Chapter

6

# Health infrastructure and equipment

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## Abbreviations

BHCPF..... Basic Health Care Provision Fund
BPE ..... Bureau of Public Enterprises
CHE..... current health expenditure
CSO..... civil society organization
DPRS ..... Department of Planning, Research and Statistics
EMS..... emergency medical services
FCT..... Federal Capital Territory
FGN ..... Federal Government of Nigeria
FMOH..... Federal Ministry of Health
LGA..... local government area
MDAs..... ministries, departments and agencies
NBTDA ..... National Biotechnology Development Agency
NEMSAS..... National Emergency Medical Service and Ambulance System
NEMT..... national emergency medical treatment
NGO ..... nongovernmental organization
NHA..... National Health Act
NHIA..... National Health Insurance Authority
NHP ..... National Health Policy
NSHDP ..... National Strategic Health Development Plan
NSHDP II ..... National Strategic Health Development Plan II (2018–2022)
NNRA ..... Nigerian Nuclear Regulatory Authority
NPHCDA ..... National Primary Health Care Development Agency
NSIA ..... Nigeria Sovereign Investment Authority
PHC..... primary health care
PPP ..... public–private partnership
SMoH ..... state ministry of health
SON ..... Standards Organisation of Nigeria
SOP..... standard operating procedure
TB..... tuberculosis
WHO..... World Health Organization

## Chapter 6 key messages

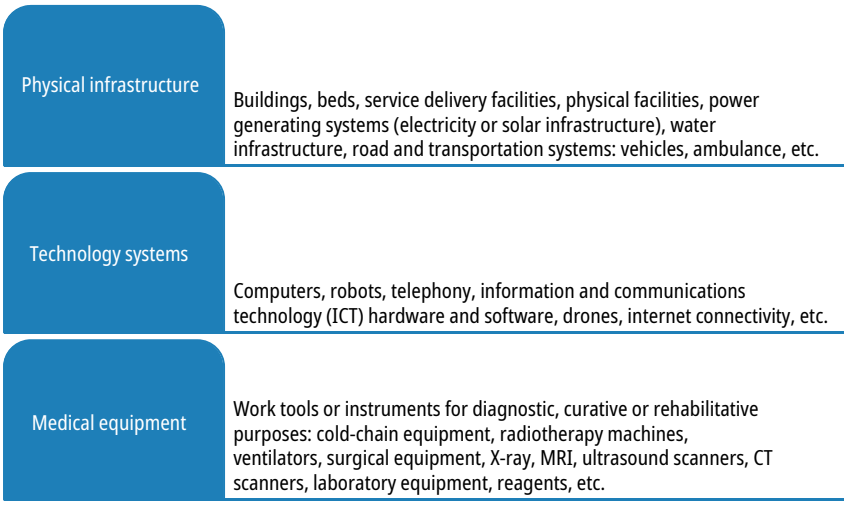
- About 80% of Nigeria's public health infrastructure is dysfunctional, which impedes the country's ability to provide health care to its citizens and leads to losses of about US$ 1 billion annually to outbound health tourism.
- Insufficient funds, the absence of plans for equipment maintenance and inadequately trained personnel exacerbate the poor state of the health infrastructure and equipment nationwide.
- Development partners have filled gaps in the provision of laboratory, diagnostic and medical equipment. Several funded programmes – such as those for malaria, HIV/AIDS and tuberculosis – provide laboratory consumables, diagnostic kits and machines.
- Policies and guidelines governing health care infrastructure and equipment are dispersed across various health-related laws and guidance. The absence of an overarching national policy has contributed to the poor distribution and allocation of health care facilities within states and across the country.
- Private health care providers deliver an estimated 70% of the health care services in the country. However, the regulation and monitoring of the sector by the government is weak, and the enforcement of standards and compliance is limited.
- The Basic Health Care Provision Fund offers a predictable funding window for infrastructure and equipment, including emergency ambulance services, but the overall level of investment is too low to maintain functionality.
- Existing government reforms to address health infrastructure gaps – including the Central Bank of Nigeria's intervention fund, public–private partnerships and concessionary arrangements – have produced mixed results.

# 6.1 Infrastructure policies

## Categories of health infrastructure and equipment

Health infrastructure encompasses physical structures and the technologies and medical equipment needed to deliver health care services for diagnostic, curative or rehabilitative purposes (FMOH, 2019a). These are set out in Fig. 6.1.a.

**Figure 6.1.a** Health infrastructure categories




**Source:** FMOH, 2018b
**Notes:** CT = computed tomography; MRI = magnetic resonance imaging.

## National norms and standards

Health care facilities and services are categorized hierarchically into primary, secondary and tertiary health institutions, predominantly serving rural populations, mixed populations and urban dwellers, respectively. The National Health Act (NHA) regulates health establishments and technologies, including by issuing certificates of standards to health facilities, while the Federal Ministry of Health (FMOH) has developed basic equipment requirements for a minimum care package across the three tiers of health care delivery. The National Tertiary Health Institutions Standards Committee oversees teaching hospitals and

federal medical centres, while the National Primary Health Care Development Agency (NPHCDA) conducts facility assessments of primary health care (PHC) facilities, including of their infrastructure and equipment. The states' hospital management boards and the health facility monitoring and accreditation agencies are responsible for registering and supervising the operations and standards of public and private health care establishments. However, the regulation and monitoring of private health care providers by the government is generally weak, and enforcement of standards and compliance is limited. As a result, the quality of infrastructure, personnel and services in private health facilities is difficult to assess (Obasanjo et al., 2016). Health promotion personnel in departments and units within health facilities ensure the functionality of service delivery hardware, while coordinating committees at different levels ensure the development, adaptation and review of guidelines regarding infrastructure and equipment management.

