COMPLIANCE WITH DISEASE SURVEILLANCE AND NOTIFICATION BY PRIVATE HEALTHCARE PROVIDERS IN SOUTH-WEST NIGERIA

BY

Olusesan Ayodeji **MAKINDE**
(1317879)

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DECLARATION

I, Olusesan Ayodeji **MAKINDE**, declare that this thesis is my own original work. It is being submitted for the degree of Doctor of Philosophy in Demography and Population Studies of the University of the Witwatersrand, Johannesburg. To the best of my knowledge, it has not been submitted before in part or in full for any degree or examination at this or any other University.

…… …….

……20th day …January., 2019

BIO-SKETCH FOR OLUSESAN AYODEJI MAKINDE

Olusesan A. Makinde holds a Bachelor of Medicine and Bachelor of Surgery (MBBS) as well as a Master of Science in Epidemiology and Medical Statistics from the University of Ibadan in Nigeria. He holds a second Master of Science in Applied Health Sciences Informatics from the Johns Hopkins University, USA. He is professionally certified as a Project Management Professional by the Project Management Institute, USA.

Olusesan has worked for several years in public health consulting across Africa. He has provided technical services to various multilateral agencies and international consulting firms including the World Health Organization, UNICEF, Abt Associates Inc., John Snow Inc., RTI International and Encompass LLC. He currently runs a research and consulting agency in Nigeria.

He has published extensively on various topics including health information systems, violence against women and children, human trafficking and gender issues. He is a member of various professional societies including the Nigerian Medical Association, Epidemiological Society of Nigeria, the International Epidemiological Association, International Society for Disease Surveillance and the Union of African Population Studies.

Publications on Thesis

1. **Makinde OA**. As Ebola winds down, Lassa Fever reemerges yet again in West Africa. J Infect Dev Ctries. 2016 Feb 28;10(02):199–200. Available from: http://www.jidc.org/index.php/journal/article/view/8148
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Conference Presentations on Thesis

1. **Makinde OA**, Odimegwu CO. Disease Surveillance by Private Health Providers in Nigeria: A Research Proposal. Online J Public Health Inform [Internet]. 2016 Mar 24;8(1). Available from: http://ojphi.org/ojs/index.php/ojphi/article/view/6554
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Papers Planned

1. Health System Challenges to Disease Surveillance in Nigeria: Looking at Duplication between IDSR and NHMIS
2. Performance of and Factors Predicting Compliance with Disease Surveillance by Private Healthcare Facilities in Nigeria

DEDICATION

This project is dedicated to all health workers in Nigeria who despite the often not very suitable work environment continue to provide healthcare services to the teeming population. You are our true heroes.

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ABSTRACT

Background

Infectious disease outbreaks with a propensity to spread over large geographic areas are happening more frequently. The advances in transportation coupled with globalization and increased travel have facilitated the propagation of infectious diseases. The Ebola Virus Disease (EVD) outbreak of 2014 exposed the challenges of responding to such outbreaks. The EVD outbreak registered in eight countries across three continents, lasted an unprecedented 22 months and infected over 20,000 people with a significant case fatality rate before it was eventually contained.

Efforts aimed at controlling the international spread of diseases have been ongoing for ages. The World Health Organization in 1969 developed the International Health Regulations (IHR) which was revised in 2005. The purpose of the IHR is "to prevent, protect against, control and provide a public health response to the international spread of disease in ways that are commensurate with and restricted to public health risks, and which avoid unnecessary interference with international traffic and trade." Several African countries implement the Integrated Disease Surveillance and Response (IDSR) strategy as their means of achieving the IHR goals. Assessments following the 2014 West Africa EVD outbreak revealed that several countries were yet to meet the targets of the IHR. A systematic review found that private health facilities were being left behind in disease surveillance systems despite serving a substantial proportion of the population across several countries including Nigeria. Thus, this study investigated the compliance with disease surveillance and notification by private health facilities in South-West Nigeria.

The objectives of the study were to: i) examine the legislative/ legal framework for routine disease reporting in Nigeria (nationally and sub-nationally) and how it might affect compliance by private providers, ii) determine the level of reporting of notifiable diseases by private providers, the completeness of information and how these compare with the public sector, iii) determine the knowledge and perceptions of private healthcare providers regarding the importance of routine disease reporting in Nigeria and iv) identify the barriers to routine disease reporting by private healthcare practitioners/ facilities in Nigeria.

Data Sources and Methods

The study used a mixed method approach that included literature review and policy analysis, key informant interviews (KIIs) and a survey of private health facilities across the six states in South-West Nigeria. The South-West geopolitical zone was selected out of the six geopolitical zones for the study because it had majority (40%) of private health facilities. A planned secondary data analysis to determine the completeness of information and how these compare with the public sector could not be accomplished due to the non-availability of routinely reported data. Key informants were identified based on their responsibility within the Integrated Disease Surveillance and Response System and the National Health Management Information System. A sample size of 424 private health facilities was calculated. The sample was proportionally allocated to the six states based on the number of private health facilities in the state.

Fourteen key informants were interviewed in all (two at the national level and 12 across the six states in the South-West). These were the National Health Management Information System (NHMIS) officer and a representative of the IHR focal point at the national level, as well as the state Health Management Information Systems Officer and State Epidemiologist

in each state. There is only one State Health Management Information System Officer and one State Epidemiologist in each state. Five hundred and seven private health facilities were surveyed across the six states in the South-West.

The KIIs were transcribed verbatim and read over repeatedly by the principal investigator. Themes were generated in line with the objectives of the study and supporting quotes were extracted. The health facility survey data was analyzed using the statistical programming language "R". Analysis entailed computing frequency distributions (to determine the level of compliance with reporting notifiable diseases) and estimation of a logistic regression model (to determine factors associated with the likelihood of reporting such diseases among private providers).

Results

Several legal instruments were identified in Nigeria with the most recent comprehensive legal instrument for disease surveillance being the IDSR policy of 2005. The active law on disease surveillance, the Quarantine Act was enacted almost a century ago, in 1926. The IDSR policy considered the system as a component of the overall NHMIS with pronouncements aimed at avoiding duplication. The national health information system policy (2014) pronounced the establishment of a National Health Data Governance Council (NHDGC) to be chaired by the Minister of Health and proposed State Health Data Governance Councils for each state. Key informants did not believe that the legal instruments and funding for disease surveillance in Nigeria were adequate. There were no specific state laws or policies on disease surveillance though most officers indicated that all states unanimously adopted the IDSR policy at a National Council of Health (NCH) meeting several years earlier. The officers also believed that the level of implementation of existing policies and laws could be further improved upon.

Only 40% (Lagos (51%), Oyo (60%) Osun (30%), Ogun (17%), Ondo (23%) and Ekiti (35%)) of the private health facilities included in the study were reporting into the disease surveillance system. About two-thirds (66%) of the facilities did not have the requisite tools for reporting, over 50% of clinicians were aware that reporting on disease surveillance was a legal responsibility and 76% of the clinicians mentioned at least two diseases that required immediate notification.

Over 90% of health providers that reported that they had never attended to a condition that needed to be reported actually attended to at least a case of Malaria in the year preceding the survey. The availability of reporting tools, having an assigned health records officer, knowledge of the data collection tools by the health records officer and the attending clinician and awareness about a law or regulation on disease surveillance were significantly associated with a higher likelihood of reporting notifiable diseases by private health facilities. There were two data collection systems operating in the country: IDSR and NHMIS. These were being managed by different departments with little to no cross-departmental collaboration. About 40% of the diseases and conditions tracked through IDSR are also tracked by NHMIS.

Achieving IHR goals in Nigeria is hampered by weak legal instruments. The IDSR policy of 2005, though a good first step, has not been enacted into a national law. All the states have adopted the IDSR policy at the NCH (a forum of the Minister of Health, Commissioners of Health and the Permanent Secretaries) but this body does not have constitutional powers. In addition, the Federated structure of Nigeria does not ensure that states must implement national laws and policies unless they are first domesticated as state instruments. Compliance with reporting by private health facilities was poor and varied by state. A wide range of factors influenced reporting by health facilities. Health facilities that had the data collection tools

were more likely to have reported into the disease surveillance system. However, the majority of the health facilities did not have the data collection tools during the survey. Many clinicians were unaware that Malaria is a notifiable disease in the IDSR forms for monthly reporting. Such gaps in knowledge could lead to reporting incomplete information. This finding was in contrast to their high levels of awareness about immediately notifiable diseases. However, the diseases predominantly mentioned were Polio, Lassa Fever and EVD which have recently ravaged the country and have been regularly featured in print and online media.

The findings of this study showed that IDSR and NHMIS systems were operating independently. However, there was a significant overlap between the two systems. The two systems are managed by the Department of Health Planning Research and Statistics and the Department of Public Health respectively and resources are not leveraged across both systems. However, officers responsible for each system reported that they lacked adequate resources for implementing them. In such situation, combining resources could have achieved more.

Conclusion

There are inadequate laws governing disease surveillance in Nigeria. Compliance with disease surveillance is poor, with variations across states. Parallel systems diffuse resources and breed inefficiency in the national health information system. There is an urgent need to address the shortcomings of the system in order to ensure that Nigeria adheres to IHR but most importantly can adequately identify and respond to infectious disease risks in the country.

Policy Implications

There is a need to strengthen the legal framework for disease surveillance at the national and state levels in Nigeria. The federal and state legislative bodies need to be further engaged on the importance of global health security as part of the protection and security mechanism for the country. Laws and policies on disease surveillance that are currently in effect need to be enforced to achieve the purpose for which they were formulated. Governance of the health information system needs to be strengthened with a view to eliminating duplication and improving efficiency within the confines of available resources. Adequate resources need to be made available for disease surveillance based on the potential impact they can have in maintaining and improving the health of the citizenry in the country.

Keywords: Disease Surveillance, Health Facilities, Health Information Systems, International Health Regulations, Infectious Diseases, Integrated Disease Surveillance and Response, Nigeria, Regulations

ABBREVIATIONS AND ACRONYMS

DHIS	District Health Information System
DHPRS	Department of Health Planning, Research and Statistics
DSN	Disease Surveillance and Notification
EVD	Ebola Virus Disease
FMOH	Federal Ministry of Health
HIS	Health Information System(s)
HMIS	Health Management Information System
IDSR	Integrated Disease Surveillance and Response
IHR	International Health Regulation
LGA	Local Government Area(s)
MDAs	Ministries, Departments and Agencies
MSF	Monthly Summary Form(s)
NCD	Non-Communicable Disease
NCDC	Nigeria Center for Disease Control
NCH	National Council on Health
NHMIS	Nigeria Health Management Information System
RHIS	Routine Health Information System
SMOH	State Ministry of Health
VHF	Viral Hemorrhagic Fevers
WAHO	West African Health Organization
WHO	World Health Organization
WPV	Wild Polio Virus

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CHAPTER 1: INTRODUCTION OF THE STUDY

1.1 Background of the Study

Infectious disease outbreaks have been known to occur for ages with devastating impact. In 541 A.D., grain merchants' from Egypt transported rats into the Eastern Roman Empire which were infested with an unknown organism at that time, causing the Plague of the Justinian period (Robert Wood Johnson Foundation, 2013). This outbreak left over 30 million people dead with significant economic impact (Robert Wood Johnson Foundation, 2013). Likewise, the black plague of the 14th century was noted to be responsible for the death of 30 per cent of Europe's population, estimated at between 75 and 200 million people (Nohl, 1969). Early in the 19th century and long before the discovery of the microscope, John Snow traced an outbreak of another unknown disease in London with a high fatality rate to specific water pumps, after he was able to map clustering of cases around some particular pumps (Cameron & Jones, 1983). He contained the epidemic by removing the handles of the water pumps thereby stopping people from getting water from the contaminated sources. The epidemic was later identified to be Cholera.

Disease outbreaks are believed to be one of the means by which nature controls the population of the world. According to the Malthusian theorem, catastrophes were meant to occur to control population growth (Malthus, 1959). One of the catastrophes identified by Thomas Malthus in his controversial theorem is disease and pestilence (Malthus, 1959). Notwithstanding the theorem, concerted efforts have been made to promptly identify such outbreaks and take action that mitigates their impact.

The risk of trans-border transmission of highly infective pathogens remains an important reason for the strengthening of vigilance towards identifying diseases with a propensity to cause an outbreak early and thereby take measures to stem undue morbidity and mortality. Diagnosis of rare travel-associated infections can be challenging thereby delaying appropriate definitive management. In 2009, a patient presented at a London hospital a few days after returning from a trip to Nigeria. Despite this history, it took about two weeks before a diagnosis of Lassa fever was reached (Kitching et al., 2009). The delay may have contributed to the demise of the patient in this instance as a result of the delay in definitive management following presentation and non-institution of Ribavirin management which has been proven to be effective in such situations (Buba et al., 2017).

The rising threat of biological warfare is also an important reason for assessing disease surveillance systems and ensuring that surveillance mechanisms are adequate to detect undue infections thereby prompting an appropriate response. Smallpox was previously used as a biological weapon during the colonization of America by British forces (GHSA Preparation Task Force Team, 2015). A fatal case of anthrax was also reported following exposure to postal mail containing a powdered substance in the United States in 2001 (Bush, Abrams, Beall, & Johnson, 2001). This was later identified to be a case of biological terrorism. With the upsurge of terrorism activities in Nigeria, the chances of a biological weapon release cannot be overlooked and requires prompt vigilance systems in order to detect such outbreaks and respond accordingly. Already the re-emergence of the Wild Polio Virus (WPV) in Nigeria after a two year interruption has been attributed to the effect of the insurgency (Zoakah, Adebiyi, Ashikeni, Makinde, & Epidemiological Society of Nigeria (EPiSON), 2016). There have also been deliberate attacks on immunization workers trying to stem the propagation of the virus.

Such attacks have led to fear and withdrawal of vaccinators resulting in pockets of low immunization coverage and increase in the number of susceptible children which resulted in the outbreak.

Lately, emerging and re-emerging infectious diseases are posing threat to human populations with fear of outbreaks of these diseases spreading globally and causing significant mortality. HIV which was first identified in the 1980s is now a pandemic disease which though has been well curtailed in its acute form by drugs, remains without a cure (Montagnier, 2010). Within the last few years, there have been several infectious disease outbreaks such as; Ebola Virus Disease (EVD) and Lassa fever in West Africa, EVD and Marburg fever in East Africa, Zika virus in the Americas and Middle East Respiratory Syndrome in Asia (Aleanizy, Mohmed, Alqahtani, & El Hadi Mohamed, 2017; Makinde, 2016; Park, 2017). Polio which was at the verge of elimination in Nigeria has again been reported in the Northeast of the country (Nnadi, 2017; Zoakah et al., 2016). Likewise, an outbreak of the Polio virus has been reported in Syria (Al-Moujahed, Alahdab, Abolaban, & Beletsky, 2017). The continued Boko Haram insurgency in the North-East of the country has been identified as a major risk factor for the continued propagation of the virulent WPV in Nigeria just as the persistent civil war in Syria has been identified as a major factor in the re-emergence of the WPV in that country (Al-Moujahed et al., 2017; Omole, Welye, & Abimbola, 2015).

The need to study and learn more about these diseases, their pattern of presentation and modalities to prevent and control them when an outbreak occurs is evident based on their potential impact. In addition, identifying such outbreaks early and taking measures to curtail their spread are important control measures that need further enhancement.

1.2 The Problem Statement

Nigeria has a population of about 180 million people with limited resources to tackle all her health challenges (Population Reference Bureau, 2017). As a result, health indices in the country are not among the best in the world. Life expectancy at birth is 54.5 years which is lower than the regional average (60 years) and far lower than the global average (71.4 years) (World Health Organization, 2017c). Various factors contribute to the low life expectancy in Nigeria when compared to other countries. Infectious diseases of public health significance contribute to this low life expectancy situation. The country has been affected by the outbreaks of various communicable diseases in the past. Notable ones include the Lassa fever outbreak in the 70's, the Avian influenza outbreak of the early 2000s and more recently, the recurrent cerebrospinal meningitis outbreak and the EVD outbreak following an imported case in 2014 (Bond, Schieffelin, Moses, Bennett, & Bausch, 2013; Lafond et al., 2014; Nnadi et al., 2017; Shuaib et al., 2014). A Lassa fever outbreak was also reported in January, 2016 with fear of the outbreak rapidly spreading across the entire country (Makinde, 2016). This Lassa fever outbreak has been protracted with at least three waves of the outbreak reported (Buba et al., 2017). The Nigeria Centres for Disease Control established an Emergency Operation Centre which coordinated the response across the country. As at May 13th 2018, there were 1914 cases reported from 21 states of which 428 were confirmed positive and 107 deaths recorded, a case fatality rate of 25% (Nigeria Centre for Disease Control, 2018).

The ability to detect communicable diseases of public health significance like the EVD and Lassa fever and act promptly rests on the availability of processes and systems to help identify outbreaks early and take action that mitigate the spread of such infectious diseases. One important method for detecting infectious disease outbreaks is when health facilities in the country are participating in the Integrated Disease Surveillance and Response (IDSR) system

and the data is reliable and provides a complete and representative picture of the disease pattern and presentation in the country. Analysis has shown that lack of timely interventions to prevent diseases prone to outbreaks such as the Viral Haemorrhagic Fevers (VHFs) can result in devastating consequences (Pigott et al., 2017).

Over 60% of the Nigerian population patronize private health facilities for care (International Finance Corporation, 2007). However, there is limited information on the compliance of these facilities with the IDSR system which was designed to achieve the international health regulation (IHR) goals of 1969. The IHR is a set of regulations that the World Health Assembly uses to implement its constitutional responsibility to prevent the international spread of diseases (World Health Organization, 2005). The latest review of the IHR was accomplished in 2005. The purpose and scope of the IHR (2005) are "to prevent, protect against, control and provide a public health response to the international spread of disease in ways that are commensurate with and restricted to public health risks, and which avoid unnecessary interference with international traffic and trade" (World Health Organization, 2005, p. 1). Non-compliance with the IDSR system by private health facilities in Nigeria may not only lead to many lost and unanalysed presenting cases, which could in turn result in major public health emergencies in the country, but implies non-compliance with international regulations.

The 2014 EVD outbreak in Nigeria was, for instance, traced to a private health facility in Lagos following an imported case by an air traveller who had cared for a sibling who died of EVD in Liberia (Fasina et al., 2014). The lack of established processes for reporting cases led to a delay in the notification of appropriate authorities about the index case and thus delayed action to forestall the spread of the disease. Though the disease was eventually contained in relatively

record time compared to other countries affected by the outbreak, the risks of systemic failure in identifying cases and notifying the relevant authorities persisted. Similarly, cases of Lassa fever later presented in private health facilities across the country following the outbreak which started in late 2015. As such, there is a need to assess the compliance with the disease surveillance system and its efficiency and effectiveness to detect infectious disease outbreaks in private health facilities.

The overall goal of the proposed study was to generate information on the status of national and sub-national legal instruments and policies on the IDSR system and the practice of private healthcare providers regarding the system in Nigeria. The information is important for informing programs aimed at improving compliance with the system among private health care providers in the country.

1.3 Purpose Statement and Scope of the Study

This study generates information to bridge the gap in knowledge about private sector engagement and compliance with the IDSR system in Nigeria.

1.4 Research Questions

1. Are the policies and regulations establishing the IDSR in Nigeria (nationally and sub-nationally) adequate to ensure compliance with the system?
2. How well are private health practices reporting notifiable diseases in Nigeria?
3. What are the factors affecting compliance with disease surveillance and notification system by private healthcare providers in Nigeria?
4. Are there factors that can predict the knowledge of health facilities/ workers on the IDSR system in Nigeria?

1.5 Research Objectives

1.5.1 General Objective

- To generate information on the status of national and sub-national policies on the IDSR system and the practice of private healthcare providers regarding the system in Nigeria.

1.5.2 Specific Objectives

1. To examine the legislative/ legal framework for routine disease reporting in Nigeria (nationally and sub-nationally) and how it might affect compliance by private providers.
2. To determine the level of reporting of notifiable diseases by private providers, the completeness of information and how these compare with the public sector.
3. To determine the knowledge and perceptions of private healthcare providers on the importance of routine disease reporting in Nigeria.
4. To identify the barriers to routine disease reporting by private healthcare practitioners/ facilities in Nigeria.

1.6 Definitions and Delimitations

Private Health Facility: A health facility that is owned and run by an individual, religious institution or corporate body outside of government administration.

Cadres of health facilities: Health facilities in Nigeria are classified into three cadres: Primary, Secondary and Tertiary. The classification is dependent on the type of services rendered at these facilities and the human resources available.

Compliance with IDSR system: requires that a health facility has reported notifiable diseases to the health authorities within the period reviewed.

Knowledge of the IDSR system: is the ability of health workers to appropriately identify three diseases that are immediately notifiable to the authorities, mention three data collection tools that are used in reporting notifiable diseases and understand the rationale for reporting these diseases to health authorities.

Barriers to disease reporting by health facilities: non-availability of reporting tools at health facilities (which ought to be distributed by the state actors), poor engagement by the state actors (no contact for the previous six months by state actors, and no feedback when reporting is done).

Readiness of the health facility: is the presence of a health records/ health information management officer, trained to carry out routine coding and disease reporting as well as materials (such as data collection tools) needed to report the notifiable diseases.

CHAPTER 2: LITERATURE REVIEW, THEORIES AND CONCEPTUAL MODEL

2.1 Literature Review

2.1.1 Global Review

Health information systems (HIS) are one of the six cardinal building blocks of a health system which provide evidence that guide objective investment in the health system. HIS are regarded as the foundations of public health (Abouzahr & Boerma, 2005; World Health Organization, 2007). According to the World Health Organization (WHO), HIS are principally made of six components: HIS resources, indicators, data sources, data management, information products and information use (World Health Organization, 2008). The HIS are made of several sub-systems which include censuses, vital registration systems, household surveys, administrative and resources data, disease surveillance, disease specific monitoring as well as patient and service records as shown in Figure 1 below.

