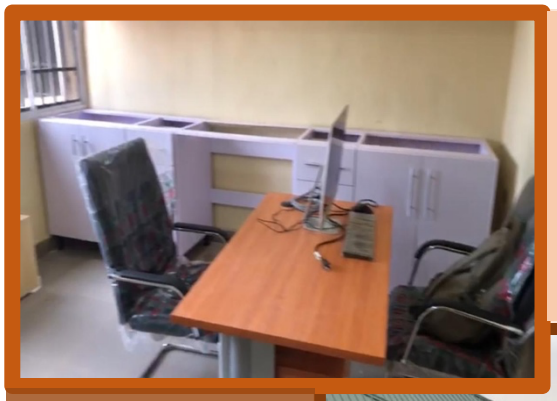
From this study, we found out that telemedicine comes in different forms and the choice of the form to be used is largely dependent on the problem being solved, availability o funding and sustainability. The telemedicine being used in Edo state is the synchronous type primarily because of the live interactions. Other forms of telemedicine do not necessarily require live video feeds to achieve their communicate.

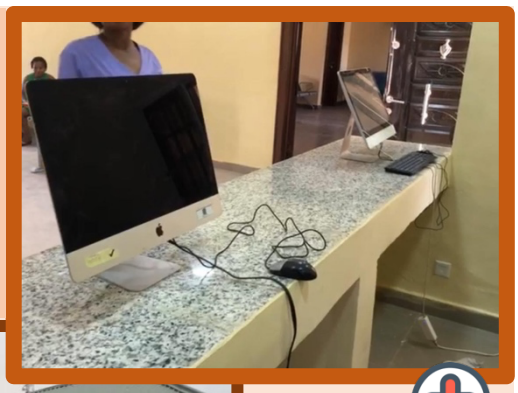
Synchronous telehealth solutions are apps that support a two-way audiovisual connection between a patient and a healthcare provider. They substitute in-person appointments with the help of video conferencing.

Asynchronous telehealth applications transmit recorded medical history to a health practitioner. They don't connect patients and clinicians directly. Patients just upload their data to the platform enabling clinicians to follow the treatment progress.

This explains the Abia state attempt at using asynchronous telemedicine for providing healthcare to its populace. No matter what type of telemedicine a state decides to use, it is pertinent to make sure it meets all ethical standards, has a robust legal framework to protect the patient as well as the healthcare provider and it can address issues of affordability, accessibility and quality care.

	Synchronous	Asynchronous
Communication	Real time	To-and-from interactions
Key Features	Video Conferencing	Data uploads and exchange
Patient's Benefits	Opportunity to speak to the doctor and get emergency help	No language and cultural barrier
Provider's Benefits	Limited resource hospitals can disuss clinical cases with other teams	Effective in fields that require imaging



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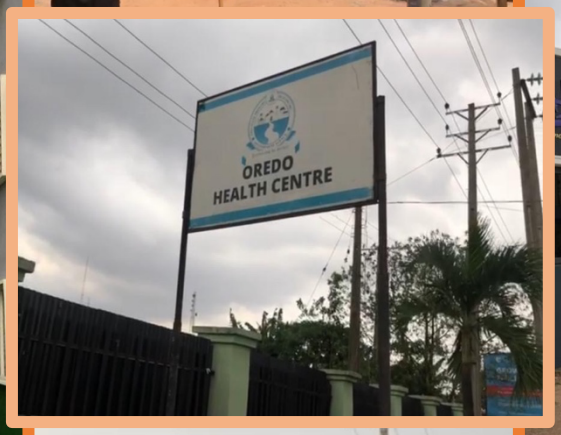
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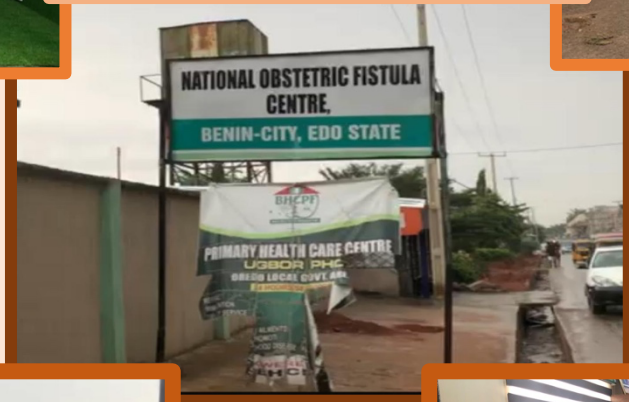
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Recommendations

Recommendation for setting up a telemedicine service at the primary health care level

Step 1: Needs Assessment for remote consultation and healthcare service delivery

Before embarking on a telemedicine project, it is important to clearly define the problems you intend to solve while also looking at the potential fallout from adopting the intervention in the first place. The assessment preferably shoud be commissioned by the government but executed by a third party independent agency. The assessment should consider a number of things in order to achieve the goal for which it was commissioned for. Some of the key areas for consideration in the assessment should include.