## Distribution of health infrastructure and equipment

Policies and guidelines on health care infrastructure and equipment, and their construction, geographical distribution and procurement, exist in several health-related laws, administrative policies and programmatic guidelines issued by the Federal Government of Nigeria (FGN). But the absence of an overarching national policy has contributed to poor distribution and allocation of health care facilities and services. This leads to underutilization of public health facilities (usually situated in rural communities) and other facilities (usually located in urban centres) being overstretched. As a result, Nigeria's health infrastructure cannot deliver the quality and level of care that citizens need. Consequently, the country loses about US$ 1 billion annually to outbound health tourism due to the paucity of infrastructure and expertise for managing complex surgery, cardiology, neurology and cancer (Adeoye, 2023)

The NHA provides overall strategic direction, while the National Health Policy (NHP) provides for a well-distributed network of health care infrastructure that meets quality and safety standards, including compliance by health facilities regarding biomedical equipment and its maintenance. The National Strategic Health Development Plan II (2018–2022) (NSHDP II) provides guidelines for health programmes, including the strengthening of infrastructure and equipment (see Table 6.1.a and Chapter 2, Section 2.2, for further details).

## Procurement and management of health infrastructure and equipment

The FGN, through the FMOH and other ministries, departments and agencies (MDAs), formulates national health policies. The states and local government areas (LGAs) contextualize these policies to reflect their respective contexts. Existing policies addressing health infrastructure and equipment are summarized below (see also Chapter 2, Section 2.5, and Chapter 3, Section 3.1).

## Acceptance, distribution and use of donated infrastructure and medical equipment

The International Cooperation Unit of the Department of Planning, Research and Statistics (DPRS) of the FMOH is responsible for coordinating international cooperation and collaboration on health with development partners, civil society organizations (CSOs) and other health actors (FMOH, 2020a). Specifically, the unit:

- registers nongovernmental organizations (NGOs) active in the health sector;
- monitors, collates and disseminates reports on the activities of health NGOs in the country.

Generally, equipment donations for donor-funded projects form an integral part of intervention projects. The extent to which the unit is involved in, or influences, the donation and deployment of project-specific equipment could not be ascertained.

**Table 6.1.a** Summary of infrastructure and equipment laws and policies

| Policy | Date introduced | Objective | Implementation challenges | Source |
|---|---|---|---|---|
| National Health Act (NHA) | 2014 | • Provides a framework for the regulation, development and management of the health system, including standards for facility construction and delivering health care services across the country<br>• Regulates and standardizes health establishments, infrastructure, technologies and equipment<br>• Issues certificates of standards for health facility structures and premises<br>• Established the National Tertiary Health Institutions Standards Committee to monitor and enforce quality compliance and standards of tertiary health care institutions<br>• Created the BHCPF | • Regulation and monitoring of private health care providers by government is weak, and enforcement of and compliance with standards are limited, making quality of provision in the private sector hard to assess | FGN, 2014 |
| National Health Policy (NHP) | 1988; 2016 | • Addresses facility management and maintenance as well as the standardization and distribution of health infrastructure<br>• Provides for upgrading health infrastructure and security systems in institutions that handle biological agents of public health importance<br>• Requires the upgrade of health infrastructure and technologies in at least one tertiary hospital in each geopolitical zone<br>• Stipulates standards for injection safety and disposal, cold-chain equipment and inventory requirements for immunization service delivery | • Absence of an overarching national policy has contributed to poor distribution and allocation of health care facilities and services, leading to underutilization | FMOH, 2016d |

**Table 6.1.a** Continued

| Policy | Date introduced | Objective | Implementation challenges | Source |
|---|---|---|---|---|
| National Health Insurance Authority Act (NHIA Act) | 2022 | • Replaced the National Health Insurance Act of 2004<br>• Sets out the provision and maintenance of ICT infrastructure for the integration of national and state health insurance scheme data | | FGN, 2022c |
| National Health Promotion Policy (NHPP) | 2006; revised in 2019 | • Addresses the poor health infrastructure across Nigeria that limits access and jeopardizes service provision efficiency<br>• Sets standards and guidance on health promotion at various levels to address infrastructural deficits and maintenance<br>• Defines health promotion divisions at the FMOH and state ministry of health (SMoH) levels and health promotion units, to oversee infrastructure and equipment maintenance, at the LGA level | • Poor infrastructure and limited technological capacity continue to impede health care delivery due to the absence of overarching policy, guidelines and operational procedures and the lack of effective enforcement and oversight mechanisms, in addition to other systemic challenges | FMOH, 2006 |
| National Strategic Health Development Plan II (2018–2022) (NSHDP II) | 2010; revised in 2018 | • Reflects the strategic health development plans (SHDPs) of the 36 states and FCT and provides a federal-level SHDP aimed at coordinating the health sector<br>• Promotes strategies for improving the availability and functionality of health infrastructure required at all levels of care delivery<br>• Guides the formation of norms and standards for health infrastructure<br>• Provides for capacity strengthening and partnerships for health infrastructure maintenance and management | • National health strategies are prone or susceptible to uneven implementation across the country because health is on Nigeria's Concurrent Legislative List whereby federal health laws and regulations are essentially advisory and subnational entities may or may not adhere strictly to the provisions | FMOH, 2018b |