Figure 1: Health Information System Data Sources

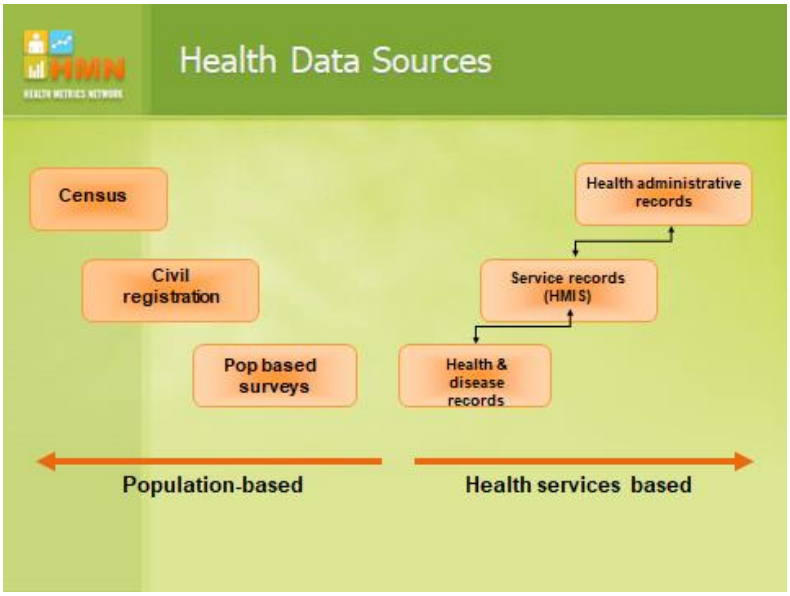


Figure 1 was extracted from a Health Metrics Network PowerPoint Presentation

HIS data sources are further grouped into population and institution based sub-components and the management of these data spans several government institutions. Furthermore, the institution based data sources are divided into service, individual and resource records (World Health Organization, 2008). The service records include the routine health information system (RHIS) and other data routinely produced in health facilities and supporting institutions. Disease surveillance and notification is a statutory responsibility of health systems across the world that was jointly agreed upon in the IHR of 1969 (World Health Organization, 2005). The IDSR strategy was developed as a means of helping low and middle income countries in meeting the obligation of disease reporting. This strategy is implemented across several African and Asian countries as a means of achieving the IHR goals (Kasolo et al., 2013).

The IHR is a comprehensive and complex framework which has been tested in the real world. Between when it came into effect in 2007 and 2014, three public health emergencies of international concern were reported. These are the pandemic influenza H1N1 in 2009, the re-emerging WPV virus in April 2014 and the EVD in August 2014 (Katz & Dowell, 2015). The IHR framework provided the guidance for the control efforts that were instituted to stem the international spread of these outbreaks.

Performance of surveillance systems globally have been observed to be suboptimal (Phalkey, Yamamoto, Awate, & Marx, 2015). Assessments that followed the outbreak of the EVD in 2014 revealed that countries did not have the capacities in place to implement the IHR (Benson, Musekiwa, Blumberg, & Rispel, 2016). Surveillance systems are further challenged by the inability to enforce international regulations as there are no law enforcement agencies established to pursue this course (Gostin, DeBartolo, & Katz, 2017). Countries sign unto

international regulations and are expected to adhere to their agreements based on self-determination. However, many countries fall short of adhering to these agreements or establishing self-monitoring mechanisms to help realign their efforts if they fall short. These result in a variety of challenges for the surveillance systems in the countries. Some of the observed challenges that have been reported from evaluation of IDSR systems across countries include lack of standard case definitions or where defined in the country these definitions are not available at the points of need, unavailable IDSR registers and poor completion of registers when present, weak diagnostic capacity in the countries, lack of competent staff and other resources, inadequate data collection tools which results in poor record keeping, multiple and often parallel reporting formats (Phalkey, Yamamoto, et al., 2015; Randriamiarana et al., 2018).

In Taiwan, a Dengue national disease surveillance system (NDSS) was put in place in 1997 as a means of improving the detection of and response to the outbreak of Dengue virus (DENV). While non-endemic, the continued importation of the DENV was of concern necessitating the establishment of this surveillance system (McKerr, Lo, Edeghere, & Bracebridge, 2015). Review of the system found that over 90% of the data collected through the system was correctly formatted and usable for further investigation. Most interviewed data users agreed that the data collected was relevant to the objectives of the program. This was associated with the simplicity of the disease surveillance system. Thus, it can be inferred that when surveillance systems are simple, acceptability and efficiency of the systems can be significantly enhanced as has been demonstrated in the Taiwan NDSS project (McKerr et al., 2015).

Primary Care Physicians (PCPs) are an important first contact group for identifying and reporting notifiable diseases. Despite the introduction of a new law that mandated the reporting of infectious diseases in Germany, several PCPs were still insufficiently informed years after the enactment of the law (Krause, Ropers, & Stark, 2005). Such poor knowledge threatens the achievement of disease surveillance goals in countries. In Malta, despite majority of General Practitioners being aware of their responsibility to report notifiable diseases to state health authorities, many still did not comply (Gauci, Gilles, O'Brien, Mamo, & Calleja, 2007). PCPs in Malta who received feedback from their local health departments were more likely to spend more time completing disease surveillance forms and were far more likely to report than those that did not receive feedback from their local health departments (Gauci et al., 2007).

Health systems have an important role to play in disease surveillance. Universal Health Coverage (UHC) can indirectly support the prompt detection of cases by ensuring that citizens have financial protection and are not afraid to present in health facilities because of the cost of services (Erondu et al., 2018). In Georgia, many sick people do not present at health facilities because of the high cost of care and will only seek care after all traditional or alternate means have failed (Djibuti, Rukhadze, Hotchkiss, Eisele, & Silvestre, 2007). In such instances, the cases present late and may inadvertently propagate infective agents if the ailment is a communicable disease. In contrast and based on the importance attributed to disease surveillance in Germany, despite budgetary cuts for various health conditions, communicable diseases were exempted from budget cuts (Krause et al., 2005). This shows the importance the country placed on early detection of cases based on the potential impact this can have for disease control. Ensuring that citizens can present to health facilities for care

without the fear of financial catastrophe can be a strategy for improving disease surveillance in countries. In India, poor health system support functions (laboratory, transportation, communication equipment, training, supervision, human and other resources) for the surveillance system were the major threat to its success in Maharashtra State (Phalkey et al., 2013).

The world over, private health facilities are increasingly playing an important role in the delivery of health services to the population (Phalkey, Butsch, Belesova, Kroll, & Kraas, 2017). Thus, their participation in disease surveillance systems has a huge potential for early disease detection. Poor compliance with reporting notifiable diseases by private healthcare providers has been reported in Iran (Ahmadi, Nedjat, Gholami, & Majdzadeh, 2013). Inadequate engagement by local authorities and lack of feedback were identified as poor practices that discouraged private health practitioners in the country from reporting notifiable diseases. Furthermore, ethical issues and poor knowledge of the benefits of disease surveillance also contributed to the poor performance of the system.

The WHO Universal Declaration of Human Rights (1948) establishes that "everyone has a right to a standard of living adequate for the health and well-being of himself and his family, including food, clothing, housing and medical care and necessary social services (McGowan, Lee, Meneses, Perkins, & Youdelman, 2016, p. 188)." Civil Laws can be an important means of addressing health equity. The use of such laws to strengthen disease surveillance and health systems has been suboptimal. Vaccinations are one of the greatest public health achievements of the twentieth century. High levels of immunizations can result in herd immunity thereby protecting the population from disease outbreaks they have been immunized against. Several countries have used laws mandating immunization to improve

compliance and therefore the health of the public. Both high and low income countries have mandatory laws for immunization, though exemptions may be granted based on religious, health or personal beliefs about the vaccination (McGowan et al., 2016). The conclusions of a controversial study in Europe on the attribution of the Measles, Mumps and Rubella (MMR) vaccine to autism resulted in a widespread rejection of the MMR vaccine and other immunizations for children. As a result of these rejections, herd immunity dropped over time and the number of susceptible children grew. Subsequently, outbreaks of measles were recorded across unimmunized communities in Europe and the US with significant public health and economic consequences (Keenan et al., 2017; Lo & Hotez, 2017; Woudenberg et al., 2017). As a result of the impact of these outbreaks, governments in several affected countries were reawakened to their responsibilities, pronouncing laws that mandated the compulsory immunization of all children. Parents of unimmunized children could be fined or jailed as a result of such laws (BBC News, 2017).

Infectious disease notification has been described as a neglected requirement in the United Kingdom where a study found that though 82% of the physician population surveyed knew that it was their responsibility to report notifiable diseases, 70% of them did not know where to obtain a disease notification form (Harvey, 1991). Unavailability of reporting forms to physicians and other health workers limits their compliance with disease surveillance reporting despite high knowledge of such requirements.

A systematic review of the contribution of private health facilities to disease surveillance found that it was poor across several countries (Phalkey et al., 2017). Only 40 studies (both peer-reviewed and grey literature) could be identified that met the inclusion criteria, suggesting that there is a deficiency of studies that have investigated the role of private

healthcare providers in disease surveillance. Of these, a significant number of studies have identified the importance of the involvement of private health providers in the disease surveillance in countries as a veritable means of improving the disease surveillance performance. Involving private practitioners in disease surveillance reduces diagnostic delays and improves case detection from 7% to 50% (Phalkey et al., 2017). Knowledge of physicians is a major facilitator for disease surveillance notification by private healthcare providers (Phalkey et al., 2017). Comparative studies from India identified knowledge of disease surveillance programs to be higher among public sector than the private sector workers (Srivastava et al., 2011). However, besides the primary knowledge of the physicians, other inhibiting factors to reporting include inadequate understanding of procedures, lack of clear instructions, inadequate dissemination and unavailable guidelines (Phalkey et al., 2017). In Bangladesh, poor relationship between the private practitioners and government workers negatively affected compliance with disease reporting (Ullah et al., 2012). Similar issues were reported in Iran (Ahmadi et al., 2013), and other studies have highlighted the mutual distrust between government officers and private practitioners (Ambe et al., 2005; Lal et al., 2011). The lack of adequately skilled personnel in disease reporting in private facilities and non-availability of computers have also contributed to the poor reporting by private health providers across countries (Phalkey et al., 2017).

2.1.2 Africa

Forty-three of the 46 countries in the WHO African Region were implementing the IDSR system as a means of achieving the IHR goals according to data collected around 2011 (Kasolo et al., 2013). There are, however, doubts about compliance with, and the reliability of routinely reported health data across different countries (Gauci et al., 2007; Krause et al., 2005; The Lancet, 2014).

Prior to the agreement to implement the IDSR strategy, several countries focused on vertical disease surveillance systems which were expensive, inefficient, overburdened personnel and yet, unable to fulfil surveillance needs (Mandyata, Olowski, & Mutale, 2017). The IDSR was viewed as a movement for the turnaround of the disease surveillance system in developing countries, especially within Africa and was designed to provide uniformity across countries to allow for the comparison of disease trends.

An assessment of IDSR implementation in four African countries (Ghana, Tanzania, Uganda and Zimbabwe) found that implementation of the IDSR led to improved data collection, reporting, quality and data use for decision making (Nsubuga, Brown, et al., 2010). However, its implementation across these countries was often challenged by political influence due to the potential socioeconomic consequences of disease outbreaks. Evidence of data use at high technical and political levels was limited and this did not reflect in the planning system in the countries (Nsubuga, Brown, et al., 2010). A recent systematic review found problems with IDSR reporting, including challenges with case detection, case registration, case confirmation, case notification (especially availability of forms at health facilities), data management, data analysis, outbreak preparedness, outbreak detection, outbreak response and feedback. In addition, there were problems with support functions (supervision, training, laboratory function, resources and coordination) and in system quality attributes (data accuracy, timeliness, completeness) (Phalkey, Yamamoto, et al., 2015).

In Zambia, notification of diseases by health facilities is mandated by law (Public Health Act of 1995 which tracks 19 diseases of importance) with consequences for defaulting health facilities (Mandyata et al., 2017). Many key informants interviewed during an evaluation of the IDSR in Zambia felt that the Public Health Act was strong but inadequately addressed all

disease surveillance priorities. They indicated that other supporting laws from the health and other sectors were needed in order for disease surveillance to be appropriately covered by the law. Physicians complained of the amount of work needed to complete data collection tools which was in conflict with the time spent consulting with their patients. This resulted in poor completion of the forms and ultimately, poor quality data. However, this was not always the reason as in some low volume facilities, despite more time on the hands of the clinicians, completion of the forms was still not being carried out routinely. Some facilities engaged dedicated data clerks specifically to complete the tally sheets though this was affected by poor legibility of the writing of the physicians (Mandyata et al., 2017). Thus, several factors affected the ability of the Zambian surveillance system to provide high quality data for disease surveillance. Public sector health workers in Zambia were more knowledgeable about the forms used in reporting notifiable diseases than their private sector counterparts (80% vs. 43%) (Maponga et al., 2014).

In Uganda, implementation of the IDSR started in 2001, just three years after the adoption by the WHO African Regional Office. The performance (completeness) of IDSR in Uganda progressively improved between 2001 and 2007 rising from 48% to 85% though timeliness was not equally matched (Lukwago et al., 2013). The success recorded was attributed to the multiple communication channels for reporting by the health facilities. However, funding for disease surveillance was noted to progressively decline and threatened the successes that had been recorded over the years. Despite the potential for an integrated system, vertical disease funding posed challenges to participation in integrated disease surveillance as projects funded for specific diseases wanted to maintain their vertical systems. Decline in IDSR funding might have contributed to the poor timeliness in reporting by the health facilities

over time. Findings from another study revealed that information technology skills were inadequate among private healthcare providers in Uganda and this was a major challenge to participating in the routine health information system (Asiimwe, 2016).

The intractable EVD of 2014 has in no little measure contributed to the renewed attention to Global Health Security and ultimately the IDSR. Weak participation of the private sector and lack of community surveillance systems have been identified as threats to the IDSR system which require urgent attention (Phalkey, Yamamoto, et al., 2015).

2.1.3 Country

The IDSR System in Nigeria is a component of the RHIS, and is designed to provide information that can guide quick response to communicable disease outbreaks of high public health impact (Lafond et al., 2014; World Health Organization & United States Agency for International Development, 2006). The global IDSR strategy was originally designed to track about 19 diseases of public health importance. However, countries are advised to keep to a minimum based on disease priorities (World Health Organization, 2010). The IDSR in Nigeria was designed to track 40 diseases and conditions but has been recently extended to 42 with the inclusion of maternal and perinatal deaths. The diseases tracked by the IDSR in the country are grouped into three: 1) epidemic prone diseases, 2) diseases targeted for eradication and elimination and 3) diseases of public health importance (Federal Ministry of Health, 2013; Isere, Fatiregun, & Ajayi, 2015; World Health Organization, 2010). The diseases and conditions that are tracked through the IDSR in Nigeria are presented in Table 1.

Table 1: Priority Diseases, Conditions and Events for Integrated Disease Surveillance and Response – 2010

Epidemic prone diseases	Diseases targeted for eradication or elimination	Other major diseases, events or conditions of public health importance
1. Cholera 2. Measles 3. Meningococcal meningitis 4. Viral haemorrhagic fever (Lassa Fever, Dengue) 5. Yellow fever	1. Buruli ulcer 2. Dracunculiasi (Guinea Worm) 3. Leprosy 4. Lymphatic filariasis 5. Neonatal tetanus 6. Noma 7. Onchocerciasis 8. Poliomyelitis1 9. [1]Disease specified by IHR (2005) for immediate notification	1.Acute viral hepatitis 2. Diabetes mellitus 3. Diarrhoea with dehydration less than 5 years of age 4. HIV/AIDS (new cases) 5. Hypertension 6. Injuries (Road traffic Accidents) 7. Malaria 8. Malnutrition in children under 5 years of age 9. Maternal deaths 10. Mental Neurological & Substance Abuse (MNS) Disorders (Epilepsy, Schizophrenia, depression etc.) 11. Human Rabies 12. Severe pneumonia in less than 5 years of age 13. STIs 14. Sickle Cell Disorder 15. Trachoma 16. Human African Trypanosomiasis 17. Tuberculosis 18. Schistosomiasis 19. SARI 20. Diarrhoea with blood 21. Whooping cough (Pertusis) 22. Diphtheria 23. Snake bites 24. Soil Transmitted Helminths 25. Adverse Events Following Immunization (AEFI)* 26. Asthma 27. Typhoid Fever *All serious AEFIs shall be reported immediately
Diseases or events of international concern		

Epidemic prone diseases	Diseases targeted for eradication or elimination	Other major diseases, events or conditions of public health importance
1.Human influenza due to a new subtype[1] 2. SARS[1] 3. Smallpox[1] 4. Any public health event of international or national concern (infectious, zoonotic, food borne, chemical, radio nuclear, or due to unknown condition-Anthrax, Plague) 1Disease specified by IHR (2005) for immediate notification		

This table was extracted from the Technical Guidelines for the IDSR (2013)

An assessment of the IDSR system in Yobe state found 71% of the respondents to have at one time or the other reported a notifiable disease to the next higher authority (Bawa, Olumide, & Umar, 2003). The importance of the IDSR in disease control and elimination necessitates continued vigilance to ensure that gains that have been made in disease control are sustained. For example, though significant progress has been made in the control of the WPV in Nigeria, the ability of the virus to continue asymptomatic transmission undetected after the declaration of the elimination in a country is an important reason to ensure continued surveillance for the virus (Vaz, Mkanda, Nsubuga, Ado, & Etsano, 2016). The Boko Haram insurgency in North-East of Nigeria has contributed to various health challenges affecting this region including the re-emergence of the WPV. Insecurity contributed to challenges with immunization of populations which in turn resulted in a depression in the herd immunity in the community which has since led to the re-emergence of new cases of the WPV following a two year interruption (Nnadi, 2017; Omole et al., 2015; Zoakah et al., 2016). In addition, disease surveillance was found to be almost non-existent at the camps of internally displaced persons (IDPs) in Borno, Adamawa and Yobe states where many affected by the protracted insurgency have taken refuge (World Health Organization, 2017a).

The IDSR system was found to grossly underreport the number of Neonatal Tetanus cases seen in Katsina state (Nass, Danawi, Cain, & Sharma, 2017). A retrospective study compared

the number of cases reported during a period with the number of cases that could be extracted from the records in health facilities. This revealed a significant difference of 336/100,000 for extracted data against 111/ 100,000 for that reported through the IDSR system for the same period. Similarly, mortality rates from the IDSR compared with the extracted data differed significantly (1.0 deaths/ 100,000 vs. 3.4 deaths/100,000) (Nass et al., 2017). These findings underscore the inability of the IDSR to provide reliable results for decision making without important changes to its current processes and performance.

Nigeria is one of the five countries responsible for 94% of the measles related mortality worldwide (Isere & Fatiregun, 2014). A recent review of the technical guidelines for the management of measles outbreak in the country recommended outbreak immunization campaigns as one of the response mechanisms. However, in order for this strategy to be successful, measles outbreaks need to be detected early and adequate response mechanisms to addressing the problem instituted. The absence of a reliable surveillance system poses a unique challenge to this laudable endeavour.

Knowledge of the disease notification system was found to be poor among doctors working in a public tertiary health facility in Edo State in Nigeria in a survey conducted in 1999 (Ofili, Ugwu, Ziregbe, Richards, & Salami, 2003). Poor awareness of the IDSR system and non-availability of data collection tools were also found to be contributory factors to poor compliance with the IDSR system by other studies carried out in the country (Bawa et al., 2003; Bawa & Umar, 2009; Nnebue, Onwasigwe, Adogu, & Onyeonoro, 2012; Nnebue, Onwasigwe, Ibeh, & Adogu, 2013). In a nationwide study carried out among public sector physicians, 93% of the respondents reported at least one obstacle to routinely reporting notifiable diseases to the authorities (Lafond et al., 2014). These were broadly classified into:

obstacles related to physician knowledge and attitude, obstacles related to physician time and resources, and obstacles related to reporting system infrastructure (Lafond et al., 2014). Several of the interviewed physicians did not know the reporting pathway for suspected avian influenza cases within their facilities.

According to a cross sectional study carried out in Anambra state, despite a high level of awareness of 89.8 per cent among healthcare workers on the disease surveillance system, only 33.3 per cent of the respondents could describe what the IDSR-001 form was used for and fewer, could mention two diseases that were being tracked by the form (Nnebue et al., 2012). Similar experiences were also reported with IDSR-002 and IDSR-003 forms in the study. Data collection forms were not always available in the health facilities surveyed and it was observed that the data collection tools were least available in tertiary health facilities (Nnebue et al., 2012). Notwithstanding these challenges, most health facilities had the IDSR forms and the stock were regularly being replenished (Nnebue et al., 2013). The public health officers at the Local Government Areas (LGAs) complained about having to beg the health facility workers to complete forms, unsure about their understanding of the importance and statutory requirement to report to the health authorities (Nnebue et al., 2013). Despite the supposed high level of reporting, there was poor record keeping at the local government offices which hampered a detailed review of completeness of the data reported by health facilities. It was noted that the IDSR system was not computerized and the Disease Surveillance and Notification (DSN) officers lacked access to computers and other telecommunication equipment for the smooth running of the program. Submission of forms by health facilities either went to the LGA offices, the Hospital Management Board or the State Ministry of Health (Nnebue et al., 2012). Lack of intra- and inter-sectoral collaboration

further limits the effectiveness of disease surveillance and notification in the country (Nnebue, Onwasigwe, Adogu, & Adinma, 2014).

Private healthcare providers make up 33 percent of health facilities in Nigeria (Makinde et al., 2014; Makinde, Sule, Ayankogbe, & Boone, 2018). However, despite being just one-third of the health facilities in the country, they serve over 60% of the population and account for over 70% of healthcare spending (International Finance Corporation, 2007; Onwujekwe et al., 2010). Non-reporting from these health facilities can bias any conclusions reached through data reported only by public health facilities. Unpublished in-country reports estimate that fewer than 50% of health facilities in the country were routinely reporting into the national HIS database in early 2014 which was worse among private health providers (Terpase, 2014). The problem was compounded by the fact that no information on the quality of the reports was provided.

A study of the surveillance system in Kaduna state revealed that despite private healthcare facilities making up 41% of the health facilities in a particular LGA, there were no representatives from this sector in the response team that was put together to counter the outbreak which was contrary to the recommendations by the national technical guidelines for IDSR in the country (Abubakar, Idris, Sabitu, Shehu, & Sambo, 2010). Based on the strategic importance of the private sector, it is imperative to investigate the factors affecting their adequate participation in the IDSR system in Nigeria.

Assessment of adherence to the IHR should include assessing the legal and institutional framework which establishes the IDSR system at the national and subnational levels and determining their adequacy and suitability to guide implementation of the IHR. In addition, it is necessary to examine the level of participation of private health facilities in the country in

routine disease reporting. Furthermore, there is need to generate evidence on the barriers to complying with the system by private health facilities and the level of knowledge of private healthcare practitioners regarding the system in order to inform strategies aimed at improving compliance.