- Target beneficiaries: Defining the potential beneficiaries of the telemedicine services (who are they, where are they, how will they access the service, will the innovation appeal to them psychologically etc.)
- Dimension of healthcare services: What healthcare services can be effectively delivered through the innovation?
- Service deivery personnel requirement: What category of personnel are required to efficiently deliver the service (this would include but the technology andnhealth specialist) and if they are readily available?
- Device and infrastructure requirement: What kinds of equipment and infrastructure is required and are the resources there to acquire them)
- Political commitment: Is the political commitment substantial to kick start, execute and sustain ?
- Design & deployment expertise: Are there experts to support the state in the set up of the system?
- Understanding potential impact pathway:
- Cost benefit analysis:

The outcome of the assessment will determine whether the state will be proceeding or not looking at how best to modify the innovation to fit into the current circumstances.

Step 2: Developing a medical framework

A critical component of telemedicine is the availability of specialist to provide the heathcare service. The introduction of telemedicine clinic into the already overloaded schedule of the specialist needs to be carefuly considered. Understanding the scope of service they will provide, how it will be provided to make the desired impact and how they will be compensated for it since it is outside of theire current work scope. All of these questions and more needs to be addressed.

A consultation of all actors in the spcae must be undertaken with a view to develop a framework for the involvement of tertiary and secondary care service providers in providing specialist consultation via telemedicine. This action will require a major policy review and legislative intervention for full compliance and domestication. This step should help you achieve the following.

1. Identifying medical specialist at second and tertiary care that should be involved and to what extent
2. Understanding how the services will be provided
3. Agree on when the services will be provided

4. Develop the important framework for integrating the three tiers of health care services through telemedicine
5. Understand the modalities for compensating the medical specialist involved in the service
6. Finally, defining the legal framework for overall success and sustainability of the service

Step 3: Assessing the political environment

Although this step also falls within the needs assessment to be conducted in Step 1, we have included here as a separate step to further amplify the important of political commitment. What has happened so far in Edo states was largely possible due to strong political commitment. This commitment was demonnstrated in the following ways

1. Setting healthcare as a priority agenda item
2. Non-interferance with decision of the experts
3. Provision of adequate funds to implement expert recommendations
4. Willingness to address all other challenges in within the health sector
5. Hiring the right people for the job

Political commitment is the singular most important input for the overall success of your telemedicine initiative or any other initiative. The health commissioner and other political appointees in the health sector are also critical for driving home the commitment of the governor.

Step 4: Establish a framework for implementation of a pilot

With steps 1-3 secured, you are ready to kick-off. We recommend you start off with a pilot. The scope of the pilot can vary depending on the scope defined in the design of the pilot. But we recommend that you choose a small size reflecting distinctive geographical peculiarities of the state. Some of the key consideration in to make in developing a framework

1. Determine what type of telehealth you plan to implement
2. Determine the cadre of personnel to be involved
3. Define your inclusion criteria for the PHC centers to be involved in the pilot
4. Develop your data tools for documentation of data ouputs from the pilot
5. Identify on the scope of service to be provided by the telehealth initiative
6. Determine the category of patients that will be part of the pilot
7. Determine what resources you require for procurrement of equipments, data etc etc.
8. Put together an implementation team for the pilot
9. Identify and secure external funding source for the pilot study
10. Finally, determine the duration of the pilot.

Being able to implement the pilot with minimal funding commitment from the state government will goa long way in the implementation if the pilot

Step 5: Engagement with the State Executive Council

This is another important milestone in the implementation of the telemedicine initiative. The health commissioner being part of the State Executive Committee would have sounded the idea of a telemedicine initiative with the executive governor and try to get buy-in at that level. The outcome of the needs assessment as well as the pilot implementation can be put together and covered with a memo for submission to the State Executive Council.

The health commissioner will present the report and memo to the council and secure a concurrence. It is important that the members of the council absolutely understand how much political capital can be

derived from this programmatic intervention and how that can potentiate the government's agenda on health. The approval of the commissioner's proposal by the council for a full scale implementation should be backed by funding and an approval for engagement to engage the state assembly for necessary legislative engagement. The engagement with the State Executive Council should achieve the following.

1. Concurrence and approval for full scale implementation of the telemedicine
2. Approval for set up of an implementation committee
3. Approval for engagement with the state assembly

Step 6: Setup of an implementation committee

The implementation committee is setup and approved by the executive governor to provide required oversight and leadership for the successful implementation of the telemedicine initiative. The committee should be under the leadership of the health commissioner. The committee function should be include but not limited to the following.

1. Development and review of needed policy and legislative framework for the telemedicine implementation with the state health system
2. Design and development of operational framework for implementation of telemedicine within healthcare system
3. Design and development of guidelines and SOP for personnel
4. Development of a training plan for personnel
5. Development of a roll-out plan for the actual implementation of the telemedicine
6. Development and deployment

The implementation committee will put all necessary things in place, secure funding and roll-out implementation. We recommend the implementation to be done in clusters, maybe by geopolitical zone. A phased roll-out will allow for evaluation of the implementation and makinng necessary review along the way.