**Table 6.1.a** Continued

| Policy | Date introduced | Objective | Implementation challenges | Source |
|---|---|---|---|---|
| Public–Private Partnership (PPP) Policy established by the Infrastructure Concession Regulatory Act | 2005 | • Promotes equity, efficiency, accessibility and quality in health care through collaboration between the public and private sectors<br>• Promotes PPP models and infrastructure concessionary arrangements<br>• Fosters joint facility management, basket funding and has an impact on investments (FMOH, 2005a).<br>• Sets out proposal for the Nigerian Health Infrastructure Development Bank to facilitate the acquisition and maintenance of health infrastructure and equipment | • The adoption and implementation of the PPP model by many states across the country have been quite limited due in part to sociopolitical and economic considerations, which oftentimes do not sufficiently prioritize population health, health care infrastructure and equipment | FMOH, 2005a |
| The Public Procurement Act and Policy | 2007 | • Guides procurement of infrastructure and equipment by the health MDAs<br>• Provides for policies, guidelines and practices related to the acceptance, distribution and use of donated infrastructure and medical equipment | | FGN, 2007 |
| Guidelines on Medical Equipment Management in Nigeria | 2005 | • Guides the selection, procurement, installation and maintenance of medical equipment<br>• Provides for the calibration of diagnostic equipment<br>• Supports the environmental and occupational safety of infrastructure/ equipment and staff | • An overarching plan for the provision and distribution of diagnostic and medical equipment does not exist and public and private operators implement their own respective plans due to the lack of effective guidance or oversight mechanisms | FGN, 2005a |

**Notes:** BHCPF = Basic Health Care Provision Fund; FCT = Federal Capital Territory; ICT = information and communications technology.

## Oversight of investment decisions, regulation and enforcement

Health care services are decentralized, with government and non-state actors participating at different levels. Accordingly, investment decisions, regulation and enforcement vary. The national and state legislatures and the supervisory councillors for health at the LGA level make investment decisions, develop regulations and perform oversight functions. Moreover, the Ministry of Defence, private operators and non-profit organizations, including faith-based organizations, make substantial contributions to health care, including through the provision of infrastructure. Oversight functions on the implementation of infrastructure and equipment types and standards in health facilities are performed by the authorities responsible for their registration and accreditation.

The agencies involved and their roles are outlined below.

The **Federal Ministry of Health (FMOH)** is responsible for policy-making, regulation, strategy and oversight in the health sector. Through its parastatals (the NPHCDA, National Agency for Food and Drug Administration and Control, National Health Insurance Authority (NHIA) and the Nigeria Centre for Disease Control and Prevention), it provides policies on resource requirements (human, infrastructure, materials and equipment) for health service delivery. The Health Promotion Division of the FMOH facilitates compliance with regulations on infrastructure and equipment, for both public and private health operators.

The **National Primary Health Care Development Agency (NPHCDA)** was merged with the National Programme on Immunization in 2007, and makes decisions on the procurement of goods and services for PHC, including the set of minimum standards for PHC facilities in the following areas: health infrastructure dimensions, furniture and medical equipment (NPHCDA, 2010). It also produces guidelines for the administration, disbursement and monitoring of the Basic Health Care Provision Fund (BHCPF).

The **National Health Insurance Authority (NHIA)**, introduced in 2021, replaced the defunct National Health Insurance Scheme, launched in 2004. The NHIA regulates health maintenance organizations (FGN, 2022c), while its flagship BHCPF ensures vulnerable Nigerians have access the basic minimum package of health services provided by PHC centres and secondary facilities.

The **Basic Health Care Provision Fund (BHCPF)** was created under the NHA to promote the provision of high-quality health infrastructure for PHC in line with the NHP (see Chapter 2, Section 2.5). Specifically, 25% of BHCPF resources are reserved for procuring drugs and equipment and 15% for the provision and maintenance of facilities and equipment for and transport to PHC facilities (FMOH, 2020a). The maintenance component of the BHCPF caters for the renovation and maintenance of infrastructure and equipment (FMOH et al., 2020).

The **National Emergency Medical Treatment Committee** provides integrated emergency medical and ambulance services. It maps state-level emergency assets and infrastructure such as ambulances (public and private), as well as the provision of infrastructure, equipment for the operation of medical emergency response centres, personal protective equipment and standard operating procedures (SOPs).

The **Standards Organisation of Nigeria (SON)** was established in 1990 for the determination and approval of standards relating to products, measurements and materials, including the certification of products, the improvement of measurement accuracy and the circulation of information relating to standards. SON regulates and enforces standards in relation to technologies, equipment and non-drug consumables (SON, 2020).

The **Nigerian Nuclear Regulatory Authority (NNRA)** registers, licenses, inspects and enforces nuclear safety and radiological practices, ensuring the safety and security of radioactive sources and nuclear materials. It also regulates nuclear diagnostic and interventional services, radiotherapy services, nuclear medicine, and X-ray and radioimaging services, among other things.

The **National Biotechnology Development Agency (NBTDA)**, through its medical biotechnology, genetics, genomics and bioinformatics departments, provides solutions for infectious and non-infectious diseases. It deploys recombinant technology for relevant application in health care products and transgenic animal development, and for the discovery, design and development of novel molecular diagnostic protocols and point-of-care diagnostics.

**Priority disease control programmes** ensure that diseases of public health importance, of which there are several, receive priority attention from

the FGN through agency-level interventions. These include the National Tuberculosis, Leprosy and Buruli Ulcer Control Programme; the National Malaria Elimination Programme; the National Agency for the Control of AIDS; and the National AIDS and Viral Hepatitis and STIs Control Programme (see also Chapter 2, Section 2.2). A number of these funded projects have a health systems strengthening component, which entails ensuring that equipment supplies (e.g. testing machines and kits) are sufficient and refurbishing or upgrading facilities.

**Health professional regulatory and accreditation agencies** set standards for, monitor and oversee the medical and health professions. They enforce government laws and standards of practice. These include the Medical and Dental Council of Nigeria, Pharmacy Council of Nigeria, Nursing and Midwifery Council of Nigeria, Radiographers Registration Board of Nigeria and Medical Laboratory Science Council of Nigeria.

**State governments** make decisions and investments to ensure that National Strategic Health Development Plan (NSHDP) objectives are achieved. Adherence to health policies and programmes set out by the FGN through the FMOH is usually managed through the National Council on Health, the Governors' Forum and the Nigeria Health Commissioners' Forum. National health laws and guidelines, among other instruments, are domesticated by the states according to their respective contexts. The state ministries of health (SMoHs) are responsible for the registration, monitoring and enforcement of standards for health facilities (public and private), including their infrastructure.