2.2 Deficiencies in the existing literature

Previous research on the IDSR system in Nigeria have largely focused on public health facilities and the administrative government authorities leaving out private health facilities which serve a larger proportion of the population (Abdulraheem, Monehin, Akanbi, Onajole, & Bamgbala, 2004; Bawa et al., 2003; Bawa & Umar, 2009; Lafond et al., 2014; Nnebue et al., 2012, 2013). Furthermore, none of the existing studies assessed the legal framework which establishes the IDSR system in Nigeria and its potential impact on compliance with disease reporting.

A systematic review which investigated the participation of private healthcare providers in disease surveillance in low and middle income countries identified only one study from Nigeria (Phalkey et al., 2017). The study cited in the systematic review was focused on Tuberculosis surveillance (a vertical system), and did not cover the entire spectrum of diseases tracked by the IDSR system nor was it targeted at the IDSR system as a whole (Daniel, Adedeji Adejumo, Abdur-Razzaq, Ngozi Adejumo, & Salako, 2013). This study by Daniel et. al. reviewed data from the Lagos State Tuberculosis and Leprosy Control Program database which is a vertical reporting system and different from the country's IDSR system. Thus, it can be inferred that the IDSR system is yet to be studied in private health facilities in Nigeria.

2.3 Theoretical Frameworks

2.3.1 Theory

No single theory adequately describes the interaction between the different components of this study. However, the systems theory is a significant near fit. Also, the diffusion of innovations theory is used to explain some of the delay in the adoption of new processes as developed under the IHR. In addition, the diffusion of innovations theory is used to explain the delay in the enrolment of private health facilities in the IDSR process despite the country adopting this system several years earlier.

2.3.1.1 The Systems Theory

The systems theory was first described by the biologist Ludwig von Bertalanffy in the 1940s and further elaborated by Ross Ashby in 1956 (Mutale, Balabanova, Chintu, Mwanamwenge, & Ayles, 2016). Systems theory focuses on the relationship of different parts of the body working together as a whole entity (holism) (Cordon, 2013). This idea of the whole body working together as a single entity has been used to describe different real-life scenarios. According to the Online Business Dictionary (http://www.businessdictionary.com/definition/system.html), a system is "an organized, purposeful structure that consists of interrelated and interdependent elements (components, entities, factors, members, parts etc.). These elements continually influence one another (directly or indirectly) to maintain their activity and the existence of the system, in order to achieve the goal of the system."

The IDSR is a system which is made up of many different interrelated parts and includes; the legislation that establishes the IDSR, health management authorities with the responsibility to administer regulations, healthcare providers who are informed and adhere to the regulation and processes to monitor and ensure compliance with the system. The IDSR system

requires each components of the continuum to function collaboratively and efficiently in order to achieve the goals of the IHR. Poor implementation of any of the component of the IDSR will cause the system to falter and be inefficient. Thus, an assessment of the IDSR must review holistically the spectrum of the system from the legislation establishing the IDSR system to the processes that were developed to implement and monitor the performance of the system.

Upon adoption of the IHR by Nigeria, it was expected that the country formulate national laws to facilitate its implementation. These laws are expected to establish the compulsory monitoring of infectious diseases and should also dictate how the implementation of the law will be carried out in the country. Nigeria is a Federation with 36 states and the Federal Capital Territory. States are semi-autonomous and national laws require that states adopt wholly or modify further as may suit their specific geographic needs. Thus, it is necessary to review if this law was enacted and the adequateness of the law to facilitate compliance with disease reporting at the national and sub-national levels. Furthermore, it is necessary to review the number of states that have actively adopted or domesticated this law and the extent to which they have embedded its implementation in their state health system.

The existence of a law on disease surveillance does not guarantee its implementation, although the promulgation of such a law paves the way for establishing processes to support implementation of disease surveillance systems. The first administrative process to ensure compliance requires that the responsibility to implement the law be embedded in an office, established for the sole purpose of the IDSR or an erstwhile existing office is granted additional responsibility to address the implementation of the legislation. The second process will require that the mechanism for implementing the IDSR be developed to capture the

necessary data and report back to the administrative authorities where the data will be analysed and used for decision making. The IDSR system requires that health facilities report routinely to the administrative authorities upon encountering some specific diseases of public health significance. The reports expected are two tiered: immediate for highly contagious diseases and intermittent (weekly or monthly) for those not regarded as highly contagious but of significant impact (Federal Ministry of Health, 2013; Isere et al., 2015). This process is important for providing the data to detect outbreaks directly to the administrative authorities where analysis is done to detect abnormal presentation of cases and action subsequently instituted which is aimed at prompt control. Poor functionality within any of the processes will distort the entire IDSR system.

Reporting notifiable diseases requires that appropriate data collection tools for reporting are available to health workers at health facilities. The administrative government authorities are responsible for providing these data collection tools to the health facilities in order to ensure that they can report to the health authorities whenever cases that need to be reported present. The government authorities also ought to follow up regularly with these health facilities to ensure that they are complying with the regulation and are expected to provide feedback to the health facilities on reports made previously or the disease pattern within their geographic area. The unavailability of these data collection tools at the points of data collection will affect a health facility's ability to routinely report to the authorities. Investigating the availability of these data collection tools at the health facilities helps identify if this important step is carried out by the government administrative units. In addition, it is necessary to investigate the commitment of government authorities in providing feedback to the health facilities upon reporting.

Furthermore, key personnel at the health facilities need to be aware of their responsibility to report, the diseases that need to be reported and they also need to be knowledgeable about the reporting tools that should be completed by them in these facilities for immediate, weekly and monthly reports. Some key personnel in the health facilities that should be aware of the responsibilities to report on some specific diseases include the clinicians and the health records/ health information management personnel. The clinicians should be knowledgeable about the infectious diseases that require immediate notification and those that require intermittent notification. They should be aware of the specific data collection tools that should be completed in each scenario. Likewise, the health records/ health information management personnel need to be aware of the tools and the processes for reporting since they are the key personnel responsible for the management of the health records. Assessing compliance with the disease surveillance system requires investigating if these health workers are aware of their responsibilities to carry out these tasks and their knowledge of the IDSR system as a whole.

Specific interactions between health facilities and the government administrative authorities are also important to ensure that there is a two-way movement of information. Such information movement is important to keep the health facility workers convinced and motivated that the information provided by them is being used by the health authorities. Feedback is also important as it makes health workers aware of disease patterns in their environment and the actions that they should take in case there is an on-going outbreak within their geographic area. Information provided can also be important for designing education programs for patients presenting at their health facilities on how to avoid and mitigate the risks of on-going disease outbreaks.

Applying the systems theory to the IDSR thereby demonstrates the importance of the different components of the system when working efficiently together. A break in the chain could cause the entire system to fall short of its expectations and thereby lead to significant population level impact that could otherwise have been minimized had the system been working harmoniously as designed.

Application of the systems theory to healthcare has generated great discussions. Its ability to provide a holistic view of the problem overshadows the individualistic application of quality improvement in health (Anderson, 2016; Bielecki & Stocki, 2010). An application to the health system in Zambia revealed several barriers to the achievement of the health-related millennium development goals. These include socio-cultural practices, poor referral systems, limited health facility infrastructures and the lack of qualified human resources (Mutale et al., 2016). Mutale and colleagues further used the systems thinking approach to develop a framework for the evaluation of a health system strengthening intervention (Mutale et al., 2016). Prior to doing this, they used the approach to demonstrate the interrelatedness of different components of the health system which need each other to function optimally. Senge (1997) argued in his widely acknowledged publication on "Systems Thinking" that the invisibility of several processes in systems permits their importance to be ignored (Senge, 1997). Senge further used his systems thinking approach to identify five characters that an organization must possess for the institution to become a learning and efficient organization. This approach rested on the interdependence of the different parts of a system.

2.3.1.2 Diffusion of Innovations Theory

Besides the systems theory, the diffusion of innovations theory has shown that despite the availability of scientific evidence showing the potential gains of an intervention, adoption and

implementation can often be delayed or not adopted due to a variety of reasons (Glanz, Rimer, & Viswanath, 2008). Diffusion is defined as the "the process through which an innovation is communicated through certain channels over-time among the members of a social system. (Rogers, Medina, Rivera, & Wiley, 2005, p. 3)" The delay in the adoption of new innovations around the world has led to a new research field of science known as dissemination studies (Dearing, 2009). As such, delay of diffusion of new innovations is a recognized challenge in social sciences. With the revision and roll out of new policies and laws, it is necessary to investigate to what extent those at the lowermost level of services have been updated and trained on the new policy directions of the government.

From previous studies, the lack of detailed roles and responsibilities has affected the adoption and implementation of the IDSR in Nigeria. In addition, non-availability of data collection tools has been identified as one of the factors affecting compliance in public health facilities. Despite overwhelming evidence showing that routine tracking of diseases has significant benefits, systems designed to achieve this goal has not been optimal. However, before such statements can be made convincingly, a properly designed investigation needs to be carried out.

2.3.2 Relevance of the Theoretical Frameworks

The two theoretical frameworks (Systems Theory and Diffusion of Innovations Theory) described above provide a valid explanation of the potential problems that have plagued the IDSR system in Nigeria. Based on the complexity of one single theory explaining problems with some systems, Rogers and colleagues have described the potential for the combination of the complex adaptive systems theory and the diffusion of innovations theory which come in useful in the explanation of this study (Rogers et al., 2005). The combination of the two

theories provides an indication of the difficulty of describing the challenges with the compliance with the disease surveillance system in Nigeria.

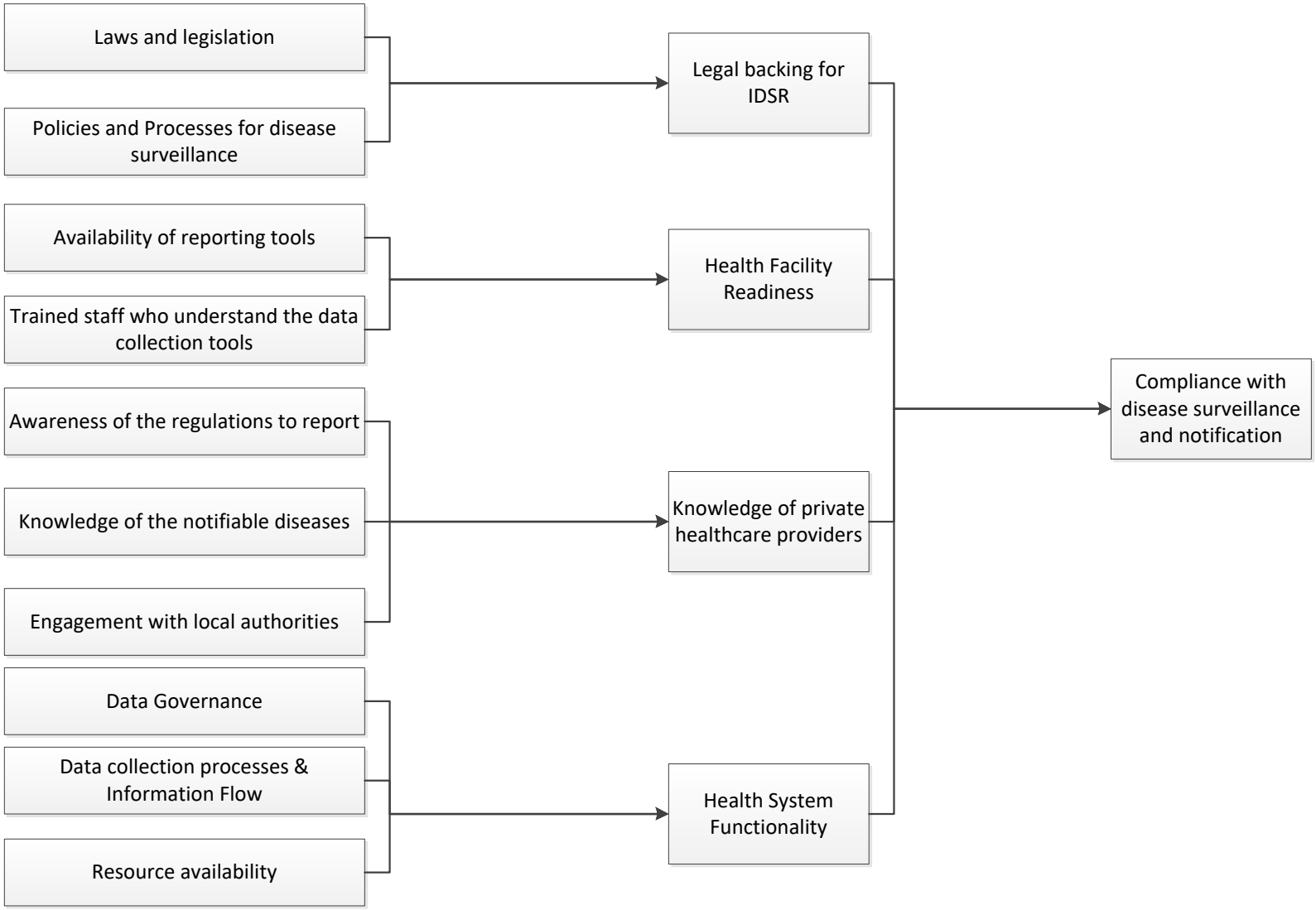
2.4 Conceptual Framework

The conceptual framework presented in Figure 2 below shows how different factors can affect compliance with disease surveillance.

2.4.1 Legal Backing for IDSR

The IDSR system in a Federation such as Nigeria requires that different tiers of the government (the Local Government, State Government and the Federal Government) work in harmony with laid out roles and responsibilities to achieve a common goal. However, poorly defined roles and systems can limit the achievement of intended goals. It is unclear how much roles are properly defined and how well laws and regulations have been enacted to provide the legal backing for the implementation of the IDSR. This study provides some answers to this lacuna. In addition, it is posited that should no office/ person be given the regulatory responsibility over health facilities with the ability to sanction them when they err, it is difficult to achieve compliance with disease surveillance.

Figure 2: Conceptual Framework showing relationship between different factors



2.4.2 Health Facility Readiness

Health facility readiness requires that different components that facilitate routine reporting by a health facility are in place. The need to report necessitates that health facilities are supplied with the necessary reporting tools and receive on-going training on its use when they are modified by state parties. Inability on the part of the state to effectively play its role limits the ability of private health facilities to keep to their part of the requirement. The study investigates if the government has carried out its responsibility of making available the necessary tools and provided training on how they should be completed by the health facilities. In addition, the study investigates if there are key trained personnel in private health facilities on health information management in South-West Nigeria.

2.4.3 Knowledge of Private Healthcare Providers

Private healthcare providers need to be aware of their responsibility in reporting and the potential benefit it brings to their health facilities for fulfilling such responsibilities. They also need to be aware of the diseases that must be reported immediately and those that require that they report on a monthly basis. They need to be aware of the forms that need to be completed for each of these responsibilities. For the purposes of this study, knowledge and awareness of private healthcare providers is examined through different survey questions that ask the kind of forms used to report on notifiable diseases by physicians and the diseases that must be reported by them.

2.4.4 Health System Functionality

The structure and functionality of the health system can have an effect on the performance of the disease surveillance system. These can be an aggregation of various factors that include the governance of the data system, data collection processes and information flow and

resource availability. These are important health system factors that can affect the proper functioning of any surveillance system. The fragmentation of surveillance systems along disease programs is a major issue that has been raised in the literature. Exploring to what extent the National Health Management Information System (NHMIS) in particular has affected or overlaps with the IDSR is important for determining whether there is duplication of effort and in identifying potential areas of synergy for the future.

2.5 Research Hypotheses

Poor legal establishment of the IDSR and its implementation, private health facility non-readiness, inadequate knowledge of healthcare providers and health system challenges affect compliance of private health facilities with disease surveillance and notification in Nigeria.

Null Hypothesis

- Legal backing for infectious disease has no effect on compliance with disease surveillance reporting by private health facilities in Nigeria.
- Health facility readiness to report has no effect on compliance with disease surveillance reporting by private health facilities in Nigeria.
- Knowledge of healthcare providers has no effect on whether they report into the disease surveillance system or not.
- Health System functionality has no role on the functionality of the disease surveillance system in the country.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This was a mixed methods study whose aim was to provide in-depth information on the Nigeria disease surveillance system and across different levels of stakeholders. The study investigated the legal system, the level of reporting and readiness of private health facilities to report, knowledge of private healthcare providers on notifiable reporting system and health system challenges that affected the performance of the disease surveillance system.

3.2 Study Setting

The study was carried out in the South-West geopolitical zone of Nigeria. The country is made up of 36 states and the Federal Capital Territory which are grouped into six geopolitical zones of between five and seven states in each zone (South-West, South-South, South-East, North-Central, North-East and North-West). The Nigeria Master Health Facility List (2013) reported that Nigeria had 34,423 private and public health facilities spread across the country (Table 2).

Data collection commenced after ethical approval was granted in March 2016 with the retrieval of relevant documents for review; however, field interviews could not be commenced until approval was received to interview government personnel. The authorization to interview federal government officers by the Honourable Minister of Health was received in October 2016. Each state Ministry of Health is headed by a Commissioner of Health. Each State Commissioner of Health was also informed about the study and approval sought and obtained before the study could commence in each of the six states where it was carried out.

Table 2: Distribution of Health Facilities by Geopolitical Zone, 2013

Geopolitical Zone	Number of Private HF	Number of Public HF	Total Number of HF	Proportion of HF in Zone (%)
North Central	1949	5108	7057	20.5
North East	371	4235	4606	13.4
North West	760	5937	6697	19.5
South East	2642	2230	4872	14.2
South-South	1335	2482	3817	11.1
South West	4338	3036	7374	21.4
Total	11,395	23,028	34,423	100

HF = Health Facilities

Private Health Facilities make up 33% of health facilities in Nigeria. However, these facilities are disproportionally distributed across the country (See Table 3 for the proportional distribution of private health facilities across the country). The South-West of Nigeria comprises six states (Lagos, Ogun, Oyo, Ondo, Osun and Ekiti states). These states together have 21% (7374/ 34423) of all health facilities and 38% (4338 /11395) of private health facilities in the country (Federal Ministry of Health Nigeria, 2013; Makinde et al., 2014). A targeted cluster sampling technique was applied to select the cluster (geopolitical zone) with the largest number of private health facilities. The South-West geopolitical zone cluster of states was selected for an in-depth study as the zone had the largest cluster of private health facilities which were targeted by the study.

Table 3: Distribution of Private Health Facilities by geopolitical zone in Nigeria

Geopolitical Zone	Number of Private Health Facilities	Proportion of Private Facilities in Country (%)
North Central	1949	17.1
North East	371	3.3
North Central	760	6.7
South East	2642	23.2
South South	1335	11.7
South West	4338	38.1

The study setting varied depending on the target population: for key informants at the national level, it was the Federal Ministry of Health – Department of Health Planning, Research and Statistics and the Nigeria Centers for Disease Control. For the State Ministry of Health across the six states, it was the Department of Health Planning, Research and Statistics and the Department of Public Health (State Epidemiology Unit), and at the health facilities, it was the clinicians (physicians and nurses) and the health records officers.

3.2.1 The Federal Ministry of Health

The Federal Ministry of Health (FMOH) is the national government's agency responsible for protecting the health of all Nigerians. Its Vision is "A World-Class Government Institution that ensures a healthy Nigeria" and its Mission is "To develop and implement policies that strengthen the national health system for effective, efficient, accessible and affordable delivery of health services in partnership with other stakeholders." A Minister of Health is appointed by the President of the Federal Republic of Nigeria as the Executive Head of the FMOH whereas, a Permanent Secretary who is a Civil Servant is appointed to run the Ministry.

FMOH has different departments each of which is headed by a Director. The Directors report to the Permanent Secretary. The departments in the FMOH include: Health Planning, Research and Statistics, Public Health, Family Health, Hospital Services, Food and Drug Services, Information and Communication Technology, Procurement, Public Private Partnership/ Diaspora and Legal Services. The FMOH also has four semi-autonomous agencies which are: National Primary Healthcare Development Agency, National Health Insurance Scheme, the National Agency for Food and Drug Administration and Control, and the National Institute for Medical Research (http://health.gov.ng/).

3.2.2 The Nigeria Centre for Disease Control

The Nigeria Centre for Disease Control (NCDC) was first reported in the literature as a plan in process in 2008 (Wakabi, 2008). However, it eventually started out as a project of the Federal Ministry of Health which was funded by the US Centers for Disease Control and Prevention in 2011. The NCDC has recently been in the spotlight following the EVD outbreak of 2014 and the important role that the institution played in maintaining the national health security. Based on its presumed importance and the continued threat to global health security especially the persistent Lassa fever outbreak in the country, the Federal Executive Council in 2017 submitted a Bill to the Nigerian legislature to consider enacting a Law establishing the NCDC as an agency of the FMOH. A public hearing by the Nigerian Senate has since been held on the 22nd January, 2018 to discuss the Bill to legally establish the NCDC as an independent agency of the FMOH (Ifijeh, 2018). Notwithstanding its legal status, the institution has been performing the function of monitoring disease outbreaks.

The NCDC's core mandate is to detect, investigate, prevent and control diseases of national and international public health importance. It has six Directorates which are: Public Health

Laboratory Services, Prevention and Programs Coordination, Emergency Preparedness and Response, Surveillance and Epidemiology, Finance & Accounts and Administration & Human Resources. The NCDC has been designated as the IHR National Focal Point. More information can be obtained from its website (http://www.ncdc.gov.ng/).

3.2.3 The State Ministry of Health

Each of the 36 states in the country has a State Ministry of Health (SMOH) with the goal of championing the affairs of the State Government in health. The SMOH is headed by a Commissioner of Health who is appointed by the Governor of the State. The SMOH also has a Permanent Secretary to run the administrative affairs of the SMOH. There are several departments headed by Directors who report to the Permanent Secretary at that level. However, the names of the departments vary from state to state. Notwithstanding the variations, all states have the Department of Health Planning Research and Statistics and the Department of Public Health. The State Health Management Information System Officer resides within the Department of Health Planning, Research and Statistics (DHPRS) while the State Epidemiologist is at the Department of Public Health.

3.2.4 The Health Facilities

The private health facilities in the South West were the target sampling units for the quantitative section of the study. The clinicians (doctors and nurses) and the health records personnel (trained or untrained) in these facilities were the respondents in the health facility survey. Physicians were preferred to other clinicians but when unavailable, the next senior clinician was permitted to respond to the clinician's component of the study. Since the outcome of interest was the health facility's practice of reporting of notifiable diseases, it was expected that any senior clinician could provide appropriate responses.

3.3 Study Design

The study employed a mixed-methods approach which included a desk review and policy analysis, key informant interviews (KIIs), and a cross sectional survey of private health facilities across the six states of the South West. These are subsequently elaborated upon.