Step 7: Development of legal framework

Telemedicine, being technology-driven, faces heightened security risks, and requires strict compliance with data protection measures. The Nigeria Data Protection Act, 2023, and the Nigeria Data Protection Regulations, 2019, outline the responsibilities of providers in managing and processing patient data securely. The MDCN's Code of Medical Ethics further requires practitioners to safeguard data security during electronic transmission, emphasizing the need to prevent unauthorized access or data interception.

In terms of service quality, telemedicine providers are expected to ensure that their medical devices and healthcare software meet ISO standards and comply with the provisions outlined in the Standard Organization of Nigeria (SON) Act 2015. Additionally, the delivery of services must uphold patient rights as outlined in the Patients' Bill of Rights and consumer rights under the Federal Competition and Consumer Protection Act, 2018, during service delivery. Overall, telemedicine practitioners must comply with ethical principles outlined in the Code of Medical Ethics. [xxvi]

Based on several considerations some of which are outlined above, we recommend an extensive review of all related and existing legal provisions as well as any best practice from a global context.

Step 8: Development of operationl framework and other tools

For the safe and ethical conduct of any practice, particularly one such has telemedicine, there is the need for an extensive definition of the operational environment for its professional use. The operational framework has to take several dimensions into consideration, that way nothing is left out. Some of the dimention to consider are.

1. Operational environment (in this case the PHC)
2. The Client
3. The service provider (in this case the physician)
4. The support staff (in this case the nurses, CHW)
5. The Linkage between the primary, secondary and tertiary facilities
6. Data management
7. Personnel Workload etc.

The operational framework when fully developed will at the end of the day provide the framework for the development of implementation tools such as guidelines and SOP. The implementation tools are derivatives of the operational framework that ensures the implementation of the framework. There are several component derivatives involved in the operational framework of telemedicine practice and some of them are;

- Training manuals for telemedicine providers
- Guidelines on professional conduct during consultation
- Guidelines on reporting of equipment malfunctions
- Confidentiality of telemedicine consultations
- Third party viewing of live telemedicine consultants

Conclusion

The application of telemedicine in Edo State PHC centers is the right step in the right direction if the state is to achieve universal health coverage Considering the need to ensure no one is marginalized regardless of their distance to a secondary or tertiary facility where they can access specialized care at little or no cost to them. The introduction of telemedicine into primary care as a service will be the first of its kind in Nigeria and provides a springboard for the actualization of accessible care for all as well as the digitalization of the healthcare services. However, this opportunnity is not without the challenge of a high cost of setting up and an added burden of building an ecosystem for the sustained application and learning from its use.

Globally, telemedicine and virtual care technology have demonstrated numerous benefits for patients and healthcare professionals. The low doctor-to-patient ratio in Nigeria makes telemedicine an essential tool in health care delivery. Telemedicine improves healthcare access in rural and underserved areas while also ensuring the efficient use of the skills of healthcare professionals. Telemedicine systems also limit unnecessary human exposures and foster high-quality care. Telemedicine can be used to manage the challenges facing healthcare systems in the event of future outbreaks.[xxvii]

Some other benefits of telemedicine include

- Geographical Barriers: Nigeria is a large country with many rural and remote areas where access to healthcare facilities is limited. Telemedicine helps bridge the gap by allowing patients to consult with doctors without needing to travel long distances.
- Shortage of Healthcare Professionals: There is a significant shortage of doctors, specialists, and healthcare workers in Nigeria. Telemedicine allows for more efficient use of available healthcare professionals by enabling them to reach more patients.
- Cost of Healthcare: Healthcare can be expensive, and many Nigerians cannot afford regular visits to doctors or specialists. Telemedicine can reduce costs associated with travel and clinic visits, making healthcare more accessible and affordable.
- Timely Access to Care: Telemedicine provides timely access to medical advice and consultations, which can be critical in emergencies or for conditions requiring prompt medical attention.
- Telemedicine can provide timely access to healthcare services, reduce waiting times, and improve patient outcomes.
- Education and Training: Telemedicine platforms can also be used for the continuous education and training of healthcare professionals, particularly in remote areas, helping to improve the overall quality of care.
- Infrastructure Challenges: Many healthcare facilities in Nigeria are under-resourced and lack essential medical equipment. Telemedicine can provide access to specialists and advanced medical advice without the need for extensive physical infrastructure.
- Epidemic and Disease Outbreaks: During epidemics or disease outbreaks, such as the COVID-19 pandemic, telemedicine has proven crucial in reducing the risk of infection by minimizing the need for in-person consultations and allowing for remote monitoring and treatment of patients.
- Improved Chronic Disease Management: Telemedicine facilitates better management of chronic diseases by enabling regular follow-ups and monitoring of patients, thus improving their quality of life and reducing hospital admissions.

We are opined that the right use of technology in the best interest of mankind will go a long way in assuring better quality of life. The telemedicine is an eye opener to the possibilities that technology brings into the bridging the gap that exist in the healthcare space.

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