The **local government areas (LGAs)**, of which there are 774 across the 36 states and the Federal Capital Territory (FCT), are responsible for the PHC facilities through the supervisory councillors for health and health departments. In addition, community structures such as ward development committees, village development committees and health facility committees bear the responsibilities of demand creation, monitoring accessibility and ensuring a high quality of health service delivery, and community mobilization and participation.

## 6.2 Planning, availability and distribution of health infrastructure and equipment

The distribution of health care infrastructure and medical equipment operationally reflects a hierarchical pyramid, with PHC centres being less well equipped than tertiary hospitals, which possess advanced machines and highly skilled personnel. Equipment inadequacies and the lack of capacity for local manufacturing of consumables cause operational challenges at all levels. In line with Nigeria's decentralized model, the planning, provision and distribution of health infrastructure and equipment are determined by facility ownership (governments at the federal, state and LGA levels, and private and not-for-profit operators).

### Infrastructural planning

#### Government agency oversight

Health infrastructure planning is decentralized to the federal, state and LGA levels. The Department of Hospital Services produces policy guidelines (assessment checklists) for the various units of tertiary health facilities. The federal health institutions are semi-autonomous, with their own boards that oversee their operations, including the provision and maintenance of infrastructure and equipment. The BHCPF requires that, to access its funding, states should identify one functional PHC centre per political ward for accreditation and issuance of a certificate of standards. The BHCPF also provides guidelines on physical infrastructure planning for the PHC centres. According to NSHDP II, infrastructure and equipment departments and units ensure the functionality of health infrastructure and equipment. Infrastructural coordinating committees contribute to the development, adaptation and review of policies and guidelines regarding infrastructure and equipment maintenance.

#### Long-term planning

A long-term national plan for the expansion of health care infrastructure is contained within the strategic plans of respective health MDAs. Owners of health facilities at the different levels make strategic decisions based on their respective objectives and organizational mandates. According to the Presidential

Health Sector Reform Committee, long-term options include developing public–private partnership (PPP) models within specific services (e.g. laboratories or radiology) or for selected hospitals. The Lancet Nigeria Commission (Abubakar et al., 2022) has recommended setting national standards for the digitization of health records and boosting disease testing infrastructure, including point-of-care test kits at the PHC level (Abubakar et al., 2022). Finally, the National Development Plan (FGN, 2021a) proposed mainstreaming accountability in planning and budgeting for medical procurement (FGN, 2021a). One of four agenda points of the FMOH is to bolster Nigeria's pharmaceutical and health care manufacturing capabilities to reduce the country's current reliance on imports for about 70% of its pharmaceuticals (Public Health Journal, 2024).

### Laboratory, diagnostic and medical equipment

Effective laboratory, diagnostic and imaging infrastructure is critical to the provision of high-quality health care services. However, poor fund management, dilapidated infrastructure and limited technological capacity (see Table 6.2.a) currently impede health care delivery. For example, the numbers of computed tomography, radiotherapy and mammography units per million women in

**Table 6.2.a** Census of radiology equipment in Nigeria

| Equipment type | Current estimate | Year estimate was computed |
|---|---|---|
| X-ray | 5000 | 2006 |
| CT | 183 | 2018 |
| MRI | 58 | 2018 |
| Ultrasound | 4500 | 2018 |
| Mammography | 180 | 2018 |
| Fluoroscopy | 28 | 2018 |
| LINAC | 5 | 2017 |
| Cobalt-60 machine | 3 | 2016 |
| SPECT | 3 | 2016 |

**Source:** Idowu and Okedere, 2020

**Notes:** CT = computed tomography; LINAC = linear accelerator; MRI = magnetic resonance imaging; SPECT = single-photon emission computed tomography.

Nigeria are far below the World Health Organization (WHO) African Region average (Obasanjo et al., 2016).

Medical imaging services are provided by both public and private operators. Generally, radiology practice is constrained by an erratic power supply, equipment acquisition costs, maintenance downtime and spare parts availability (Idowu and Okedere, 2020). An overarching plan for the provision and distribution of diagnostic and medical equipment does not exist, and public and private operators implement their own respective plans. SON, the NNRA and the NBTDA are also involved in the regulation of infrastructure and equipment related to medical laboratory and imaging services.

### Donated physical infrastructure and equipment

Nigeria has benefited substantially from development partners filling gaps in the provision of laboratory, diagnostic and medical equipment. Several funded programmes (e.g. for malaria, HIV/AIDS and tuberculosis (TB)) provide a supply of laboratory consumables, diagnostic kits and machines (e.g. GeneXpert for TB), given the health systems strengthening component of their implementation. Development partners that support commodity logistics and transportation include the United States President's Emergency Plan For AIDS Relief; the Global Fund to Fight AIDS, Tuberculosis and Malaria; the United States Centers for Disease Control and Prevention; the United Kingdom Foreign, Commonwealth and Development Office (formerly the Department for International Development); and Gavi. There is a Nigerian national laboratory network system for enhanced case finding for TB and viral load monitoring for HIV.

The International Cooperation Unit of the DPRS of the FMOH is responsible for coordinating international collaborations on health with development partners, CSOs and other actors (FMOH, 2020a).

## Availability and distribution of health facilities

There are 40 184 operational health facilities in Nigeria, including 115 public tertiary health institutions (teaching hospitals, federal medical centres and specialist eye, ear, orthopaedic and neuropsychiatric hospitals) across Nigeria with an average bed space of 490. Table 6.2.b shows the total numbers of health facilities (hospitals and clinics) according to the level of care they

provide, and whether the facilities (hospitals and clinics) are publicly or privately owned. PHC centres account for 85.2%, while secondary and tertiary facilities account for 14.4% and 0.4%, respectively, nationwide. Primary and tertiary facilities are mainly owned by the government, while secondary facilities are predominantly privately owned, with more public health facilities located in the north (Makinde et al., 2018). Although only 35% of facilities are privately owned, private provision of health care services predominates, at about 70% of total provision (Omogbolagun, 2021; Presidential Health Sector Reform Committee, 2023).