3.3.1 Desk Review and Policy Analysis

The legislative framework for the disease surveillance system in Nigeria was assessed through detailed literature review and policy analysis in order to understand the global standard for disease reporting as stipulated by the IHR and what was being done in Nigeria. The study examined the national and subnational legal framework and guidelines establishing disease surveillance in Nigeria with a view to determining their adequacy for providing the needed backing for an efficient disease surveillance system in the country. In addition to the websites of the Federal Ministry of Health and the NCDC, several databases were searched for published literature on the Nigeria disease surveillance system. Contact with staff of government was also used to identify and validate policies and laws on disease surveillance. This methodology addressed the first objective of the study.

3.3.2 Key Informant Interviews

Key informants in health administration at the national level and in the six states of the South-West were interviewed to augment the information gathered during the literature review. The interviews collected data on the participants' expectations of the system, their perceptions on the adequacy of the legal system establishing disease surveillance in Nigeria, their understanding of the role of the IDSR system, the actions taken to ensure compliance with the system and limitations in enforcing compliance with the system. In addition,

information was collected on how data gathered through the system was utilized. The detailed KII guide is available in the annex of the report.

3.3.3 Secondary Data Analysis

The initial plan was to examine the level of compliance with the IDSR system including completeness of information and how the private sector data compares with the public sector. This was to address the second objective of the study. Data for the IDSR was requested from the states and the Federal Ministry of Health in order to meet the objectives of the study. However, the data was not readily available. While the District Health Information System (DHIS) software had been deployed for the collection of routine health data in the country, this was absolutely being used for the National Health Management Information System (NHMIS) which was run parallel to the IDSR. In the states, the IDSR was retrieved from only sentinel facilities by the LGA officers and only the aggregate data (based on the total number of facilities and how many reported for a given period) was reported to the State from the Local Government Area offices and subsequently to the Federal Ministry of Health using a predefined MS Excel template. As such, granular data was not readily available to fulfil the study objective which was expected to compare reporting practices across private and public health facilities. Thus, the study assessed the self-reported compliance with the IDSR by private healthcare providers, compared the overlaps of the two health information systems (NHMIS and IDSR) operating in the country and discusses the inefficiencies inherent in running parallel systems.

3.3.4 Health Facility Survey

The third and fourth objectives were addressed through multiple approaches. A structured questionnaire was designed to collect quantitative data on the knowledge and perceptions of

private healthcare providers regarding the IDSR system and the barriers to routinely complying with the requirements. Information was captured on the knowledge of the healthcare providers regarding the statutory requirement of reporting diseases to the health authorities, perceptions about the importance of routine reporting to the health authorities, and the barriers to routinely reporting to health authorities. The respondents in the health facilities were the clinicians and health facility records managers. Attending physicians were the primary target respondents and in their absence, the nursing officer in charge of the health facility was targeted for interview.

Table 4 below illustrates the objectives of the study and the methodology that was utilized in addressing each of them.

Table 4: Cross Match of Research Objective and Method of Investigation

Research Objective	**Method of Investigation**
Objective 1: To examine the legislative/ legal framework for routine disease reporting in Nigeria (nationally and sub-nationally) and how it might affect compliance by private providers.	Policy analysis, document reviews and Key Informant Interviews
Objective 2: To determine the level of reporting of notifiable diseases by private providers, the completeness of information and how these compare with the public sector.	Health facility survey and Key Informant Interviews
Objective 3: To determine the knowledge and perceptions of private healthcare providers on	Cross sectional data collected during health facility survey.

Research Objective	Method of Investigation
the importance of routine disease reporting in Nigeria.	
Objective 4: To identify the barriers to routine disease reporting by private healthcare practitioners/ facilities in Nigeria.	Cross sectional data collected during health facility survey, Key Informant Interviews with health administrators at the Ministry of Health and comparative analysis of two parallel systems (IDSR and NHMIS)

3.4 The Population and Sample

Study participants depended on the objective and nature of the data that was being collected. Key Informants were personnel responsible for managing the IDSR and the routine health information system in the FMOH and the Nigeria Centers for Disease Control at the National level and in the SMOH in the targeted states. These institutions have been described earlier in the report (see section 3.2).

Data on compliance with reporting and completeness of information was obtained from the study participants. Although the initial plan was to analyze routine data reported by states, this could not be achieved because such data was not readily available. However, analysis of the parallel processes for the collection of routine health data operating in the country was carried out.

A cross sectional survey of private health facilities in the South West geopolitical zone was completed. The health facilities were proportionally selected from the states within the

region after an appropriate sample size had been determined. Within the health facilities, the respondents were the clinicians (Physicians and Nurses) and the health records managers.

3.4.1 Sample Size Determination

The six states in the South-West geopolitical zone were enrolled in the data collection exercise. Key personnel such as the state epidemiologist, state health management information system officer and other IDSR key personnel were interviewed during the KIIs in each of the six states. At the national level, the NHMIS officer and the IHR contact person were interviewed.

The sample size for health facilities was determined using the Fishers formula for sample size calculation shown below.

$$N = Z^2PQ/ D^2$$

Where N = the sample size

Z = is the normal score (at 95% = 1.96)

P = Is the proportion of health facilities complying with reporting responsibilities

Q = Proportion of health facilities not complying with the reporting responsibilities

D = The desired level of precision for this study (0.05)

Since there were no previous studies that have carried out similar assessments in Nigeria to provide prevalence of compliance in private health facilities, P and Q were therefore set at 0.5.

Using these values, we calculated our minimum sample N to be 384.

However, the sample size was increased to 424 taking into account non-response/ error rate of 10%.

3.4.2 Site Selection

3.4.2.1 Key Informant Interview

The South-West geopolitical zone was identified for the study because it had the largest concentration of private health facilities. All the states in this zone were selected for further investigation. Each state has only one state epidemiologist and one state HMIS officer. In one state, there was no substantive state epidemiologist and the next officer in line, the State Disease Surveillance and Notification (DSN) officer was interviewed. The two officers in each state were recruited into the study to provide perspectives on the IDSR system and the NHMIS respectively. Similarly, at the National level, the national IHR focal person and the NHMIS officer were interviewed. In all, 14 government officers were interviewed across the six states and at the national level.

3.4.2.2 Health Facility Survey

The national master health facility list (MFL) published in 2013 was used as the sampling frame for the health facility survey. The number of health facilities from each state in the South-West geopolitical zone was calculated from the MFL. The proportion of facilities represented in each state of the total in the geopolitical zone was also calculated. A proportional allocation of the sample to each state was then computed based on the sample size that was previously calculated. This served as the target number of facilities for each state to be visited. See table 5 below for more information.

Table 5: Health Facility Sample Population by State

State	Private HF Distribution from MFL (A)	Proportion of Private HF Population (%) = B = A * 100%/4338	Minimum Expected Sample in HF Survey (number) = C = B * 424
Ekiti	146	3.4	14
Lagos	1964	45.3	193
Ogun	1014	23.4	99
Ondo	330	7.6	32
Osun	358	8.3	35
Oyo	536	12.1	51
Total	4338	100	424

HF = Health Facilities

Each state is made of local government areas (LGAs). The MFL was further analyzed to determine the total number of health facilities within each LGA. The resulting output was then arranged in descending order based on the number of private health facilities in the LGAs. The top five LGAs with the largest number of facilities were then identified and targeted for the data collection starting with the LGA with the largest number of facilities. However, upon arrival in each state this selection process was discussed with the SMOH personnel. In one instance, an updated list of facilities was available which revealed that more private health facilities were in another LGA and this finding changed the order of priority of LGAs in this state. Thus, in this state (Ogun), this updated list was used for site identification. Once a LGA was selected, the data collection team set out to collect data across private health facilities in the LGA until they exhausted all available facilities before moving to the next LGA. In some instances, the sample size was achieved within the first LGA.

3.5 The Instruments

A KII guide was developed to steer the interviews with key personnel and to serve as a quality assurance tool during data collection while a questionnaire was developed to collect quantitative data for the health facility survey.

3.5.1 The Key Informant Interview Guide

The Key Informant Interview (KII) guide was designed to be exploratory and for the questions to be progressive. Later questions built on the earlier answered ones thereby providing an opportunity for building a pathway for the information collected. The questions were designed to address the objectives of the study, most importantly the first and last objectives of the study. An analysis of each of the questions asked is provided below.

1. How does Nigeria or this state (insert name) meet the International Health Regulations? Prompt if necessary,

- The notifiable diseases
- What systems are in place to ensure compliance?

This question asked for information on the policies and laws for disease surveillance in Nigeria from the key informants. It investigated the knowledge of the officers on the laws for disease surveillance in the country and in the different states where the survey was carried out. The tool provided an opportunity for exploring the systems that are in place for meeting the international health regulations in the different states and at the national level.

This question was used to address the first objective of the study which sought to examine the legislative/ legal framework for routine disease reporting in Nigeria (nationally and sub-nationally) and how it might affect compliance by private providers.

2. What are the policies, guidelines or processes currently active in Nigeria and/ or this state to enforce compliance with the integrated disease surveillance and response (IDSR)?
    - Can I get copies of these policies, guidelines or processes?
    - Do you think these policies, guidelines and processes are comprehensive and well managed to detect epidemics early and take into account interventions to reduce their impact?

The second question provided an opportunity for the interviewer to request for any state/ national level policies for further in-depth study. It also investigated the opinion of the interviewee on the adequacy of the policies and laws for disease surveillance in the state or the country. Furthermore, it gave the respondents an opportunity to provide additional information on the management of the disease surveillance system in general. This question also addressed the first objective of the study.

3. What contribution do private health facilities give to healthcare provision in Nigeria/ this state?
    - What is their coverage?
    - How many people (estimated) do they serve?
    - Do you think they attend to diseases of public health significance?

This question investigated the individual assessment of the health workers on the contribution of private health facilities to the general health system in the state. It further probed whether the health worker felt that private health facilities attend to diseases of public health significance. The rationale for the question was to provide an opportunity to understand their views regarding the missed opportunities for private health facility reporting

into routine health information system. It contributed towards addressing the second objective of the study: “To determine the level of reporting of notifiable diseases by private providers, the completeness of information and how these compare with the public sector”.

4. How do the policies/ guidelines for disease surveillance incorporate private healthcare facilities?

- Is there a statute at the federal/ state that compel health facilities to report? If yes, can I get a copy?
- Do you think this statute is well implemented?
- How well do private health facilities report notifiable diseases in the country/ this state?
- What specific challenges have you identified as a senior healthcare worker responsible for this observation in the state?

This question explored how well the policies and laws on disease surveillance incorporated private health facilities in the state/ country. It goes in-depth to investigate the availability of a law/ policy that compels health facilities to report notifiable diseases to the state through the LGA. It explores the perception of the health worker on how well the law/ policy is implemented in the state and seeks to identify specific challenges that the health worker has identified as an impediment to the reporting by private health facilities in the state. This question addressed the first objective of the study.

5. How can the efficiency of reporting of notifiable diseases from private health facilities be improved? Prompt for the following

- Do you think we have adequate legislation?

- Do you think the system is currently well funded across governments? Probe for federal, state and LGA funding.
- What do you think about the adequacy of the district health information system which houses the database for collecting the data?
- Do you think there is duplication of efforts across program areas causing gridlocks and overburdening of the system?

The question explored the perceptions of health workers regarding how reporting of notifiable diseases could be improved. It further explored how health workers viewed the legislation and its adequacy where available, the level of funding by the LGA, state and federal government for the disease surveillance system, the adequacy of the district health information system for collecting data for disease surveillance and the presence or absence of duplication of effort across the data collection systems in the country. This question contributed to addressing the fourth objective of the study: "To identify the barriers to routine disease reporting by private healthcare practitioners/ facilities in Nigeria."

6. Reflecting on the Ebola Virus Outbreak of 2014, would you say there was prompt response to the epidemic following the presentation of a case in a private hospital?

- Prompt identification
- Response to the case
- Protection for the entire population

The question explored the perceptions of health workers regarding the response to the EVD outbreak in the country.

7. How do you use the data from disease surveillance in the state/ country?

- How frequently is it analyzed?
- Are there any products from these data? What is the role of the epidemiology bulletins in disseminating information from the disease surveillance and response system?
- Is this being routinely done?

The last two questions were on data use. The first explored how the state/ federal ministry of health uses the data collected from the disease surveillance system, frequency of analysing the data and the reports or bulletins produced from the data.

8. Can you tell us some notable infectious disease outbreaks in the country/ state in the past? (mention the years if known)
- How were these identified and what measures were taken to address them early and prevent a recurrence or reduce the potential impact should another episode occur?

The last question was used to explore if the state had recorded any notable infectious disease outbreak, the process for the identification of the outbreak and the response that was initiated following the detection of the outbreak.

A copy of the full KII guide is available in the annex of the report.

3.5.2 The Health Facility Survey Tool

A 53-question health facility assessment tool was also developed to assess the health facility's readiness, willingness and ability to report into the disease surveillance and response system. The tool had three sections: the first was on the general information on the facility, the second was completed by the health records officer or the person assigned in the facility for the

management of health records while the third section was completed by a clinician (medical practitioner or nursing staff).

The first section of the survey tool documented general information on the facility including the address (street, local government, state), the type of health facility: whether for profit or not-for-profit, level of services provided (primary, secondary or tertiary) and the year of establishment of the facility. The general information on facilities was important for investigating if there were variations based on location, the type and level of care of the private health facilities. Some states could be more proactive in implementing policies and laws than others and this could be an important point of disaggregation to identify differences across the states.

The next section was targeted at the health records officer and documented the educational qualification of the officer, whether he/ she had formal training in health information/ records management, the level of training of the individual, certification by the health records officers' registration board of Nigeria, participation of the health facility in disease surveillance and knowledge of the officer on the type of tools used in reporting notifiable diseases to the authorities. Health records officers are an important resource in disease surveillance as they handle the records of individual clients and are expected to compile statistics of the cases seen in the health facilities on a daily basis. They are also trained in coding diseases according to the International Statistical Classification of Diseases and Related Health Problems. Thus, the availability of a qualified health records officer could have a significant impact on the health facility's contribution to the disease surveillance system in the state. Furthermore, the availability of qualified health records personnel could signify the upholding of quality standards by the health facility. This could be an indirect reflection of

how well the state was enforcing its regulatory responsibilities in ensuring quality healthcare services were being discharged in private health facilities. It could also reflect the shortfall in the needed skills in health records management in the country. These are important factors that need to be taken into consideration as part of efforts to strengthen routine disease surveillance system in a state and by extension, the entire country. Availability of tools is a prerequisite to reporting and can be an important factor in ensuring that private health facilities document their disease presentation and communicate these to the state authorities for action.

The next set of questions of the tool was on general information of the physician where one was available to complete the form. This section documented the year of qualification of the physician, whether the physician had an additional qualification, number of years since qualification, specific training on disease surveillance and when the training was received (in medical school, postgraduate degree after medical school or a short course). Qualification of the physician is an important factor that determines whether a health facility complies with disease reporting. The length of period that a physician has been in practice can be an important factor in contributing to the disease surveillance system as the older physicians could have witnessed more outbreaks thereby influencing their participation in the disease surveillance system. They may also have been more exposed to the state and government officers thereby making them more knowledgeable about the disease surveillance system and thus more likely to participate in it.

The remaining part of the questionnaire evaluated the awareness of the clinician and practice of the health facility towards disease surveillance. This section was completed by the physicians or any other clinician available within the health facility. It evaluated their

knowledge of diseases that require immediate reporting, the data collection tools that are used for disease surveillance, the last time the data collection tool had been sighted by the clinician, their perception of responsibility for reporting notifiable diseases to the state authorities, attendance to diseases that required reporting, and the ability to report these cases when necessary, the level of difficulty with reporting, the level of success with reporting and the response of the state to the reports. Other questions explored awareness of a law or regulation that compels health facilities to report notifiable diseases to the authorities, assessment of the surveillance system, challenges that the health worker felt deterred performance of the surveillance system, relationship with the disease surveillance officer in the local government, receipt of feedback from the health authorities on disease outbreaks or routine reports within their jurisdiction and the cases of specific diseases that were seen within a particular period. A table of specific diseases that were seen over a six-month period was to be completed in each facility by the data collector. The table specified three tracer indicators that were investigated across the health facilities. The three tracer diseases are 1) Number of vaginal discharge cases seen 2) Number of Malaria cases seen 3) Number of cases of Diarrhea (with blood) seen. This section of the data collection tool was important for documenting the potential factors that could influence reporting by the health facilities.

3.6 Data Collection

The data was collected across all the states by the principal investigator and data assistants engaged to support the data collection exercise. The principal investigator conducted all the key informant interviews and recruited data assistants in each state to support data collection in all eligible health facilities in the states. The data assistants were experienced data collectors who had been previously engaged in similar exercises in the states. All data

assistants were trained by the principal investigator prior to their deployment for the data collection exercise. They were also provided continuous mentoring and support by the principal investigator until data collection was completed.

3.6.1 Literature Review and Policy Analysis

A list of all the policies and laws on disease surveillance was progressively made from studying the literature and also from engagement with the key informants. Eight documents identified were retrieved and reviewed. An external evaluation of the IHR capacity of the country which was led by WHO was also reviewed and information from the document extracted. A tabulation of all these documents was done. The key objectives of each of the identified documents were extracted after reading through each of them. Also, the year of establishment of the policy/ law was also extracted and tabulated.

A detailed literature review was also conducted to provide background information on what has been done in Nigeria. The Medline, SCOPUS and Google Scholar databases were searched using key terms such as "'Communicable Diseases", "'Integrated Disease Surveillance and Response" and "IDSR". These were combined with 'Private Hospitals', Africa AND Nigeria to narrow down to focused articles on private health facilities globally, in Africa and Nigeria as necessary. In addition, a Google Scholar alert was setup at the beginning of the project in 2016 using the term "IDSR or 'Integrated Disease Surveillance and Response'" which ensured all newly published articles which mention the key terms were automatically seen and reviewed as necessary. References of identified articles were also scanned to locate additional publications that should be reviewed.

3.6.2 Qualitative Data Management

The KIIs were conducted in quiet sections of the offices of the respondents. Prior to conducting the sessions, an introductory letter was written to the Minister of Health and each State Commissioner across the six states seeking approval for the conduct of the study in the state. The sessions were recorded using a digital voice recorder. The recordings were subsequently transcribed verbatim by the principal investigator.

3.6.3 Quantitative Data Management

The quantitative data was collected using the questionnaire designed for the purpose. They were completed by the data assistants or the respondents in the health facilities when they were unavailable to provide immediate answers to the data assistants for their sections. A Microsoft Access database was designed for data entry. Data validation rules were incorporated in the database design. Where the data element was numeric, only numbers could be entered into the database. In situations where the response was predefined from a list of options, this was also incorporated into the database and could be selected from a dropdown list. One data entry assistant was engaged for the entire exercise. The assistant also received training on the system prior to commencing the data entry.

Random records from the database were compared with the source documents using a unique identifier that had been assigned each data collection form by the principal investigator. This did not reveal any systematic data entry error. Data cleaning was done by randomly checking for errors on a spreadsheet/ table after the data entry was completed. In addition, frequencies were run to show outliers in the quantitative data. Where outliers were found with no justifiable explanation for the observation seen, the data entry forms were further screened. In situations where errors in recording on the data entry forms were suspected, the records were excluded from further analysis.

3.7 Data Analysis

Analytical approach differed by the nature of data collected as presented in the next section.

3.7.1 Literature and Policy Analysis

Literature review on policy revealed the presence of several policies and laws on disease surveillance. Some were entirely focused on the disease surveillance system while others were on the health system and incorporated the disease surveillance system or the national health information system only as a matter of concern or importance to that law/ policy. Important extracts from these documents were taken and used in the preparation of the report.

Literature review on disease surveillance system was divided into global, regional and national studies. The studies were reviewed to understand research that have been carried out in various parts of the world, the successes and level of compliance with disease surveillance by geographic location and health facility types and barriers affecting the performance of disease surveillance system.

3.7.2 Qualitative Analysis

The principal investigator read the transcripts repeatedly to identify key themes emerging from the data. The themes generated were then arranged based on the objectives of the study especially around legal framework for disease surveillance and barriers to disease surveillance in Nigeria. Important quotes by key informants were identified and extracted for use in the preparation of the report. The data analysis was manually done by the principal investigator.

Open ended questions from the health facility survey were also reviewed and recoded. Themes were identified and used in the preparation of the report. Important quotes were extracted for use in the report.

3.7.3 Quantitative Analysis

Quantitative data analysis was conducted using the statistical package "R". R is an open-source programming language for statistical computing. It is an integrated suite of software facilities for data manipulation, calculation and graphical display (CRAN, n.d.). R is increasingly becoming popular with statisticians because of its great visualizations and ability for manipulation to deliver results in different customized formats. However, it depends on command-line scripting which can be challenging for a beginner. Based on its increasing popularity among statisticians, the Comprehensive R Archive Network (CRAN) which serves as the parent organization for the suite of applications has established a specific journal to advance learning and growth of the application. Several books have also been published on the application some of which are listed on the CRAN website (https://www.r-project.org/doc/bib/R-books.html).

The data for this study was first exported in an appropriate format from the MS Access database where the data entry was done before subsequently being imported into R. Frequency tables and charts were then generated from the data. In some instances, composite indicators were generated based on multiple responses to a single question. For example, participants were asked to mention three diseases that were being tracked for immediate reporting in Nigeria. Participants who mentioned only one correct answer were scored '1', those that mentioned two were scored '2' while those that successfully mentioned three were scored '3'. Those that did not get any right scored '0' for this question. Another

composite indicator was in mentioning three data collection tools for disease notification system in the country. Participants who successfully mentioned the three data collection tools were categorized as “Correct” for the question, those that got at least one but not the three got a “Partially Correct” grading while those that did not get any were graded “Wrong”. Some participants mentioned only the NHMIS tools and these individuals were coded as “NHMIS” for the purpose of the descriptive analysis. While the mention of NHMIS was wrong, this level of analysis was important to show the confusion across the two routine data collection systems in operation in the country. For those that mentioned one IDSR tool and NHMIS, they were also graded as “Partially Correct”.

Quantitative data analysis entailed computing univariate distributions and bivariate associations as described in the subsequent sections.

3.7.3.1 Descriptive Analysis

The descriptive analysis was done to show the feedback of the respondents from the health facility survey. For these, each question is analysed independently to generate frequency tables and charts. The frequency analysis was important to provide a view of the patterns and behaviour of the different health facilities. It provided a quick view of how well the health facilities were doing with respect to the reporting practice and whether reporting varied by state, health facility ownership type (for profit or not-for-profit) or level of care.