**Table 6.2.b** Health facilities by level of care and ownership

| Level of care | Ownership, number (or percentage) of facilities | | Number of facilities | Percentage of total number of facilities at all levels |
|---|---|---|---|---|
| | Public | Private | | |
| Primary care | 24 319 (76.4%) | 7 496 (23.6%) | 31 815 | 85.2% |
| Secondary care | 1 480 (18.2%) | 6 648 (81.8%) | 8 128 | 14.4% |
| Tertiary care | 115 (47.7%) | 126 (52.3%) | 241 | 0.4% |
| All levels | 25 914 (64.5%) | 14 270 (35.5%) | 40 184 | 100.0% |

**Source:** FMOH, 2023a

Table 6.2.c shows the geopolitical disparities in the distribution of primary, secondary and tertiary health facilities per 100 000 population. Populations in the north-central region have access to more primary health facilities than those in other zones, while secondary health facilities are predominantly located in the southern zones.

Table 6.2.1 provides a breakdown of the number, distribution and density of available health facilities across the different levels of care and ownership of facilities within the health care system in Nigeria. The levels are grouped under the public, private and non-profit categories (FMOH, 2023a).

**Table 6.2.c** Distribution of primary, secondary and tertiary health facilities per 100 000 population in Nigeria

| Geopolitical zone | Number of facilities per 100 000 population | | |
|---|---|---|---|
| | Primary | Secondary | Tertiary |
| North-central | 23.3 | 2.400 | 0.055 |
| North-east | 17.9 | 0.669 | 0.028 |
| North-west | 14.0 | 0.462 | 0.028 |
| South-east | 17.9 | 5.441 | 0.048 |
| South-south | 11.8 | 2.137 | 0.062 |
| South-west | 16.9 | 3.421 | 0.064 |
| National | 16.6 | 2.184 | 0.046 |

**Source:** Makinde et al., 2018

**Table 6.2.1** Number and density of health facilities in public, private and non-profit sectors, latest available year (2019)

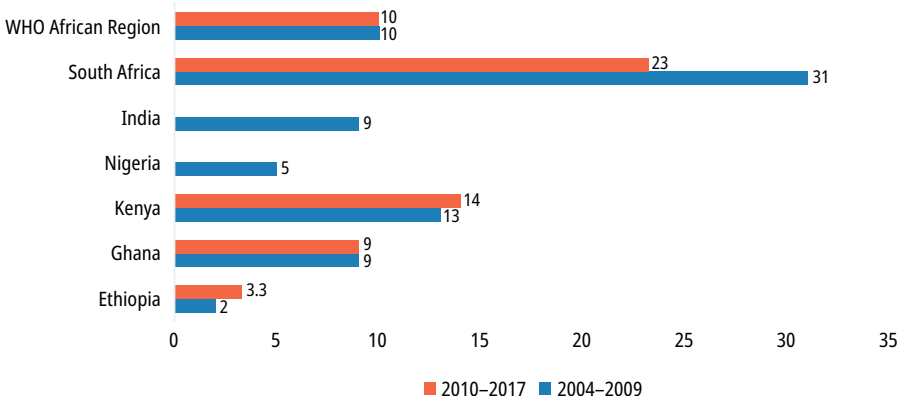
| | Public | | Private | | Non-profit | |
|---|---|---|---|---|---|---|
| | Number | Per 100 000 | Number | Per 100 000 | Number | Per 100 000 |
| **Primary health centres/clinics** | 27 015 | 13.00 | 7 449 | 3.70 | 432 | 0.200 |
| **Secondary hospitals** | 1 222 | 0.60 | 3654 | 1.80 | 194 | 0.100 |
| **Tertiary hospitals** | 110 | 0.05 | 100 | 0.05 | 15 | 0.007 |
| **Other** | NA | NA | NA | NA | NA | NA |

**Source:** CCIH, 2021
**Note:** NA = data not available.

Health facilities within the public sector substantially outnumber those owned by private sector operators. In 2019, there were 3.3 times as many publicly owned PHC facilities as privately owned PHC facilities, and 2.9 times as many publicly owned secondary health care facilities.

Fig. 6.2.1 shows Nigeria's hospital bed availability per 10, 000 population in comparison with other countries in the WHO African Region. Nigeria's provision of 5 beds per 10 000 population is below the regional average of 10.3 and well below those of Kenya and South Africa (WHO African Region, 2017c).

**Figure 6.2.1** Hospital beds per 10 000 population, WHO African Region and selected countries, 2004–2009 and 2010–2017




**Source:** WHO, 2021

The implementation guidelines of the BHCPF provide for the establishment and operations of a national emergency medical treatment (NEMT) service, to provide an integrated emergency ambulance system across Nigeria. The BHCPF allocates 5% of its resources to emergency medical services (EMS). The FMOH in 2018 produced a policy on EMS to coordinate all EMS including organizational stakeholders such as the National Emergency Management Agency. This agency hosts the national emergency call centre number – 112 – in collaboration with services including the Federal Road Safety Corps, paramedic training schools, the accident and emergency units of all hospitals, the armed forces medical services, the security services, the police, the Federal Fire Service, customs, prison services, port health services and aviation medical systems and private organizations operating ambulance services (FMOH, 2016d). The NEMT service is expected to serve as a support system for the actualization of the federal government's strategic vision (2023–2026) for the health sector (Okunola, 2024).

National and regional data on functioning diagnostic imaging equipment per 1000 population suggest gross inadequacy (Table 6.2.2), signposting the overall diagnostic infrastructure and equipment deficit in the country.

**Table 6.2.2** Items of functioning diagnostic imaging technologies per 1000 population, latest available year

| Imaging technology | Nigeria | Year | African Region average |
|---|---|---|---|
| MRI units | 0.0003 | 2018 | 0.66 (2013) |
| CT scanners | 0.0009 | 2018 | 1.17 (2013) |
| Radiotherapy machines | 0.00002 | 2016 | 0.17 (2013) |
| X-ray machines | 0.025 | 2006 | NA |
| Ultrasound machines | 0.023 | 2018 | NA |

**Source:** Idowu and Okedere, 2020
**Notes:** CT = computed tomography; MRI = magnetic resonance imaging; NA = data not available.

Limited data availability prevented authors from including planned Table 6.2.3, "Number and density of transport infrastructure, latest available year", which would usually form part of our template description of a country's health system and services. Proxy data on transport to primary health facilities for childbirth are shown in Table 6.2.d instead. Proxy data on transport to secondary and tertiary facilities were unavailable.

**Table 6.2.d** Expectant mothers' mode of transport to primary health facilities (2019)

| Mode | Primary care N (% of Total 1) |
|---|---|
| Public transport/ambulance | 21.2 |
| Private transport/ambulance | 20.5 |
| Motorcycle | 30.7 |
| Bicycle | 0.8 |
| Boat | 0.6 |
| Other (walking) | 21.7 |
| Total | 95.5 |

**Source:** NPC and ICF Macro, 2019
**Notes:** NA = data not available.

Table 6.2.d shows the various ways in which expectant mothers travel to health facilities for childbirth in Nigeria. The majority arrive by motorcycle (30.7%) or on foot (21.7%). Public and private transport, including ambulances, account for 21.2% and 20.5% of arrivals, respectively. Prior to the introduction of the National Emergency Medical Service and Ambulance System (NEMSAS), the estimated 1000 ambulances available nationwide (based predominantly in Lagos state and the FCT) and low personnel capacity were able to meet only 20% of national needs for all emergencies, including childbirth (FMOH, 2018b).

Targeted public health initiatives on EMS are described in Chapter 7, Section 7.9. For example, in 2018, the FMOH launched the National Emergency Medical Services Policy and developed guidelines for national ambulance services. NEMSAS was established in 2022 and rolled out as a national multisectoral service, complemented by the Rural Emergency Services and Maternal Transportation scheme.

### Distribution of health infrastructure and medical equipment

The distribution of health care infrastructure and medical equipment reflects the level of socioeconomic development across the country. Primary, secondary and tertiary health institutions predominantly serve rural populations, mixed populations and urban dwellers, respectively. Distribution of infrastructure and equipment follows the same trend, with PHC centres being less well equipped than tertiary hospitals. Within states, similar variables define the numbers and sophistication of health facilities, their infrastructure and their equipment. Infrastructure and medical equipment distribution favours urban areas, where the ability to pay is greater. Similarly, regional disparities exist between the north and south. Overall, publicly owned health facilities (65%) outnumber privately owned health facilities (35%), although for secondary health facilities specifically, the majority belong to private operators (FMOH, 2023a), with more secondary facilities being located in the south.

## 6.3 Production, construction and procurement of health infrastructure and equipment

The production, construction and procurement of health care infrastructure favours urban areas. The Economic Recovery and Growth Plan planned to revitalize 10 000 PHC centres and establish one functional PHC centre in

each political ward by the end of 2020. The Presidential Health Sector Reform Committee proposed the following interventions, but these have not been fully realized:

- facility upgrades of three selected general hospitals across all states and the FCT;
- implementation of health equipment and facility upgrades through managed equipment schemes;
- equipment and infrastructure upgrades in all federal teaching hospitals;
- implementation of a programme to deliver 12 health PPPs and concessionary financing for private health facilities;
- deployment of digitized systems for the integration of the procurement of all health commodities within states and strengthening of logistics and supply chain systems, as well as the improvement of local manufacturing of health commodities (FGN, 2017).

Capital health expenditure data are set out in Table 6.3.1.

**Table 6.3.1** Capital expenditure in Nigeria (2010–2020)

| | 2010 | 2015 | Latest available year (2020) | WHO African Region average |
|---|---|---|---|---|
| Capital health expenditure, total (million current purchasing power parity) | 2086 | 1414 | 744.20 | 134.37 |
| Capital health expenditure, total (million US$) | 834 | 176 | 1850.78 | 334.64 |
| Domestic public capital health expenditure (% of CHE) | 13.60 | 16.44 | 0.15 | 0.25 |
| Domestic private capital health expenditure (% of CHE) | 80.14 | 73.64 | 0.002 | 0.02 |
| External capital health expenditure (% of CHE) | 6.25 | 9.91 | 0.01 | 0.11 |

**Source:** WHO, 2021
**Note:** CHE = current health expenditure.

The data in Table 6.3.1 demonstrate that capital health expenditure has decreased over time. Total capital health expenditure (million current purchasing

power parity) declined by 32% between 2010 and 2015, and by a further 47% between 2015 and 2020. Total capital health expenditure (million US dollars) also declined sharply, by 79%, between 2010 and 2015, but then increased significantly, nearly 10-fold, between 2015 and 2020. Conversely, domestic public capital health expenditure and external capital health expenditure as a percentage of current health expenditure (CHE) increased over the period 2010–2015 and then declined sharply between 2015 and 2020. Private domestic capital expenditure as a percentage of CHE decreased slightly from 2010 to 2015 and then dropped sharply from 2015 to 2020 (FMOH, 2019a). This fluctuation in government health expenditure is the result of macroeconomic volatility and sundry shocks and interruptions, including recessions and a global pandemic (Lawal et al., 2023). The direct impact has been a reduced budgetary allocation to the health sector, including for infrastructure and equipment.

## Donated health infrastructure and equipment

Specific data on the sources and value of donated health infrastructure and equipment are not accessible. However, over the period 2010–2017, although foreign-donated resources to the health sector increased overall, there was a steady decline in the percentage of total foreign transfers (Alonge, 2020).