3.7.3.2 Inferential Analysis

Bivariate analysis was conducted to determine the relationship between the outcome variable of interest (reporting) and the different predisposing (independent) factors. The variables included in the analysis are presented below:

1. Availability of reporting tools

2. Availability of an assigned Health Records Officer
3. Duration health records officer has spent in the health facility
4. Knowledge of the data collection tools used for reporting notifiable diseases by health records officers
5. Knowledge of data collection tools used for reporting notifiable diseases by the clinician in attendance.
6. Number of years since graduation of the physician.
7. Health worker agrees it is their responsibility to report
8. Health worker is aware of a law to report

The selection of variables and analysis were guided by the objectives of the study and conceptual and theoretical frameworks presented earlier. The bivariate inferential analysis method used in the investigation was logistic regression. Health facilities complying with reporting were coded as '1' and those not complying as '0'. This new variable was then used as the outcome variable in the calculation of odds ratios and 95% confidence intervals for various independent parameters of interest.

Table 6: Rationale for Data Analysis

	Analysis	Rationale
1	Compliance with disease reporting by health facilities surveyed	This table provides an overview of the distribution of the responses of the health facilities across the states, by level of care provided and ownership of the health facilities.
2	Effect of the average length of period the health facilities had been in operation by 2017 and reporting practice	The duration of operation of a health facility could be related to the behavior of the health facility as they may have had more time to be engaged by the health authorities.
3	Effect of the average number of staff available in the health facilities and reporting practice	This variable is used as a proxy to determine the size of the health facility. The bigger health facilities are more likely to have more workers traversing different sections of health service delivery in the facility. This could be an important factor affecting ability to report into the disease surveillance system.
4	Effect of the level of services provided by the health facilities: Primary, Secondary or Tertiary and the reporting behavior.	Higher level facilities may attend to more complicated cases, including infectious diseases which may determine whether they report notifiable diseases compared with facilities that do not receive such cases. This analysis

		shows the distribution of these facilities in our study and how they influence the level of the facility influences reporting behavior.
5	Availability of tools for reporting and reporting behavior	The availability of the tools for reporting is an important precursor to compliance with reporting in the health facilities since health facilities need these data collection tools to report to the authorities.
6	Relationship between availability of an assigned health records officer and reporting behavior	Health records officers are responsible for the collation of health records in health facilities. They are trained in disease coding and have a shared responsibility for the completion of the disease surveillance forms in the health facilities.
7	The relationship between facilities with a health records' officer that is formally trained in health records management and reporting practice.	The behavior of health records officers with regards to reporting may be related to whether they are academically qualified in health records management and this was tested statistically.
8	The Level of Education of Designated Health Records Officers without Formal Training in health records management.	This analysis provides information on the kinds of people that are holding health records positions in health facilities despite not being trained in health records management.

9	Health Records' Officer Correctly identified three data collection tools for reporting notifiable diseases	This analysis shows the knowledge of the health records officers on the disease surveillance system in the country.
10	Health Facility Routinely Reports and Clinician Correctly Identified Three Reporting Tools.	The practice of reporting can be done incorrectly when the knowledge of the tools used for reporting among health workers is inadequate. This variable provides an opportunity to investigate the knowledge of the healthcare providers.
11	Among those that claim to routinely report, those that identified correctly three disease notification tools by State	This analysis provides an opportunity to conduct a quality check since health facilities that claim to routinely report should have an understanding of the disease surveillance tools.

3.7.3.3 Comparative Health System Analysis

The data collection tools and processes of the two routine health information systems (NHMIS and IDSR) identified to be operating in the country were compared in detail. The guidelines for the two documents and the governance process for the health data systems were also examined and inferences drawn from these analysis and the key informant interviews earlier described. Particularly, the questions on funding for disease surveillance system, adequacy of the district health information system for data storage and transmission and the perception of the informant regarding duplication of effort and its attendant consequences on the national health information system were important KII questions that fed into the health system analysis.

3.8 Ethical Issues

Ethical approval for the study was obtained from the National Health Research Ethics Committee in Nigeria (NHREC Approval Number NHREC/01/01/2007-18/03/2016) and the University of the Witwatersrand Human Research Ethics Committee (Non-Medical) Protocol Number H16/05/09.

The main contact with individuals during the course of the study was through key informant interviews, and the structured face-to-face interviews with healthcare providers during the health facility survey. A participant's information sheet which contained detailed information about the study and the contact of the principal investigator and his supervisor at the University of the Witwatersrand was shared with each respondent before interview commenced. The participants were also verbally informed about the purpose of the study and each provided a written consent before participating in the study. They were also informed of the right not to answer any question or to stop the interview if they did not wish

to proceed at any time during the course of the interview. Prior to interviewing key informants in government, approval to conduct the study and interview government officers was obtained from the Minister of Health for the Federal officers and from the Commissioners of Health in each state where the study was conducted. Some states also requested for and reviewed the proposal for the study prior to commencement of the study in the state. In such instances, state level ethical approvals were also obtained from these states.

Care was also taken to de-identify the recordings made during the KII using aliases for the respondents with the principal investigator keeping a code book. Where references needed to be made, the principal investigator maintained a master file that links the data sources with the data. In addition, states were not identified in extracts used in the report. The health facilities sampled were not identified by name and only summary statistics are presented in the report.

CHAPTER 4: PROFILE OF THE STUDY PARTICIPANTS

4.1 Introduction

This chapter provides a profile of the different participants in the study. It provides a basic description of the study participants and their distribution across the states.

4.2 Key Informants

Fourteen key informants were interviewed: two at the national level and 12 across the six states. At the national level, the officers interviewed were the National Health Management Information System Officer and the Director of Surveillance at the Nigeria Centre for Disease Control. In each of the states, the State Epidemiologist and the State Health Management Information System officer were interviewed. In Oyo state, there was no substantive State Epidemiologist in office and as such, the State Disease Surveillance and Notification Officer, who was the next most senior person was interviewed.

4.3 Health Facilities

Five hundred and seven private health facilities spread across the six states in the south-west were surveyed to provide information on their compliance with the disease surveillance system in the country and to determine the factors that affect compliance with this system. Table 7 shows the number of facilities surveyed in each state.

Table 7: Distribution of Facilities Surveyed

State	Target (with 10% non-response)	Surveyed (Percentage)
Ekiti	14	20 (3.9)
Lagos	193	235 (46.3)

State	Target (with 10% non-response)	Surveyed (Percentage)
Ogun	99	118 (23.3)
Ondo	32	39 (7.7)
Osun	35	40 (7.9)
Oyo	51	55 (10.8)
Total	424	507 (100)

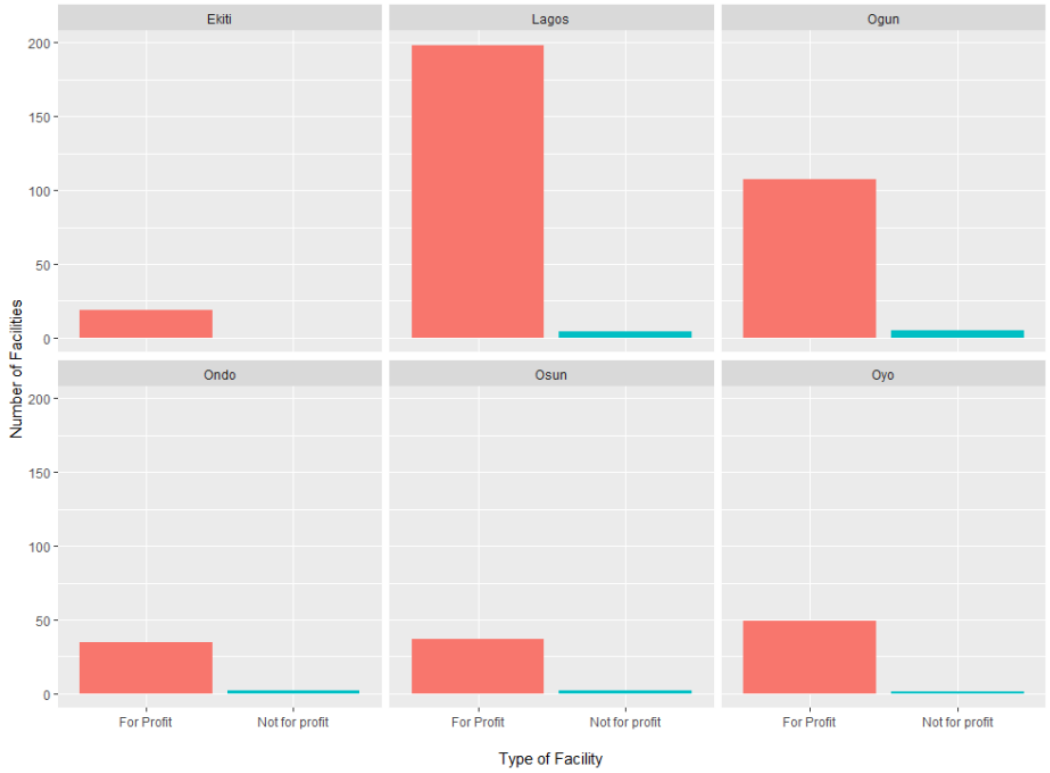
Table 8 shows the distribution of health facilities surveyed by type and level of care. Of the facilities surveyed, 445 (97%) were for profit. The not-for-profit health facilities are usually Mission hospitals which are larger than the for-profit private health facilities and more likely to have a wider range of staff with the various responsibilities including health records management and reporting. Figure 3 presents the distribution of health facilities across the states by type and ownership.

Table 8: Distribution of Ownership Type and Level of Facility

	Categories	Number of Respondents	Percentage
Ownership Type of Private Health Facility	For Profit	445	87.8
	Not for profit	14	2.8
	Blank	48	9.5
	Total	507	100
Level of Facility	Primary	207	40.8
	Secondary	250	49.3

	Tertiary	11	2.2
	Blank	39	7.7
	Total	507	100

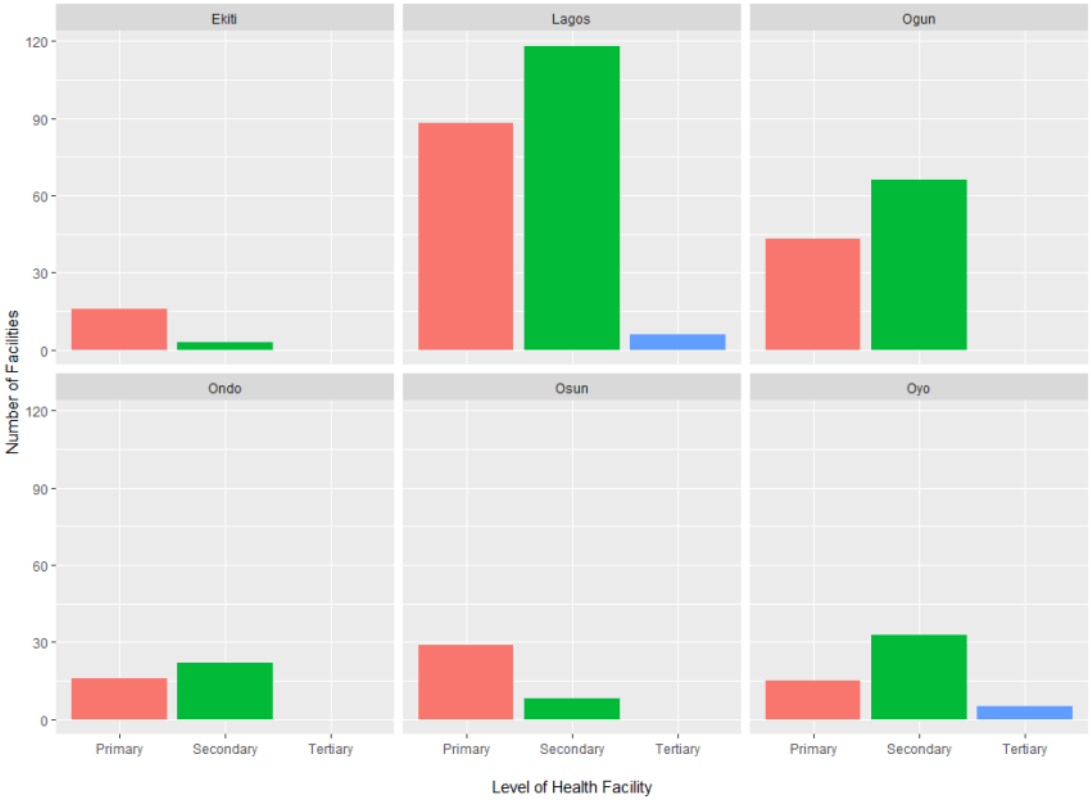
Figure 3: Ownership Type of Facilities Surveyed by State



Health facilities in Nigeria are categorized into Primary, Secondary and Tertiary levels. Primary health facilities provide the most basic services whilst tertiary health facilities provide the most advanced services within the country. Two-hundred and seven (41%) of the facilities surveyed were primary, 250 (49%) were secondary, 11 (2.2%) were tertiary while 39 (7.7%) did not indicate their level of care (Table 8). Figure 4: provides the distribution of the health facilities across the six states. It shows that tertiary health facilities were surveyed in only Lagos and Oyo states. It also showed that while four states (Lagos, Oyo, Ondo and Ogun) had more secondary health facilities than primary on the study, Osun and Ekiti states had more primary health facilities than secondary.

The average length of time the health facilities surveyed had been established was 15.95 years (sd=10.80 years). The average number of staff in each health facility was 12.51 persons (sd=13.11 persons).

Figure 4: Distribution of Level of Health Facilities Surveyed by State



4.4 Summary

In summary, there were 14 key informant interviews and 507 health facilities surveyed for this study. These health facilities were of different levels and utilized various financial models (for profit and not for profit) though most were for profit. The distribution across the states also varied with Lagos state having the largest share and Ekiti state having the lowest share of the sample.

CHAPTER 5: STATUS AND ADEQUACY OF LEGAL INSTRUMENTS ESTABLISHING INFECTIOUS DISEASE SURVEILLANCE IN NIGERIA

5.1 Introduction

The performance of the IDSR system is influenced by a range of factors one of which is the availability of a legal instrument that establishes the disease surveillance system in a country (World Health Organization, 2009). According to the IHR, every member country is expected to establish processes for meeting the IHR including a robust disease surveillance system that can provide timely information on diseases in the country within five years of the IHR (2005) coming into force (World Health Organization, 2005). The IHR identifies the sovereignty of countries to develop their own laws and implementation processes for the surveillance system. As such, every country needs to develop its own means of achieving the IHR while WHO provides overall guidance. A toolkit to guide countries for implementation of the legal requirements was later released in 2009 (World Health Organization, 2009).

The IHR is a robust international framework covering several areas of infectious disease prevention and surveillance including across health facilities, animals and point of entry (World Health Organization, 2005). With the revision of the IHR in 2005, the guidelines did not require that countries must revisit their legislation to determine that it made adequate provisions for achieving the pronouncements of the new regulation. It is, however, important to conduct assessments of a country's legislative framework aimed at achieving IHR goals in order to identify areas that require improvement. In Uganda for instance, an assessment of the legislative framework to support IHR found the laws were still inadequate despite the country being rated favorably in terms of making progress towards achieving the IHR (Wamala et al., 2010).

Other African countries that have carried out assessments of implementation of the IHR have found sub-optimal knowledge on the IHR processes among policy makers from the National Ministry of Health (Bakari & Frumence, 2013; Youssouf, Amed, Daouda, Daniel, & Simplice, 2018). In Cote D'Ivoire and Tanzania, government respondents had insufficient awareness of the components of the IHR (Youssouf et al., 2018). Respondents in Tanzania did not know the objectives of the IHR and could not describe how it was to be implemented in the country (Bakari & Frumence, 2013). These are the officers who are expected to drive the implementation of the regulation and monitor its performance. Thus, poor understanding of IHR by officers entrusted with the responsibility of implementing and monitoring progress suggests that a country might not achieve the desired goals.

A joint external evaluation of the IHR core capacities of Nigeria conducted in 2017 revealed inadequate legal backing for the IHR. While the assessment identified nine different legal instruments (laws, policies and guidelines) towards meeting the IHR, it also identified several bottlenecks to their implementation including the administrative and political structure of the country (World Health Organization, 2017b). The legal instruments covered different components of the health system which have varied levels of authority and contribution to the disease surveillance system. The semi-autonomous nature of the states as a barrier to the implementation of national laws was also another issue raised by the report (World Health Organization, 2017b). The evaluation further showed that the Nigeria Center for Disease Control did not have any legal backing, which makes the need for such legislation a priority. It also found limited interactions between human and animal disease control units despite the important need for collaboration. A previous study by Nnebue and colleagues in Anambra

state found that there were no state policies on disease surveillance systems in the state (Nnebue et al., 2012).

This chapter presents findings from analysis of the legal and policy environment for disease surveillance in Nigeria and utilizes important extracts from the key informant interviews to support the discussion. The chapter provides the results that address the first objective of the study: "To examine the legislative/ legal framework for routine disease reporting in Nigeria (nationally and sub-nationally) and how it might affect compliance by private providers."

5.2 Presentation of Results

5.2.1 Policy and Law Analysis

Different legal instruments establishing or reinforcing disease surveillance in the country were identified during the study. Some of the legal instruments were identified during the literature reviews and before the KIIs while some were identified and/ or reinforced during the KIIs. In total, eight documents were identified as most important and subsequently profiled in this report. The identified documents during this process are presented in Table 9.

Table 9: Profiled Legal Instruments on Disease Surveillance in Nigeria

	Legal Instrument	Year	Purpose
1	Quarantine Act	1926	The purpose of the Quarantine Act was to "provide for and regulate the imposition of quarantine and to make other provisions for preventing the introduction into and spread in Nigeria, and the transmission from Nigeria, of dangerous infectious diseases"
2	Animal Diseases (Control) Act	2004	The Animal Diseases (Control) Act provides the legal framework for monitoring of infectious diseases in

	Legal Instrument	Year	Purpose
			animals and importation of animals and animal products into the country.
3	National Policy on IDSR in Nigeria	2005	IDSR was adopted as means of achieving the IHR in 1998 following a decision reached at a WHO Regional Committee for Africa meeting in Zimbabwe but did not come into effect in Nigeria until 2005. The IDSR policy was developed to guide and provide the necessary environment for the planning, implementation, monitoring and evaluation of the IDSR by all tiers of the government including parastatals, private health sector, non-governmental organizations and partners.
4	Technical Guidelines for IDSR in Nigeria	2013	Technical guideline for the implementation of the IDSR was developed in 2013 and followed the international guidelines released by WHO Regional Office for Africa three years earlier.
5	National Health Act	2014	The National Health Act of 2014 is a health law enacted to strengthen the national health system. It provides a new funding arrangement for the health system.
6	National Health Information System Policy	2014	The National Health Information System Policy (2014) came into being as a revision of the National Health Management Information System Policy of 2007. It was developed to provide guidance for strengthening of the HIS in the country.
7	Bill for an Act to Establish the Nigeria Public Health Act	2004	The Bill seeks to establish a Public Health Emergency Planning Commission and to repeal the Quarantine Act of 1926.

	Legal Instrument	Year	Purpose
8	Bill for an Act for the Establishment of the Nigeria Centres for Disease Control and Prevention	2018	The Bill sought to establish the Nigeria Centres for Disease Control and Prevention as an agency of the Federal Ministry of Health.

5.2.2 Legal Instruments on Disease Surveillance in Nigeria

This section provides a summary of the identified legal instruments for disease surveillance in the country.

5.2.2.1 The Quarantine Act

The Quarantine Act of 1926 remains the active law governing public health in emergencies in Nigeria today (Federal Government of Nigeria, 1926). The purpose of the Act is "to provide for and regulate the imposition of quarantine and to make other provisions for preventing the introduction into and spread in Nigeria, and the transmission from Nigeria, of dangerous infectious diseases" (Federal Government of Nigeria, 1926, p. 1). The Act provides detailed guidance for the notification of infectious diseases especially for those arriving into the country through the sea port. The Act in Section 18 specifies that persons arriving in Nigeria should produce certificates of vaccination. Subsection 1 particularly states that "Every person arriving by ship from outside Nigeria shall be in possession of a valid international certificate of vaccination against **smallpox** and of inoculation against yellow fever" (Federal Government of Nigeria, 1926, p. 13). Section 2 states that an officer may detain anyone without the requisite documentation until the arrival of a port health officer or until 3 hours had elapsed. The penalty allotted to defaulters of the Act is N200 (0.7 US Dollars) fine or six months jail time.

5.2.2.2 Animal Diseases (Control) Act

The Animal Diseases (Control) Act of 2004 is "An Act to provide for the control and prevention of animal disease, with the object of preventing the introduction and spread of infectious and contagious disease among animal, hatcheries and poultries in Nigeria" (Federal Government of Nigeria, 2004, p. 2) The Act is targeted at the control of infective agents in animals and animal products that are being imported into the country. It also specifies that any person who is in possession of an animal that develops some specific infective illnesses should report to the authorities for further investigation and disease control.

5.2.2.3 The National Policy on IDSR (2005) and Technical Guidelines for IDSR (2013)

The IDSR policy of 2005 is the most recent comprehensive legal instrument reinforcing disease surveillance in Nigeria. The IDSR was adopted to replace the Disease Surveillance and Notification system which had been put in place following a Yellow fever outbreak in 1986/87. The adoption of the IDSR was believed to be the needed change to revamp the ability to predict and detect disease outbreaks in the country. The policy was to be reviewed every five years or as deemed fit by the Minister of Health in consultation with the National Council on Health. It identified the need for the coordination with the NHMIS to avoid duplication.

The technical guidelines for the implementation of the IDSR provide operational processes for achieving the IDSR goals. It lists the 41 diseases and conditions of importance to be tracked in Nigeria. It also contained samples of the forms (IDSR 001, IDSR 002 & IDSR 003) to be used for tracking infectious diseases in the country.

5.2.2.4 The National Health Act

The National Health Act is not focused on disease surveillance but provides some further support towards the implementation of the NHMIS. Part IV section 35 subsection (1) states that "The Federal Ministry of Health shall facilitate and coordinate the establishment, implementation and maintenance by State ministries, local government health authorities and the private health sector of the health information system at the national, State and local government levels in order to create a comprehensive NHMIS"(Federal Government of Nigeria, 2014, p. A160). It further gives the Minister power to determine the class of data that can be collected and the need for the Minister and State Commissioners to publish annual reports on the health of the citizenry.