**Table 6.3.a** Foreign donations in support of the Nigerian health sector, 2010–2017

| Year | Amount (US$) | Percentage (%) of total foreign transfers |
|---|---|---|
| 2010 | 7 785 491 | 77.0 |
| 2011 | 4 628 523 | 23.3 |
| 2012 | 3 048 483 | 19.5 |
| 2013 | 8 116 466 | 28.3 |
| 2014 | 24 432 623 | 34.9 |
| 2015 | 16 322 655 | 10.3 |
| 2016 | 39 439 790 | 8.4 |
| 2017 | 32 011 695 | 3.4 |

**Source:** Alonge, 2020

## 6.4 Maintenance and functionality of health infrastructure and equipment

### Asset management practices

The FMOH in 2017 published the *Essential Equipment List for Tertiary Health Care Facilities in Nigeria* (FMOH, 2017a), which identified the following prerequisites for the use and maintenance of equipment:

- access to utilities needed to use equipment, including power supply, adequate quantities and quality of water, and effective waste disposal facilities;
- availability of skilled biomedical engineers with technical capabilities to check, repair and service equipment;
- training of staff (e.g. on equipment guidelines and SOPs);
- availability of consumables, accessories and spare parts.

However, public health facilities in major cities suffer from insufficient funds for maintenance works, absence of planned maintenance programmes and inadequately trained personnel (Ebekozien et al., 2022). The inadequate maintenance of public hospital buildings has been attributed to six causes: statutory requirements, design stage, construction stage, budget for maintenance tasks, managing maintenance unit activities and user perception of maintenance management (Anaemene, 2016). Most public sector organizations do not have sufficient technical capacity to manage complex infrastructural projects (Bobou, 2017).

### Maintenance of existing health infrastructure and equipment

The FMOH in 2005 produced guidelines on medical equipment management together with frameworks for the acquisition of equipment so that its procurement complies with the international standard rules and regulations on procurement (FMOH, 2005a). The Medical Support Unit conducts an annual assessment of the objectives, scope, performance and effectiveness of the medical equipment management plan that includes preventive maintenance, disposal of obsolete equipment and the production and supply of medical

oxygen. In addition, the National Center for Equipment Maintenance and Development at the University of Nigeria hosts training courses on equipment maintenance, installation and repairs (UNN, 2020). The departments of hospital services at the FMOH and SMoHs as well as the health facility monitoring and accreditation agencies of states are responsible for registering facilities and supervising operations and standards in private health care establishments, while the respective national agencies are responsible for accrediting degrees and training institutions, as well as overseeing the conduct of medical and health professionals.

### Maintenance of staffing capacity

About 80% of public health facilities are reportedly in varying states of dysfunctionality, ranging from structural dilapidation to lack of water and electricity. Secondary- and tertiary-level facilities have obsolete and non-functional equipment due to lack of maintenance (FMOH, 2023c). According to the NSHDP, health promotion departments and units within health facilities should ensure functionality of service delivery hardware, while coordinating committees at different levels ensure the development, adaptation and review of guidelines regarding infrastructure and equipment management. Some teaching hospitals have a biomedical engineering department that is responsible for medical equipment management, including calibration, safety and performance testing, maintenance and repairs and training of users, as well as for the safe disposal of obsolete medical equipment and ensuring an adequate supply of medical gas. The paucity of technical personnel is further exacerbated by the emigration of trained personnel to other countries.

## 6.5 Recent reforms

Several challenges constrain health care sector reforms: weak political will, absence of community involvement, lack of transparency in implementation and poor accountability (Sambo, 2020). As indicated in Section 6.1, a number of factors constrain the effective implementation of initiatives on health infrastructure and equipment across Nigeria. These include the lack of an overarching national policy on the distribution and allocation of health care facilities, limited equipment deployment, poor enforcement mechanisms and

the fact that socioeconomic and political considerations of states sometimes fail to align with priorities and targets set at the national level. However, a number of reforms have been initiated by the FGN in recent years (see Table 6.5.a). These reforms endeavour to promote and institutionalize PPPs and concessionary arrangements for the acquisition and maintenance of health infrastructure and equipment in order to address health infrastructure gaps. Some examples of such reforms are outlined below.

- **The Nigeria Sovereign Investment Authority (NSIA)**, in partnership with the FMOH, signed agreements in 2016 on modernizing and expanding health care services through private sector participation (Oxford Business Group, 2016). The initiative sought to develop the capacity of specialist hospitals and diagnostic centres to provide advanced medical care services by channelling public funds into health care institutions, as well as to boost technical cooperation between private hospitals and federal health institutions. The initial promise to refurbish 14 teaching hospitals by VAMED, a hospital support company, has not materialized (Muanya, 2015), but other initiatives are currently being implemented (see Table 6.5.a).
- **The Bureau of Public Enterprises (BPE)** supports the development of the health sector by both government and private sector investors through the provision of expertise and technical finance resourcing services (BPE, 2022).
- **The Central Bank of Nigeria** – to mitigate the impact of COVID-19 on the health sector – created a special-purpose vehicle to facilitate long-term, low-interest financing for health care infrastructure development in the country.

Prior to the 2023 general elections, the Health Sector Reform Coalition of Nigeria produced a charter of demands for the political parties and their candidates, stipulating that they must prioritize health care (Adejoro, 2023), while other CSOs currently advocate for full implementation of the NHA, including the enforcement of a certificate of standards. In December 2023, the FGN unveiled Nigeria's Health Sector Renewal Investment Initiative and signed the Health Sector Renewal Compact with state governments and development partners on achieving universal health coverage (2023b). Finally, one of the four main priorities of the current leadership of the Federal

Ministry of Health and Social Welfare is to prioritize medical industrialization, strengthen the sector's value chain and promote the local production of vaccines and pharmaceuticals.