5.2.2.5 National Health Information System Policy & Strategy

The National Health Management Information System Policy was revised in 2014 which culminated in a National Health Information System Policy. The stakeholders opted to use the term 'National Health Information System' which they considered all-encompassing as opposed to NHMIS which was limited to routine data (Meribole et al., 2018). The idea of making the policy broader was based on assessments that revealed poor coordination by different Ministries, Departments and Agencies responsible for various components of the national health information system. The revision followed the World Health Organizations' "Framework and Standards for Country Health Information Systems" (World Health Organization, 2008). The Policy provides new innovative ideas for the coordination of all institutions generating health data in the country. It particularly prescribes a health data governance structure for the country with the Minister as the chair of the National Health Data Governance Council (NHDGC). The heads of all institutions generating health data in the country including the National Population Commission, the National Bureau of Statistics and

the different departments in the Ministry are members of the NHDGC. The policy also proposes the creation of State Health Data Governance Councils to be chaired by the Honourable Commissioner of Health in each state with similar representativeness of members across units in the state that generate health data.

A five year (2014-2018) strategic plan to guide the implementation of the health information system policy was also developed. The Strategy document provided step by step guidance on how the policy was to be implemented over the first five years following its roll out. The goal and objectives of the strategy document were similar to that of the policy.

5.2.2.6 The National Public Health Bill

Though it was discovered that a Public Health Bill had been waitlisted since 2004 in the Nigerian Senate for possible enactment as a Law, this Bill is yet to be discussed by legislators (*Bill for an Act to Establish the Nigeria Public Health (Quarantine, Isolation and Emergency Health Matters Procedure) Act*, 2004). The purpose of the Public Health Bill was to "provide for and regulate the imposition of quarantine, isolation and to make other provisions for preventing the introduction into and spread in Nigeria, and regulate steps for the containment in Nigeria, and the transmission from Nigeria, of dangerous infectious and communicable diseases, organisms and agents"(*Bill for an Act to Establish the Nigeria Public Health (Quarantine, Isolation and Emergency Health Matters Procedure) Act*, 2004, p. 1). This Bill was also drafted to repeal the Quarantine Act of 1926.

5.2.2.7 Bill for Establishment of the Nigeria Centre for Disease Control

The Bill for the establishment of the Nigeria Centre for Disease Control (NCDC) and Prevention and for matters concerned therewith (2018) was prepared by the Federal Government and presented to the Nigerian legislature for discussion and possible enactment so as to give legal

backing to the NCDC which has performed the function since 2012. A public discussion of the NCDC Bill was held in February 2018.

A joint external evaluation of the IHR capacities of the country which was led by WHO in 2017 identified the lack of a legal backing for the NCDC as a major shortcoming for the legal framework for disease control. The Bill pronounces the NCDC as the IHR National Focal Point though the institution has functioned in this role for years, albeit without formal legal backing. The Bill pronounces that the NCDC may have centres across the six geo-political zones and in each state in the country.

5.2.3 Key Informant's Perspectives Regarding Legal Instruments

The key informants interviewed buttressed the finding from the document reviews that the IDSR policy of 2005 is the most recent comprehensive legal instrument guiding disease surveillance in Nigeria. A key informant noted that: "States actually agreed at the National Council on Health (NCH) years back to implement the IDSR strategy and that is what we have on ground". The NCH is regarded as the highest policy making body in Nigeria with regards to health and comprises the Minister for Health, Minister of State for Health, the Commissioners of Health across the 36 states of the Federation, the Secretary of Health and Human Services of the Federal Capital Territory and the Permanent Secretary at the Federal Ministry of Health (Federal Government of Nigeria, 2014). However, an assessment showed that although the NCH was an important forum, it did not have legal powers to enforce any decisions reached (World Health Organization, 2017b).

Besides the IDSR policy, another legal instrument identified by key informants was the National Health Act. An informant noted that: "We are capitalizing on the National Health Act. The Act has a section on disease surveillance". Several key informants held opinions that

other laws governing infectious diseases were as old as the country and not useful with current disease challenges. It was stated by a key informant that: “The public health laws are already out-dated. They were drafted back in 1958.” Another informant noted that: “The public health laws in Nigeria are old and the penalties spelt out in them are so meagre (five Naira), as such, it is not relevant to deter offenders.” A key informant highlighted that small pox which was eradicated in 1980 remains one of the diseases highlighted in the main public health law in the country which makes it archaic.

Key informants from the States noted that their States were aligning with the Federal Government’s policy on infectious disease control. One informant highlighted that: “There is no specific law or guideline apart from the Federal Ministry of Health document on the IDSR. This is what has been adopted in our state.” An informant opined that: “We have adequate laws that can help us in meeting the IHR. However, enforcing their implementation is the problem.” Contrary to this view, most informants do not believe that Nigeria and their specific states (for the state officers), have adequate laws on disease surveillance. They believe that a revision of existing laws was necessary to address emerging issues. Notwithstanding the varied opinions, there was consensus that existing laws were poorly implemented.

It was noted by an informant that there were on-going efforts to strengthen legislation on infectious disease control in his state. He noted that following the EVD outbreak of 2014, a Bill to enact a law on cremation of suspected infectious disease cases has been under discussion in the legislature. However, progress to enact the law has been slow. This draft Bill was not available to the researcher upon request as it was stated to be a confidential document.

5.3 Summary of Chapter

This chapter provides information on the different legal instruments on disease surveillance in Nigeria. It provides a general overview of each of the legal instruments identified. It further provides the perspectives of key informants on the strength of the legal instruments for infectious disease surveillance in the country. The chapter revealed that the laws governing disease surveillance in Nigeria were archaic and may not be able to support the country to achieve the IHR. The current main legal document of reference for disease surveillance is the IDSR policy of 2005. States do not have laws or specific policies on disease surveillance but had adopted the national IDSR policy in principle at a National Council of Health session several years earlier. Key informants did not feel that the existing legislation on disease surveillance was adequate or being properly implemented and most suggested that the situation could be improved by enacting new legislation.

CHAPTER 6: THE LEVEL OF COMPLIANCE WITH DISEASE SURVEILLANCE BY PRIVATE HEALTHCARE FACILITIES IN NIGERIA

6.1 Introduction

Private healthcare facilities are important contributors to health service delivery in Nigeria. They make up 33% of the health facilities in the country (Makinde et al., 2014). These facilities are responsible for over 70% of healthcare spending on health and about 60% of client encounter with health workers are estimated to take place within these facilities (International Finance Corporation, 2007). Recent analysis has shown that there is an uneven distribution of health facilities across the country in type and with respect to the geographic variation in population (Makinde, Sule, et al., 2018). Some areas have significantly more access to health facilities than others including the different levels of care (Makinde, Sule, et al., 2018). Private health facilities are more common in the southern part of the country but rare in the north.

The important contribution of private healthcare facilities to service delivery in Nigeria has been on an upward rise based on the unreliability of public health facilities and the frequent industrial action by government workers over the last few years (Oleribe et al., 2016). There are also concerns about the quality of care received at public health facilities and timeliness in the provision of services to clients presenting there (Uchendu, Ilesanmi, & Olumide, 2013). These concerns have no doubt propagated and indirectly contributed to the increase in patronage of private health facilities across the country. In addition, secondary health facilities are predominantly privately owned with some level of specialized services being provided in these facilities (Makinde, Sule, et al., 2018). They also serve as referral centres for the primary health facilities. Thus, private secondary health facilities can be a receptacle for

infectious disease outbreaks and can serve as an important shield for the public when proper disease surveillance systems are in place. Furthermore, the National Health Act of 2014 made provision for the engagement of private health facilities in the formal health service delivery in the country, a policy initiative geared towards achieving universal health coverage, which is a key component of SDGs. As such, private health facilities are positioned for an increased volume of patients expected to receive care at these facilities in the near future.

With the large number of private health facilities and client encounters taking place within them in Nigeria, their non-inclusion in the disease surveillance system can result in a misrepresentation of the disease distribution profile. Despite their level of importance based on the share of client encounters, there has never been a comprehensive assessment of the level of the participation of these private health facilities in the disease surveillance system in the country.

This chapter addresses the second objective of this study: "To determine the level of reporting of notifiable diseases by private providers, the completeness of information and how these compare with the public sector." The findings of the health facility survey are subsequently presented in this section. The initial plan was to conduct secondary analysis of routinely collected disease surveillance data. However, this data was not readily available and thus, data on public health facilities could not be retrieved and analysed. This made the comparison of the public and private health facilities not feasible as planned but it provides an indication of the poor data management process for disease surveillance in the country. Notwithstanding the limitation, the chapter provides insights into the performance of private health facilities regarding reporting notifiable diseases.

6.2 Presentation of Results

Table 10 presents the distribution of private health facilities reporting notifiable diseases by state, type of ownership and level of care.

Only 201 (40%) of the health facilities surveyed routinely reported notifiable diseases to the health authorities through the national health information system. There were variations in reporting notifiable diseases by level of care and type of ownership (Table 10). Health facilities that did not specify their ownership type – whether for profit or not for profit – were less likely to report into the disease surveillance system..

Among the states surveyed, only Lagos (51%) and Oyo (60%) had more than half of the health facilities surveyed reporting into the disease surveillance system. Osun, Ogun, Ondo and Ekiti states were 30%, 17%, 23% and 35% respectively. There were no obvious differences in reporting notifiable diseases between the profit oriented and the not-profit oriented health facilities (41% vs. 36%). However further analysis showed that the proportion reporting notifiable diseases was higher among tertiary for-profit than lower level health facilities. Among non-profit facilities, the proportion reporting notifiable diseases was higher among secondary than primary facilities, while there were no tertiary non-profit facilities.

Table 10: Compliance with Reporting by Private Health Facilities

Type of Facility Ownership	Level of Facility	NR	R	Rep. Prop (%)	NR	R	Rep. Prop (%)	NR	R	Rep. Prop (%)	NR	R	Rep. Prop (%)	NR	R	Rep. Prop (%)	NR	R	Rep. Prop (%)	NR	R	Rep. Prop (%)
		Ekiti	Ekiti		Lagos	Lagos		Ogun	Ogun		Ondo	Ondo		Osun	Osun		Oyo	Oyo		Total	Total	
Unknown	Unknown	0	0	0	15	2	12	4	0	0	1	0	0	0	1	100	0	2	100	20	5	20
	Primary	0	0	0	2	2	50	2	0	0	1	0	0	0	0	0	0	0	0	5	2	29
	Secondary	0	1	100	7	5	42	0	0	0	0	0	0	0	0	0	1	2	67	8	8	50
	Tertiary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	**0**	**1**	**100**	**24**	**9**	**27**	**6**	**0**	**0**	**2**	**0**	**0**	**0**	**1**	**100**	**1**	**4**	**80**	**33**	**15**	**31%**
For Profit	Unknown	0	1	100	2	3	60	5	0	0	0	0	0	1	1	100	0	0	0	8	5	38
	Primary	3	2	40	17	29	63	62	18	23	23	8	26	9	0	0	12	9	43	126	66	34
	Secondary	8	2	20	68	74	52	21	0	0	4	1	20	16	9	36	8	18	69	125	104	45
	Tertiary	2	1	33	0	3	100	2	1	33	0	0	0	1	1	50	0	0	0	5	6	55
	Total	**13**	**6**	**32**	**87**	**109**	**56**	**90**	**19**	**17**	**27**	**9**	**25**	**27**	**11**	**29**	**20**	**27**	**57**	**264**	**181**	**41%**
Not For Profit	Unknown	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	Primary	0	0	0	2	1	33	2	1	33	0	0	0	1	0	0	1	0	0	6	2	25
	Secondary	0	0	0	1	1	50	0	0	0	1	0	0	0	0	0	0	2	100	2	3	60
	Tertiary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	**0**	**0**	**0**	**4**	**2**	**33**	**2**	**1**	**33**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**2**	**67**	**9**	**5**	**36%**
State Total		**13**	**7**	**35**	**115**	**120**	**51**	**98**	**20**	**17**	**30**	**9**	**23**	**28**	**12**	**30**	**22**	**33**	**60**	**306**	**201**	**40%**

Key: R: Reporting, **NR**: Not Reporting, **Rep. Prop**: Reporting Proportion

6.3 Summary of Chapter

The level of reporting of private health facilities into the disease surveillance system based on self-reports is 40% with variations observed across states. The proportion of private facilities reporting notifiable diseases varied by type of ownership and level of care provided by the health facility. It was highest in Oyo and Lagos states (60% and 51% respectively). The proportions of Ekiti, Ogun, Ondo and Osun states were 35%, 17%, 23% and 30% respectively.

CHAPTER 7: KNOWLEDGE AND PERCEPTIONS OF THE DISEASE SURVEILLANCE SYSTEM BY PRIVATE HEALTHCARE PROVIDERS IN NIGERIA

7.1 Introduction

Successfully tracking infectious diseases presenting in health facilities is one of the processes for monitoring progress of a country towards achieving the IHR. As earlier noted, 43 out of 46 sub-Saharan African countries are implementing the IDSR as their means for achieving the IHR (Kasolo et al., 2013). However, compliance with disease reporting and the knowledge of healthcare providers have been reported as inadequate by several studies carried out in the country (Bawa et al., 2003; Lafond et al., 2014; Nnebue et al., 2012). In addition, there has been bias of studies focusing predominantly on public health facilities within the country (Abubakar, Idris, Nguku, Sabitu, & Sambo, 2013; Bawa & Umar, 2009; Lafond et al., 2014; Nnebue et al., 2014). This may be because enrolment and engagement in disease reporting have largely targeted public health facilities. However, given the large number of private health facilities operating in the country, their exclusion from disease surveillance deals a big blow to the system.

In India, the importance of including private health facilities in monitoring diseases that were targeted for elimination and eradication led to their engagement early during the planning phase of setting up the disease surveillance system in one district (Jacob John, Samuel, Balraj, & John, 1998). As part of effort to ensure their participation in reporting, private health facilities were provided with postage-paid envelopes to facilitate reporting to district offices (Jacob John et al., 1998). This effort ensured that private health facilities were not left out in the overall routine reporting system in the district.

Studies that have been carried out in Nigeria on the disease surveillance system have revealed wide ranging problems with the system including: poor knowledge by healthcare providers, multiple data collection tools, inadequate knowledge of the system, delays in reporting, poor encouragement by healthcare managers and health system challenges (Abubakar et al., 2013; Bawa & Umar, 2009; Nnebue et al., 2014, 2013). In addition, emphasis on the implementation of disease surveillance system including the routine training of health workers have been concentrated at the national and state level without cascaded efforts to the LGAs and health facilities where the data is generated (Bawa & Olumide, 2005). Even when health facilities have been involved, public healthcare facilities have been predominantly targeted. Although the interventions were at national and state levels, evidence shows that training health workers at the facility and LGA levels – lowermost levels of service delivery – improves quality of reporting (Bawa & Olumide, 2005). Thus, evidence has been poorly utilized in making decisions over the years. A previous study in two states of South-Western Nigeria found that majority of the Disease Surveillance and Notification (DSN) officers at the LGAs had been trained on disease surveillance, however they lacked the resources to perform their roles (Dairo, Bamidele, & Adebimpe, 2010). Fewer than 50% of the LGAs visited in the study conducted by Dairo et al. had the requisite data collection tools in stock which was needed for health facilities to report.

With the wide-ranging importance of disease surveillance systems, its poor performance in Nigeria results in missed opportunities. If properly implemented, disease surveillance and the evidence generated through the system are important for identifying epidemics and triggering interventions to control them before they lead to devastating consequences. It can also help with the efficient allocation and investment of resources in the health system.

However, research has shown that LGAs depend on focal and sentinel sites to report notifiable diseases and projections of the disease burden for the LGA is derived from such reports (Nnebue et al., 2013). In Anambra state, key informants reported that each LGA had four to six reporting sites which provide information on the identified diseases to the LGA authorities (Nnebue et al., 2013). Since there are 21 LGAs in Anambra state, it means that only 126 health facilities report into the disease surveillance system although there are over a thousand health facilities in the state. In such a situation, the focus shifts to the few facilities that are being monitored which usually are government-owned outlets. It is unlikely that the health facilities were randomly selected introducing some bias in the process. Having only a few facilities reporting notifiable diseases could lead to many missed cases and potential underreporting of the true burden of infectious diseases in a locality.

Knowledge of health workers on disease surveillance has been identified as an important influencing factor towards the practice of disease reporting. In several developing countries including Nigeria, there has been inadequate focus on the knowledge of health care workers (Adokiya, Awoonor-Williams, Barau, Beiersmann, & Mueller, 2015; Phalkey, Yamamoto, et al., 2015). Previous studies in Anambra State found that fewer than 33% of health workers had been trained on the Disease Surveillance and Notification system (Nnebue et al., 2014, 2012). The lack of computerization of the IDSR system was also identified as a major drawback in the study carried out in Anambra State. Human resource capacity was a significant deterrent to the efficient performance of the disease surveillance system as health workers with inadequate qualifications such as Community Health Extension Workers, Junior Community Health Extension Workers, and Community Health Officers were deployed to oversee disease surveillance systems in tertiary health facilities when they are better equipped at overseeing

data collection in the communities (Nnebue et al., 2014). Inadequate supervisory visits due to budgetary limitations contribute to missed opportunities for providing mentorship to health workers.

In Anambra state, the Disease Surveillance and Notifications (DSN) officers at the local governments reported that they had been sponsored to training events. However, this did not translate to knowledge of the healthcare providers in the health facilities. Findings showed that some of those selected for trainings were not suited for the sessions (Nnebue et al., 2012). There have also been reports of people being trained and subsequently transferred from monitoring and evaluation roles in the health facilities and LGAs, which negatively impacts the disease surveillance system (Makinde, Onigbanjo-Williams, et al., 2012).

This chapter presents findings on knowledge and perception of private healthcare providers on the disease surveillance system in the six states that were included in the study. It details the health facility's readiness to report, the knowledge of the healthcare providers and the effect of receiving feedback on the reporting practice. It addresses the third objective of the study which is "to determine the knowledge and perceptions of private healthcare providers on the importance of routine disease reporting in Nigeria".

7.2 Presentation of Results

The findings presented in this chapter are organized under two broad headings: the health facility's readiness to report and the knowledge of the providers on the disease surveillance system.

7.2.1 Health Facility Readiness to Report

Health facility readiness to report was described in the conceptual framework (Figure 2: Conceptual Framework showing relationship between different factors) as being dependent on two main factors. These are the availability of reporting tools in the health facilities and trained staff that understand the data collection tools, although in reality, other factors may influence reporting behaviour. A key consideration of the framework was that data collection tools are needed in the health facilities before reports can be completed and sent to the authorities for further analysis. It is also related to the providers' understanding of the tools as poor understanding may affect their ability to complete them. Even when the health facilities do report, it is likely that the level of knowledge of staff will influence their ability to complete the tools and ultimately, the quality of the data.

The staff in health facilities that are expected to have knowledge of the data collection tools are the health records officers and the clinicians. As such, the knowledge and the qualifications of the health records officers and clinicians in the health facilities was examined. These analyses were used in assessing the readiness of the health facilities to comply with disease reporting.

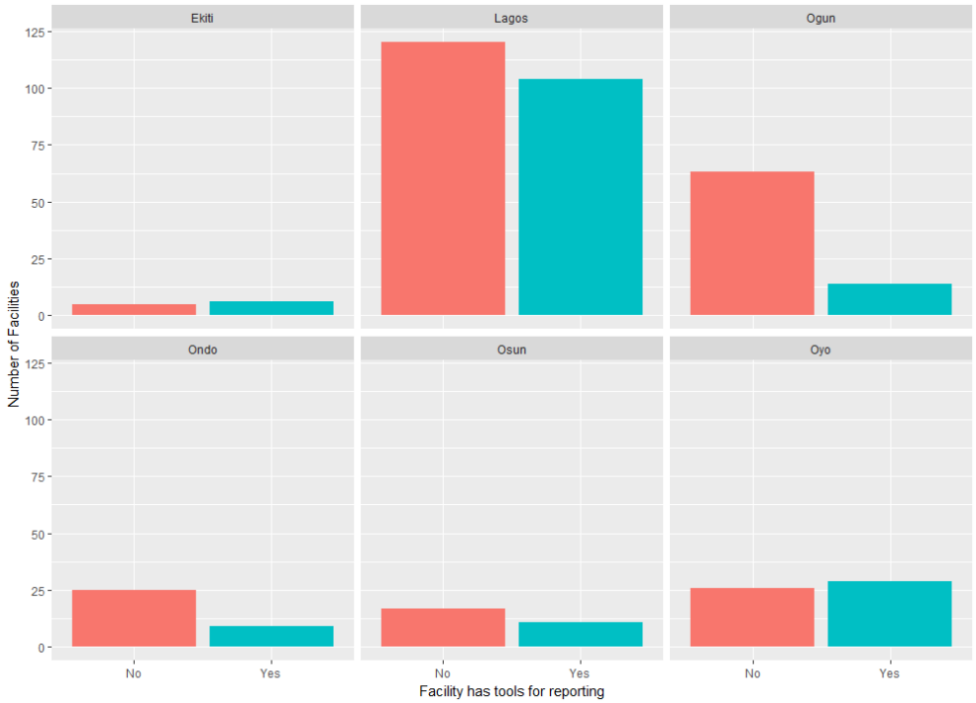
7.2.1.1 Availability of Reporting Tools

Three hundred and thirty-four (66%) of the health facilities surveyed did not have tools for reporting notifiable diseases to the health authorities (Table 11). Figure 5 shows the distribution of the health facilities based on availability of tools for reporting notifiable diseases to the health authorities by state. It revealed that the availability of the reporting tools varied across the states. Only Ekiti and Oyo states had more than half of the health facilities having the reporting tools. Ogun and Ondo states had the lowest proportion of facilities with reporting tools.