**Table 6.5.a** Key health infrastructure and equipment financing reform initiatives

| Reform initiative | Key interventions | Implementation and evaluation | Source |
|---|---|---|---|
| Petroleum Trust Fund (PTF), 1994 | Provided substantial financial resources to the pharmaceutical sector to upgrade facilities and improve their operation, including through enabling the local manufacture of drugs | The initial gains and impact were not sustained after the change of government in 1999 | FGN, 2017 |
| VAMED (2002) | Refurbishment of 14 teaching hospitals with the installation of diagnostic equipment | The programme had limited impact and was short lived | Muanya, 2015 |
| NSIA (2022) | Supports domestic investments in health infrastructure development | Successfully established three pilot centres in Umuahia, Kano and Lagos, and is in the process of establishing 23 medical diagnostic centres across six geopolitical zones | NSIA, 2022 |
| BHCPF (2014) | Deploys 15% of its resources for health infrastructure and equipment and 5% for NEMT | Relevant MDAs are leveraging the BHCPF to strengthen targeted functions; for example, the NCDC uses it to support state infectious disease treatment centres, the National Reference Laboratory and state public health laboratories, and a digital surveillance and response system | NCDC, 2022a |
| National Policy on PPPs for Health (2005) | Operationalizes a framework for private sector participation in health infrastructure financing | Its initial promise of the refurbishment of 14 teaching hospitals by VAMED did not materialize<br>The planned revitalization set out in the ERGP of 10 000 PHC facilities, among other things, by 2020 was also not actualized, while targets set by the Presidential Health Sector Reform Committee were also not fully realized | FGN, 2017 |

**Table 6.5.a** Continued

| Reform initiative | Key interventions | Implementation and evaluation | Source |
|---|---|---|---|
| Central Bank of Nigeria's Health Care Sector Intervention Facility (2010) | Provides a low-interest funding window for equipment acquisition and facility upgrades | 93 billion Nigerian naira (US$ 66 million) was disbursed out of the 100 billion Nigerian naira (US$ 71 million) intervention portfolio | FGN, 2017 |
| BPE and Infrastructure Concession and Regulatory Commission (ICRC) (2022) | The BPE promotes investments by government and private sector investors through expertise and technical financing, while ICRC facilitates PPPs through service concessions and infrastructure supply and/or local equipment manufacture | The BPE is charged with implementing the policy on privatization and commercialization; its activities in the health sector are marginal<br>The ICRC has various projects under development or at procurement stages across the country | ICRC, 2022 |
| NHIA (2022) | Funds the provision of ICT infrastructure for the HMIS | The rolling out of funds to cover all groups eligible according to the NHIA Act has been slow | FGN, 2022c |

**Notes:** ERGP = Economic Recovery and Growth Plan; HMIS = health management information system; ICT = information and communications technology; NCDC = Nigeria Centre for Disease Control and Prevention.

## Collaboration with development partners and the private sector

In addition, development partners and multilateral agencies are helping Nigeria to close the health infrastructure gap. For example, the International Finance Corporation, World Bank and African Development Bank are engaged in providing investments to develop the private health sector in the country through infrastructure provision and equipment acquisition (NSIA, 2016). Similarly, donor-funded disease control programmes support the provision and maintenance of infrastructure and equipment supplies through their health systems strengthening components (see section "Infrastructural planning" in Section 6.2). Over 95% of ready-to-use therapeutic food (specially designed dietary supplements) procured by the United Nations Children's Fund was from local factories (UNICEF, 2023), complementing its investments in water, hygiene and sanitation and oxygen production. Moreover, the collaboration of Dutch turnkey health infrastructure advisory, engineering, procurement and

construction firms with the FMOH, the Infrastructure Concession Regulatory Committee and the NSIA on pipeline PPP projects led to the African Export–Import Bank investing US$ 1 billion in Nigerian health care, including funding the US$ 300 million African Medical Centre of Excellence based in Abuja (PharmAccess, 2022). Meanwhile, PharmaAccess's Medical Credit Fund, which mitigates risks for African banks lending to health sector small and medium-sized enterprises, facilitated integrated loan products, such as the former Diamond Bank's Mediloan QualityCare programme, in Nigeria. Thus far, the contributions of these initiatives to improving the public health infrastructure and equipment subsectors appear to be of limited scale and impact, limiting progress towards meeting population needs.

## Chapter summary

Chapter 6 describes the relevant policies and practices governing the development and maintenance of Nigeria's health infrastructure and equipment. Health infrastructure encompasses physical structures and the technologies and medical equipment needed to deliver health care services. Nigeria's health system is strained by a huge infrastructure deficit, with about 80% of its public health infrastructure being in varying states of dysfunctionality. The system is unable to cater to the health needs of Nigerian citizens, fuelling annual losses of about US$ 1 billion to outbound health tourism for conditions requiring specialist care. Insufficient funds for equipment maintenance, the absence of planned maintenance programmes and inadequately trained personnel exacerbate the poor state of the health infrastructure and equipment nationwide. Policies and guidelines governing health care infrastructure and equipment are included in several health-related policies and guidelines, but the absence of an overarching policy has contributed to the maldistribution and poor functionality of health care facilities within states and across the country.

Health infrastructure planning is decentralized to the federal, state and LGA levels. Regional disparities exist between north and south and between different levels of care, with primary facilities being less well equipped than tertiary hospitals and infrastructure distribution favouring urban areas. While the BHCPF offers a predictable funding window for infrastructure and equipment, including emergency ambulance services, the overall level of investment is too low to maintain functionality.

Existing government reforms to address health infrastructure gaps (e.g. the Central Bank of Nigeria's intervention fund, PPP models and concessionary arrangements) have produced mixed results. Further plans exist to establish a Nigerian health infrastructure development bank, to facilitate the acquisition of health infrastructure and equipment.

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