Table 11: Availability of Tools and Health Records Officer

Questions	Categories	Responses	Percentage
Does this facility have the tools for reporting notifiable diseases in Nigeria?	No	334	66
	Yes	173	34
	Total	507	100
Health Facility has an assigned Health Records officer	No	259	51
	Yes	248	49
	Total	507	100
Health Records Officer assigned has training in health records/ information management	No	167	67
	Yes	81	33
	Total	248	100

Figure 5: Availability of reporting tools by state



7.2.1.2 Designated Health Records Officer

Over half of the health facilities surveyed did not have a specific officer designated to health records' management (Table 11). Figure 6 shows the distribution of health facilities by state that have designated personnel for health records management. The state level analysis revealed that private health facilities in Lagos are doing far better in allocating personnel to health records management than the other states. However, in terms of whether health records personnel actually had academic qualification in health records management, it was found that fewer than 81 facilities (of the 507) studied actually had a trained individual (in health records management) overseeing their health records unit. In this regard, state level analysis shown in Figure 7 revealed that Lagos and Ogun states performed poorly as most of the health records personnel were not formally trained in health records management. Several of the designated personnel who did not have formal training in health records management also did not complete high school. Table 12 shows that 16 (8.7%) did not have

any formal/ academic training, 60 (32.6%) had only a high school certificate, 51 (27.7%) had an Ordinary National Diploma. However, while the remaining 57 (31%) had either a National Diploma or higher qualification, albeit it was not in health records or health information management. The disciplines of the designated health records personnel without formal training in health information management included nursing (trained and untrained), environmental management, community health extension, information and communications technology, banking and finance, marketing, science laboratory technology and biochemistry. Majority of them were auxiliary nurses (nurses trained on the job rather than in formal training schools).

Only 13 (5%) of the health records officers could correctly identify the three different tools for notifiable disease reporting, 49 (20%) partially identified them, 27 (11%) mentioned only the NHMIS tools while 159 (64%) could not identify any of the tools as seen in Table 13. For the clinicians, 33 (7%) correctly identified the data collection tools, 69 (14%) partially identified them, 9 (2%) mentioned only the NHMIS tools and 396 (78%) got it wrong (Table 13). Knowledge of the health records personnel on the processes for the notification of diseases was low as only a few of them correctly identified the three different forms that are used to report notifiable diseases. A larger fraction partially identified some of the IDSR tools (also mentioning the NHMIS tools occasionally) while some mentioned only the NHMIS tools. The proportion of respondents mentioning the NHMIS tools (alone or in combination with the IDSR tools) made it obvious that the health records officers were mixing up the two different data collection processes spearheaded by the government.

Figure 6: Availability of a designated Health Records Officer by State

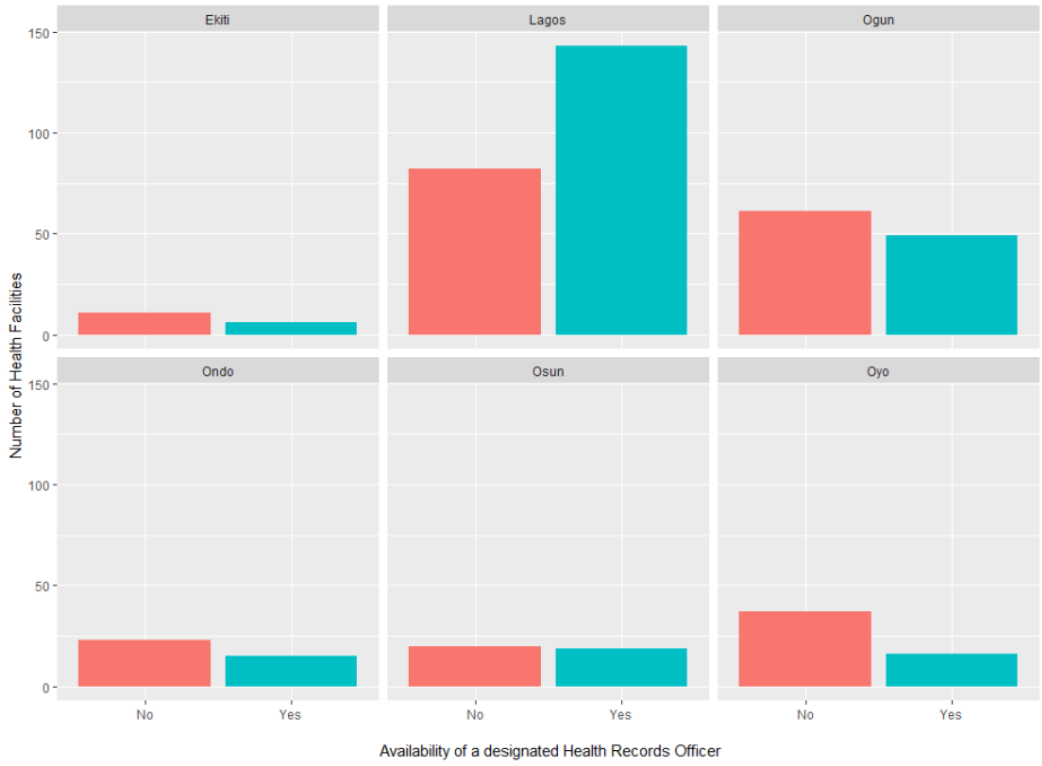


Figure 7: Designated Health Records Personnel has Formal Training in Health Records Management by State

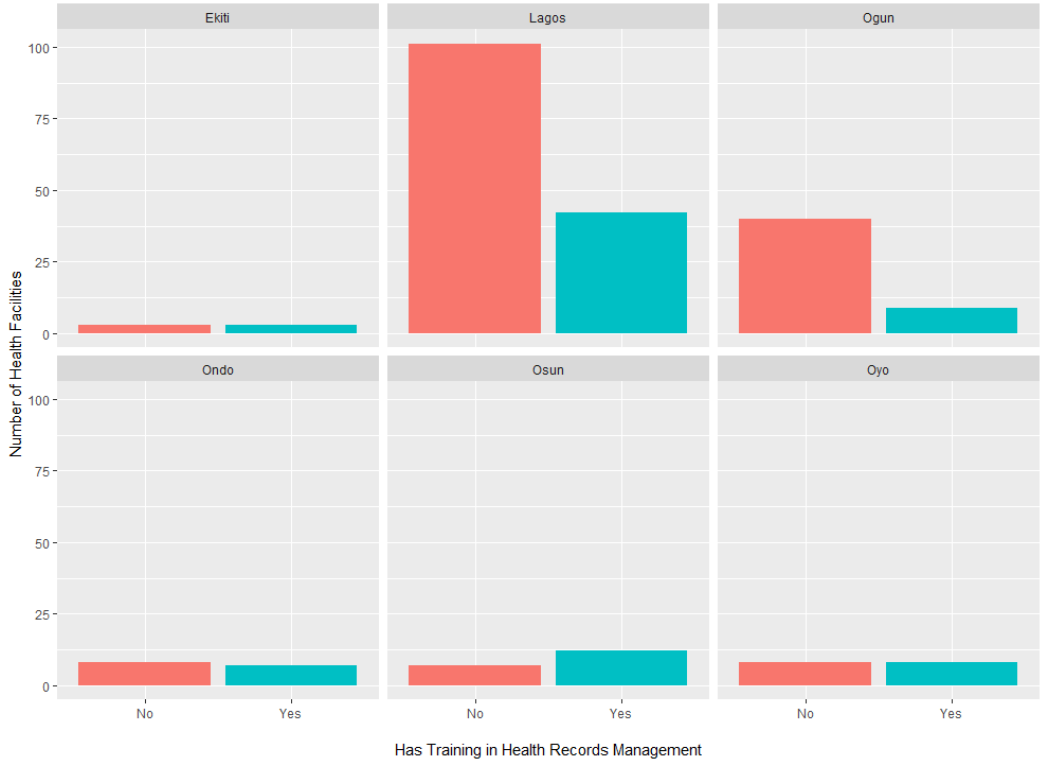


Table 12: Level of Education of Designated Health Records Officers without Formal Training

	Level of Education				
State	**No formal Training**	**SSCE**	**OND**	**HND or Higher**	**Total**
Ekiti	0	1	4	4	9
Lagos	5	45	22	21	93
Ogun	11	2	3	9	25
Ondo	0	7	11	10	28
Osun	0	1	0	0	1
Oyo	0	4	11	13	28
Total	16 (8.7%)	60 (32.6%)	51 (27.7%)	57 (31.0%)	184 (100%)

Codes: SSCE – Senior School Certificate Examination (O 'levels), OND – Ordinary National Diploma, HND – Higher National Diploma

Figures 8 and 9 show the breakdown of the understanding of reporting processes among those that stated that they routinely report notifiable diseases. It was observed that those that report notifiable diseases generally outperformed those that said otherwise. This can be explained by the likelihood of better understanding of the reporting process and their prior interaction with the data collection tools. However, the proportion that knew the reporting process was below 50%. At the state level, three states (Ekiti, Ogun and Ondo) did not have any health facilities with health workers having the appropriate knowledge of the data collection tools for reporting notifiable diseases (Figure 9). Respondents in these states mentioned the NHMIS tools rather than the IDSR tools suggesting that the IDSR data collection process was being confused with the NHMIS process which is a parallel routine data collection platform.

Table 13: Identification of Data Collection Tools

Questions	Categories	Number of Responses	Percent
Identification of three data collection tools for disease surveillance reporting by health records officer	Correct	13	5
	Partially Correct	49	20
	NHMIS	27	11
	Wrong	159	64
	Total	248	100
Identification of three data collection tools for disease surveillance reporting by Clinician	Correct	33	7
	Partially Correct	69	14
	NHMIS	9	2
	Wrong	398	78
	Total	507	100

Figure 8: Knowledge of Tools by Status of Reporting by Health Facilities

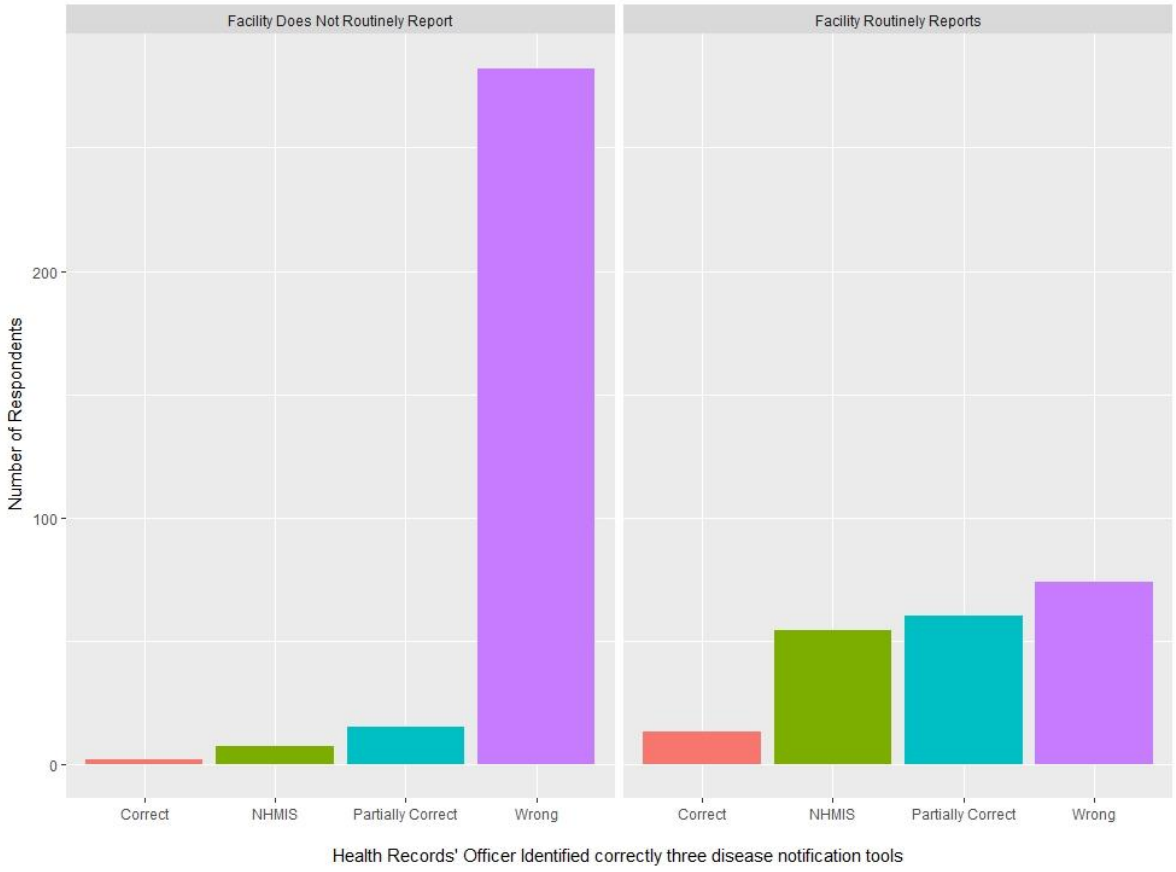
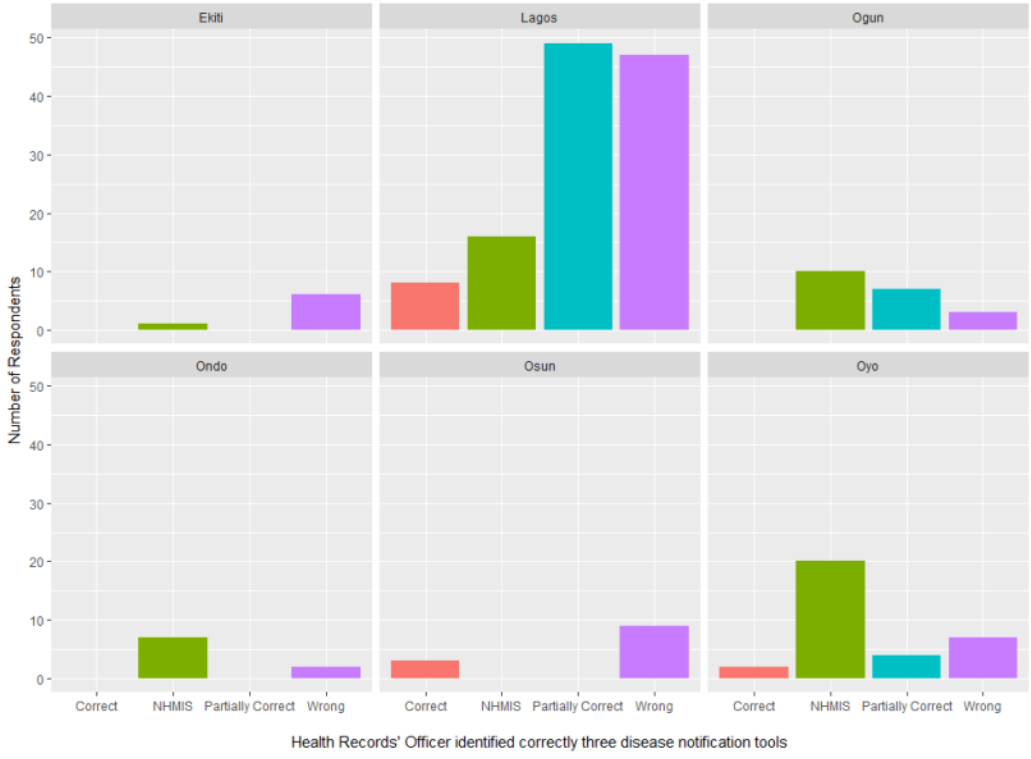


Figure 9: Knowledge of Reporting Tools Across States



7.2.2 Knowledge of Providers

Knowledge of private healthcare providers was determined by a series of questions on awareness of regulations on reporting, knowledge of notifiable diseases and consistent engagement with the local authorities (Figure 2: Conceptual Framework showing relationship between different factors). Theoretically, these factors are believed to influence the ability of the health facilities to comply with the disease surveillance and notification system.

It should be expected that health workers who are aware of the compulsory regulations for reporting are more likely to report into the disease surveillance system than those who are not aware of such requirements. However, even if they are aware of the regulations, health workers' ability to comply with them may depend on other factors. Notwithstanding the possible influence of other factors, we can assume that if the circumstances are the same across board, then health facilities with adequate staff will have a higher chance of reporting than those with few staff.

Furthermore, knowledge of notifiable diseases will influence the practice of complete reporting and quality of data. Health workers that are unaware of the diseases that require reporting will more likely report incomplete data even if they are complying with the reporting practice. In such instances, epidemic prone diseases may be underreported thereby masking the true picture of the disease distribution in an area. However, poor awareness of the notifiable diseases might also be a pointer to the poor practice of reporting. In situations where facilities have not routinely reported notifiable diseases, local government officers responsible for overseeing the facilities should be in a position to identify such cases during routine data quality checks. Drawing health workers' attention to such issues could in turn, lead to improved knowledge of disease surveillance process. However, the absence of such

routine processes permits the poor reporting practices to continue. Besides these, the knowledge of the health workers was assessed based on their performance in identifying diseases that should be reported into the disease surveillance system.

Engagement with the local authorities is the last determinant identified in the conceptual framework that can influence reporting practices. Local authorities are expected to provide oversight for the health facilities within their jurisdiction. The Disease Surveillance and Notification Officer in each LGA is expected to provide this oversight and pay visits to the health facilities from time to time, retrieve the completed data collection tools, perform supportive supervision and carry out data quality audits. During these visits, the officer is expected to provide feedback to health workers on errors or incomplete data identified in previous months' report so that the capacity of health workers to adequately report is enhanced. The absence of such engagements hampers improvement in knowledge of healthcare providers regarding the disease surveillance system. The engagement with local authorities was assessed using proxy questions on whether the health worker had the contact details of the local health officer overseeing the health facility and whether the facility had received feedback from the local health authorities in the past on disease outbreaks within their locality. Furthermore, the health workers rating of the system was used in assessing their perceived level of performance of the disease surveillance system as a whole.

Knowledge of healthcare providers in the study was diverse based on different questions used to assess their understanding of the disease surveillance system (Table 14). Over 50% of the clinicians interviewed were aware of a law or regulation that required compulsory reporting of notifiable diseases to the health authorities. About three-quarters (76%) of the clinicians scored at least 2 (out of a maximum of 3) in identifying items that were used to measure

knowledge of notifiable diseases. However, most identified Polio, EVD and Lassa fever which are the main epidemic prone diseases that have recently been ravaging the country and have been in the media. Thus, their recognition of these three diseases may be due to their media exposure. Only 228 (45%) of the respondents had a link with or the contact information for the LGA focal person for surveillance within their locality. Most facilities (85%) did not receive feedback or information from the LGA authorities on disease outlook within their locality.

Two-hundred and six (41%) of the respondents noted that they had attended to a case that they believed should be reported to the health authorities. However, of these providers, only 106 (51%) succeeded in reporting to the health authorities. Of respondents that claimed not to have seen a case that needed to be reported to the authorities, over 90% of them had attended to at least one case of malaria within the year preceding the survey. Assessment of the performance of the disease surveillance system by private healthcare workers revealed that 39% of providers thought the system was either excellent or good while the majority (61%) were either indifferent about the system, thought it was poor or non-existent. The state level distribution of their responses is presented in Figure 10. Asides Lagos state, health workers across all other states were more likely to rate the disease surveillance system as poor than other categories.

Table 14: Health Worker Knowledge and Performance of Disease Surveillance System

Questions	Categories	Number of Respondents	Percentage
Awareness of Law/ Regulation on compulsory reporting	No	222	44
	Yes	285	56
	Total	507	100
Score of clinician's knowledge of immediately notifiable diseases	0	46	9
	1	76	15
	2	153	30
	3	232	46
	Total	507	100
Have link or Contact information to LGA representative in charge of disease surveillance in locality	No	279	55
	Yes	228	45
	Total	507	100
Do you receive report/ feedback on disease outbreaks in your locality?	No	436	86
	Yes	71	14
	Total	507	100
Have you ever attended to cases that you think should be reported to the health authorities?	No	301	59
	Yes	206	41
	Total	507	100
Among those that said they had attended to a case that they think	No	100	49
	Yes	106	51
	Total	206	100

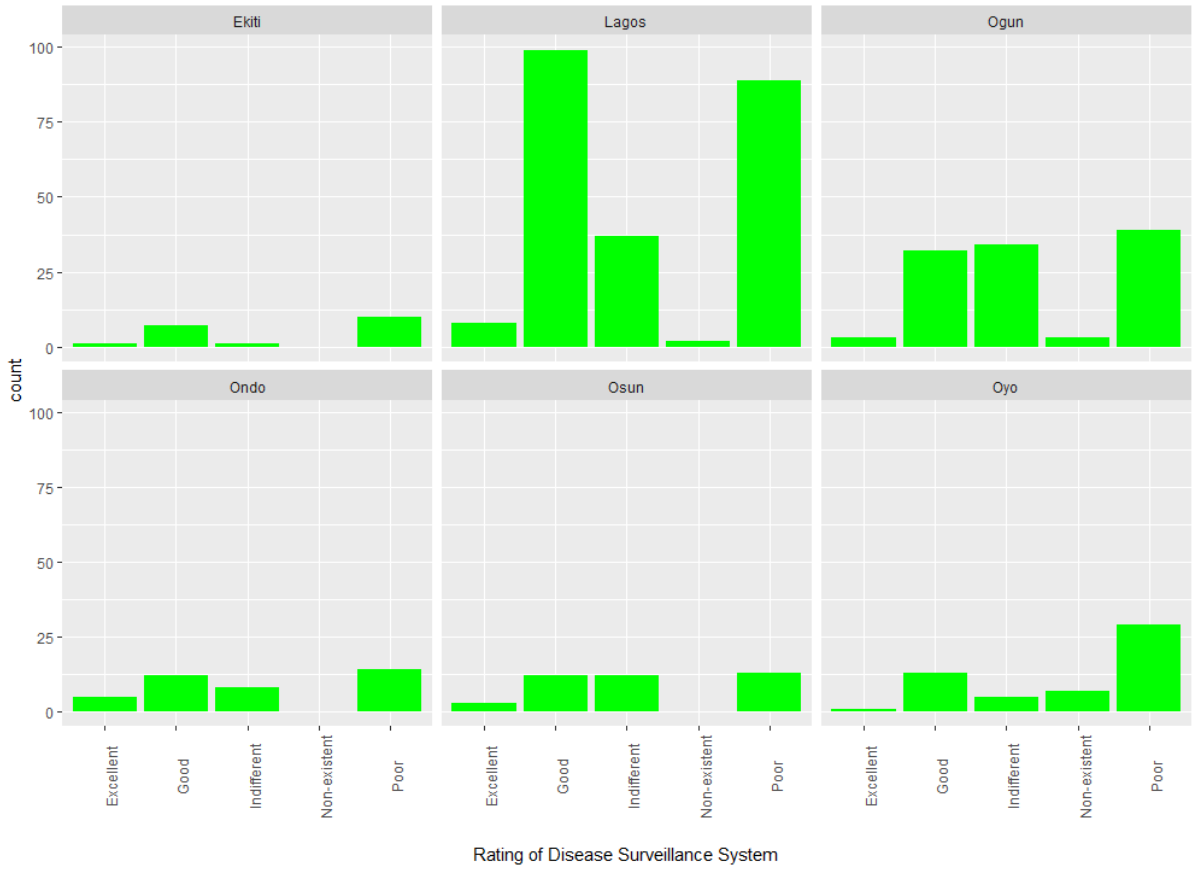
Questions	Categories	Number of Respondents	Percentage
should be reported, the number that were able to report.			
Among those that said no, those that had attended to at least a case of Malaria within the last one year.	No	21	7
	Yes	269	93
	Total	290	100
Rating of the disease surveillance system	Excellent	21	4
	Good	175	35
	Indifferent	97	19
	Poor	194	39
	Non-existent	12	2
	Total	499	99

7.3 Summary of Chapter

This chapter provided a descriptive analysis of the readiness of health facilities to report into the disease surveillance system as well as the knowledge and perceptions of the private health facility workers on the disease surveillance system across the six states studied. About two-thirds of health facilities did not have the requisite tools that are needed to report into the disease surveillance system. Over half of the health facilities did not have designated personnel in health records management. Only 81 (out of 507) of the health facilities had personnel that were trained in health records/ information management. Over 60% of the respondents were either indifferent about the disease surveillance system, rated it poorly or thought it was non-existent. However, knowledge of immediately notifiable diseases (EVD,

Lassa fever and Polio) was very high among the study participants which could be a reflection of high media coverage of the three diseases.

Figure 10: Rating of the Disease Surveillance System by State



CHAPTER 8: FACTORS AFFECTING COMPLIANCE WITH DISEASE SURVEILLANCE BY PRIVATE HEALTHCARE PROVIDES

8.1 Introduction

Compliance with disease reporting can be influenced by a series of factors. These include the availability of legal backing for disease surveillance, health facility readiness to report, the knowledge of the healthcare providers and the level of functionality of the health system. Determining factors that affect compliance either positively or negatively are important for informing the design of interventions aimed at improving the performance of the system. This can range from attitude and understanding of the disease surveillance system to the functionality of the health system as highlighted earlier in the conceptual framework used in describing the influencing factors on disease surveillance compliance in health facilities.

Available evidence shows that providing feedback to health facilities motivates providers (both public and private) and encourages them to be more dedicated towards reporting to the district offices (Phalkey et al., 2017). However, a previous study revealed data at the LGAs were hardly analyzed and were just passed on to the Epidemiology unit of the SMOH which in turn passes on to the Federal Government (Abubakar et al., 2010). Thus, feedback is hardly provided to the health facilities that submit reports. Since feedback is hardly provided, the health facilities may over time lose interest in reporting to the local government authorities. In addition, prompt action is hardly taken due to lack of timely information, which diminishes the importance of the surveillance system (i.e. prompt detection and response to a disease outbreak).

A study in northern Nigeria found that timeliness and completeness of reports in the LGAs studied was abysmal (Abubakar et al., 2010). This further affected the usefulness of the data

for prompt disease identification. When data is poor chances of its utilization are low. When data is not used for making decisions by policymakers, they are unlikely to invest resources that can improve quality or prompt reporting. This results in a vicious cycle of poor data and poor systems over time. Breaking this cycle requires concerted efforts that are positively geared for the turnaround.

This chapter addresses the fourth objective of the study: "To identify the barriers to routine disease reporting by private healthcare practitioners/ facilities in Nigeria." The evidence generated can inform the design of interventions to improve the system. This chapter is influenced by the entire spectrum of the conceptual framework.

8.2 Presentation of Results

A range of factors identified in the conceptual framework can influence the performance of the disease surveillance system. In this chapter, the statistical significance of various factors that were presented in previous chapters was tested. The study investigated how the availability of reporting tools in the health facilities influenced the reporting behaviour of the health facility. It further investigated how the availability of an assigned health records officer affected the reporting behaviour of a health facility. Furthermore, the study investigated the relationship between the duration of period the health records officer had spent in the health facility and the reporting practice of the facility. These all fed into the second, third and fourth objectives of the study. Table 15 presents the factors that predict compliance with reporting by private health facilities.

Table 15: Odds ratios from logistic regression analysis examining variations in routine reporting of diseases by selected background characteristics

Factors		Odds Ratio	Lower Limit (95% Confidence Interval)	Upper Limit (95% Confidence Interval)
Availability of reporting tools		13.69	8.85	21.62
Availability of an assigned Health Records Officer		3.9	2.68	5.73
Duration health records officer has spent in the health facility		1.000	0.999	1.001
Knowledge of the data collection tools used for reporting notifiable diseases by health records officers		10.51	2.86	67.70
Knowledge of data collection tools used for reporting notifiable diseases by the clinician in attendance.		2.49	1.22	5.25
Number of years since graduation of the physician (where interviewed or responded).		1.017	0.999	1.036
Agree it is their responsibility to report		1.88	0.40	3.91
Awareness of a law to report		1.55	1.08	2.24
Level of Care Provided	Primary	Ref.	Ref.	Ref.
	Secondary	1.67	1.14	2.45

Factors		Odds Ratio	Lower Limit (95% Confidence Interval)	Upper Limit (95% Confidence Interval)
	Tertiary	2.35	0.68	8.41

The results showed that the availability of reporting tools, having an assigned health records officer, knowledge of the data collection tools by the health records officer and the attending clinician and the awareness of a law or regulation to report were the statistically significant predictors of reporting of notifiable diseases.

Reporting tools are the media for communication between the health facilities and the LGA authorities. As such, their availability had an effect on the ability of health facilities to report. The odds of reporting notifiable diseases was significantly higher among health facilities that had reporting tools than those that did not have the tools (Odds Ratio [OR]:13.69, 95% Confidence Intervals [CI]: 8.85-21.62). This finding supports the hypothesis that health facility readiness and health system challenges affect compliance with disease surveillance by private healthcare facilities.

Health facilities that had personnel assigned to health records management had a higher chance (OR = 3.9. 95% CI = 2.68-5.73) of reporting into the disease surveillance system than those that did not have such personnel. Health facilities that assign personnel to health records management are probably large outlets with high patient volume which necessitates having dedicated personnel for health records management although they may lack training in the relevant field. However, the length of period a health records officer had been in a health facility was not significantly associated with reporting notifiable diseases (OR=1.000,

95% CI=0.999-1.001). This finding might be an indication that reporting behaviour of health facilities was not absolutely dependent on the health records officer but influenced by several other factors.

Regarding knowledge of the data collection tools that were being used to report the notifiable diseases, health facilities that had health records officers who could identify these tools had significantly higher odds of reporting notifiable diseases than those with health records officers who were unaware of the tools (OR=10.51, 95% CI=2.86-67.70). Similarly, health facilities with clinicians who had knowledge of the data collection tools used for disease surveillance had significantly higher odds of complying with reporting notifiable diseases than those who had low levels of knowledge (OR=2.49, 95% CI=1.22-5.25). This finding is consistent with the study hypothesis that knowledge of the health workers has an effect on compliance with disease surveillance. On another description, it can be interpreted that the health facilities that were reporting had better knowledge of the data collection tools. This finding also supports the validity of our hypothesis. Workers in health facilities that were reporting into the disease surveillance system were more knowledgeable about the disease surveillance system and thus, likely to be better accustomed with the data collection tools than their peers in health facilities that were not reporting.

In situations where physicians were interviewed in the health facilities, the length of period that the physician had been out of medical school did not have an effect on the reporting practice of the health facility (OR=1.017, 95% CI=0.999-1.036). This might suggest that training on disease surveillance in medical schools has not changed for a long time. It may also be an indication that laxity by government officials in ensuring compliance with reporting of notifiable diseases by private health facilities has lingered for a long time. As such, both old

and young physicians alike had limited knowledge of the disease surveillance system in the country.

The level of care offered by the health facility was not significantly associated with disease surveillance reporting. Secondary health facilities had slightly higher odds of reporting than primary health facilities across the country (OR= 1.67, 95% CI=1.14-2.45). However, there was no statistically significant difference in the likelihood of reporting notifiable diseases between tertiary and primary health facilities (OR=2.35, 95% CI=0.68-8.41). Tertiary health facilities were not that common across the states included in the study and the few states represented may have had a poor reporting practice.

8.3 Summary of the Chapter

This chapter presented findings of analysis of factors associated with compliance across the six states in the South-West of Nigeria. A number of factors were found to influence the likelihood of reporting among the private health facilities which were broadly classified into health facility readiness and knowledge of the health providers on the disease surveillance system. Availability of reporting tools in a health facility, availability of a health records officer within a health facility and the awareness about laws requiring reporting are important factors influencing compliance with reporting notifiable diseases by private health facilities. In addition, facilities that complied with the reporting of notifiable diseases understood the disease surveillance tools and processes better than those that did not routinely report such diseases.

CHAPTER 9: HEALTH SYSTEM CHALLENGES TO DISEASE SURVEILLANCE IN NIGERIA: EXAMINING DUPLICATION BETWEEN IDSR AND NHMIS

9.1 Introduction

Routine health information systems in Nigeria are characterized by poor performance (Asangansi, 2012; Bosch-Capblanch et al., 2017; Makinde, Ohadi, et al., 2012; Makinde, Onigbanjo-Williams, et al., 2012; Makinde, Umar, et al., 2012; Welcome, 2011). The IDSR and the NHMIS are two important routine data collection systems within the Nigerian Health System. Like the Disease Surveillance and Notification system – the predecessor of the IDSR – the performance of the IDSR has been affected by poor funding and fragmentation of the national health information system (Bawa & Umar, 2009). Facility based health workers are meant to complete the data collection tools of the two data systems independent of each other. The volume of data to be completed by health workers has been labelled as overburdening by various studies that have been conducted across the country and is seen as a major limitation to the completeness of the data reported by health facilities (Bosch-Capblanch et al., 2017; Makinde, Adebayo, et al., 2012; Makinde, Enemuo, et al., 2012; Makinde, Onazi, et al., 2012).

The NHMIS preceded the establishment of the IDSR in the country. The policy which established the IDSR described it as a sub-system of the NHMIS with the need for the coordination of the two data collection efforts to avoid duplication (Federal Ministry of Health Nigeria, 2005). However, it is unclear to what extent this coordination has been achieved given the poor performance of the NHMIS (Asangansi, 2012; Asangansi et al., 2013; Uneke et al., 2013).

Implementation of the IDSR system in Nigeria started in 2000 with sensitization of various stakeholders across the country on the system (Federal Ministry of Health Nigeria, 2005). Subsequent assessment of the surveillance system in the country identified various systems operating along disease lines. The IDSR policy stated that it was an integral part of the NHMIS but with a focus on shorter frequency of reporting (daily, weekly and monthly) compared with the NHMIS which was returned every six months. This was part of the justification provided for setting up the IDSR system. The policy statement as outlined in the document states that: "There shall be proper streamlining of data management between the NHMIS and Federal Epidemiology Division to avoid duplication of efforts"(Federal Ministry of Health Nigeria, 2005, p. 14). However, the extent to which duplication of effort has been avoided or has occurred has never been assessed. Lack of knowledge on how the systems have evolved can: i) be a major limitation in unlocking the perceived failure of the NHMIS, ii) prevent learning from the potential shortcomings and iii) not support evidence-based planning of interventions for strengthening the overall system.

Duplication of effort is the bane of several health systems in low and middle income countries. Duplication often occurs as a result of poor responsibility assignment across government agencies and poor planning of interventions (Makinde, Sule, et al., 2018; Ulikpan, Narula, Malik, & Hill, 2014). Several countries have made effort in developing strategic plans that detail the responsibility of different government units as a means of addressing duplication (Ulikpan et al., 2014). These also help in providing a coordinated response by countries. Duplication also occurs when several donors support governments in low and middle income countries to carry out parallel development projects (Logie, Rowson, & Ndagije, 2008). Within the health system, parallel projects and fragmentation of the system along disease focused

priorities have resulted in the proliferation of various health information systems which barely communicate with one another in some countries (Angula & Dlodlo, 2018; Makinde, Meribole, et al., 2018). Addressing duplication is seen as an important means of making the best use of development aid and achieving greater impact in the health system.

This chapter makes a critical comparison of the IDSR and the NHMIS with the aim of identifying barriers to proper functioning of the two systems and potential synergies. It addresses the last objective of the study: "To identify the barriers to routine disease reporting by private healthcare practitioners/ facilities in Nigeria." It also focuses on the last prong of the conceptual framework which looks at how the health system functionality influences compliance with disease surveillance and notification in private health facilities.

9.2 Presentation of Results

The findings presented in this section are from the literature review (analysis of policy documents and guidelines) and the key informant interviews. These are presented based on themes generated from the key informant interviews and supported by findings from the literature and policy analysis.

9.2.1 Governance and Interdepartmental Relationships

The findings showed that state level, IDSR and the NHMIS operate as separate entities, with staff in one department having limited knowledge and understanding of what the other does. In response to how the state meets the IHR, one of the state HMIS officers stated that: "I don't know too much about notification of infectious diseases. That has to do with people in the epidemiology. Although, we also have some of the diseases that are in the IDSR on the NHMIS as well, we have come together in an agreement to avoid duplication." Another HMIS officer was asked if the state had a law on disease surveillance and he responded that: "There

should be but I am not sure. We have an officer for IDSR but my own area is the HMIS. Those people working on surveillance will be able to tell you better if there is a law for this." Although there is a statement on the need to avoid duplication in the IDSR policy, lack of adequate cross understanding of the processes and goals of the overall NHMIS and its supposed sub-system, IDSR, by officers responsible for their independent management so that areas of overlap can be adequately identified and streamlined remains a major drawback.

There was no organizational chart on the Federal Ministry of Health website for reference on how the different departments relate to one another. However, based on information provided by key informants, one has been constructed. Figure 11 shows the cross-departmental relationships and the roles of the different departments in the RHIS in the country based on information provided by the key informants interviewed and the understanding of the author regarding the federal system. The Department of Planning Research and Statistics is responsible for the NHMIS while the Department of Public Health was previously responsible for the IDSR before the responsibility was transitioned to the NCDC in 2018. The two departments are headed by Directors who report to the Permanent Secretary, a non-technical officer. Permanent Secretaries are usually appointed by the President and could be from other Ministries and disciplines since the position is regarded as an administrative role. As such, they usually lack the capacity to provide technical leadership to the departments. The directors are expected to provide technical leadership and coordinate their departments. They are expected to advice the Permanent Secretary on technical issues. In a situation where the directors see their roles as the technical end, it will be difficult to foster collaboration across the departments. In 2018, the responsibility for the management of the IDSR was transited from the Department of Public Health to NCDC.

Although the role of NCDC in the IDSR management process was not investigated in this study, a shift in culture and approach is needed to improve the NHMIS as a whole. The State Ministries have a structure similar to the one presented with the Minister replaced by the Commissioner for Health and the absence of the NCDC and Minister of State positions.

9.2.2 The Data Collection Tools

Since 2005 when IDSR was introduced into the National health information system, it has operated as a parallel system to NHMIS. The IDSR policy stated that the data for the IDSR will be collected on weekly and monthly basis, whereas the NHMIS retuned data from the states bi-annually. However, the NHMIS now also returns data on a monthly basis just like the IDSR with an overlap in the diseases covered by the two systems. Information on when the NHMIS was mandated to provide monthly reports was not found in any of the documents reviewed. However, it can be inferred that the transition took place sometime after 2005 when the policy on IDSR was first published.

The IDSR is made of the following tools: IDSR 001, IDSR 002 and IDSR 003 forms. The IDSR 001 forms can have a suffix of A (case-based reporting form), B (laboratory request form) or C (line list form). The IDSR 001 forms are for immediate reporting of epidemic prone notifiable diseases, IDSR 002 forms are for weekly reporting of notifiable diseases whereas the IDSR 003 forms are for monthly reporting of notifiable diseases. The NHMIS is made of the Monthly Summary Form (MSF), tally sheets and various registers for specific diseases/ health services including the Antenatal Care register, Out-Patient Register, Family Planning Register, Immunization Register, Prevention of Mother to Child Transmission (PMTCT)/ Antiretroviral Registers and the Tetanus Toxoid Registers. The registers are used for daily recording of contact data which is later transferred to the Monthly Summary Form at the end of each

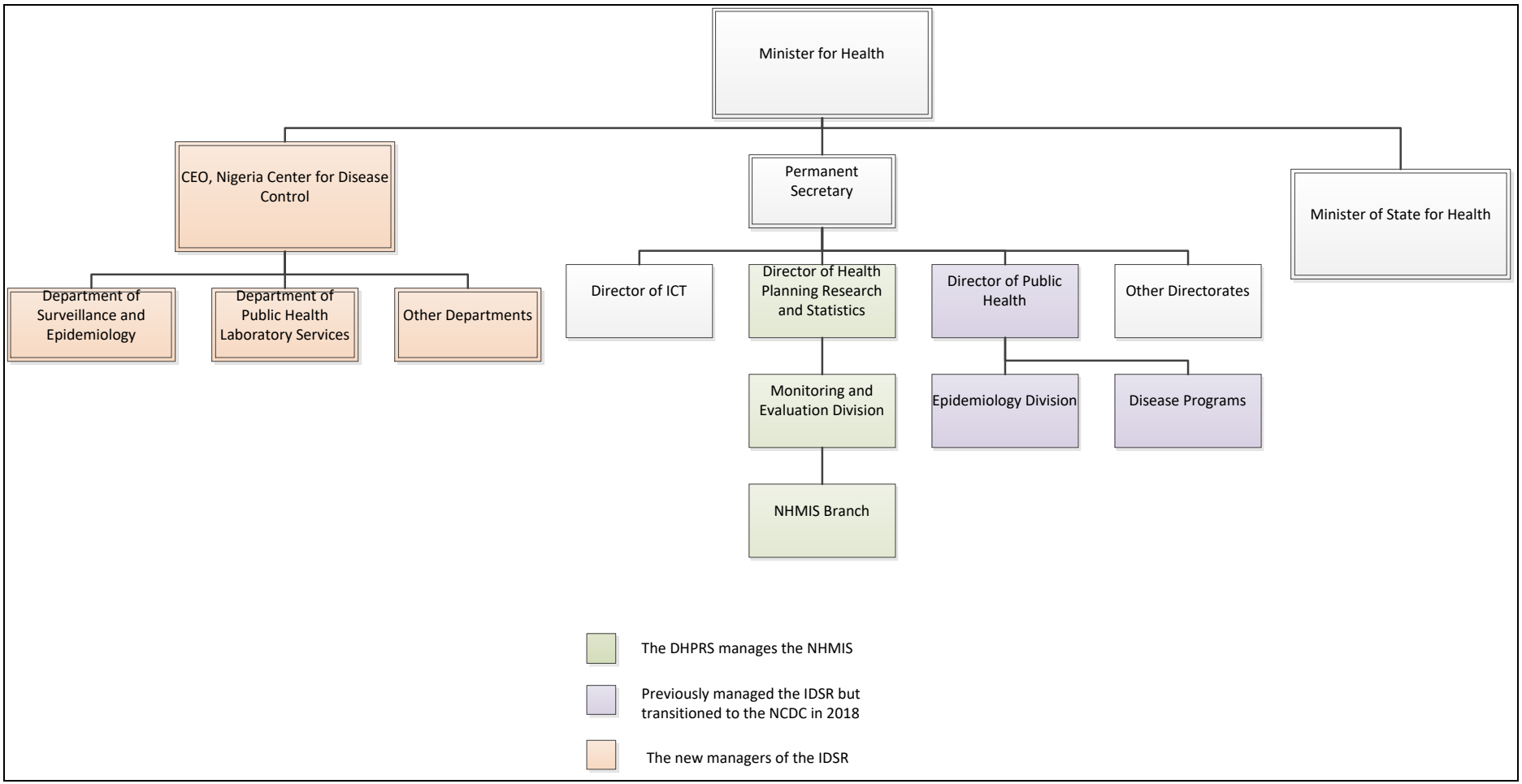
month. The different monthly data collection tools were further analysed to identify the diseases and conditions that are covered by both systems.

Analysis of the monthly report forms for the IDSR (IDSR003) and the Monthly Summary Form of the NHMIS are subsequently presented in Table 17 showing the overlaps in the diseases and conditions tracked by the two data collection systems. About 40% (15/41) of the diseases and conditions that are tracked by the IDSR 003 monthly reporting forms are equally tracked by the NHMIS Monthly Summary Form.

Table 16: Diseases or Conditions Tracked by both IDSR and NHMIS

	Disease/ Condition
1	Buruli Ulcer
2	Malaria
3	HIV/ AIDS
4	Pneumonia in under 5
5	Sexually Transmitted Infections
6	Tuberculosis
7	Adverse events following immunization
8	Asthma
9	Diabetes Mellitus
10	Hypertension
11	Road Traffic Accidents
12	Malnutrition
13	Snake Bites
14	Sickle Cell Disorders
15	Maternal and Perinatal Deaths

Figure 11: Health Management Information System Institutional Structure at Federal Level (As constructed by author)



When asked about the data collection process for routine data in the country, a state HMIS officer explained that: “We have a set of tools that we use to collect data from facilities. The tool was put in place by the FMOH. At the 56th NCH, it was agreed that all the healthcare practitioners, (including private and public health facilities) will be reporting with the NHMIS tools. In it we have some notifiable diseases in there. It contains about 233 data elements. Before it gets to the Monthly Summary Form, there are 13 different registers that make up the MSF. Out of the 13, we have one that deals with some of the specific diseases. The IDSR is a separate form but there are some of the components of the IDSR also within the NHMIS too.” Whilst continuing further, the HMIS officer stated that: “I am aware that they (IDSR) have another means of getting their data from the facilities which is not as structured as the NHMIS.” In this situation he was referring to the IDSR process which has a different interaction point with the health facilities from the NHMIS. Many of the key informants interviewed were of the view that there were overlaps in the data collected by the two systems with variations only in the level of disaggregation. However, they could not say what efforts were being made to harmonize the systems.

9.2.3 Information Flow

The flow of information differed across the two data collection systems. A state epidemiologist noted that: “With my state, we have the epidemiology preparedness and response unit within the Department of Public Health and we are saddled with working with DSN officers in the LGA. We have like a chain of command, LGA officers report to the state DSN officer who reports to the State Epidemiologist who in turn reports to the Federal.” Federal in this statement was the Division of Epidemiology within the Department of Public Health of the Federal Ministry of Health. The similarities of the data flow of both systems were highlighted by an HMIS officer who noted that: “the IDSR is managed by the Disease

Surveillance Officer which is within the Public Health department. However, the job done by the HMIS officer is similar to that by the disease surveillance officer at the LGA and the state." Though the similarities between the two units are observed, the processes for carrying out their day to day responsibilities are parallel and resources are not leveraged across the system. This is further highlighted in the information flow extracted from the guidelines of the two systems.

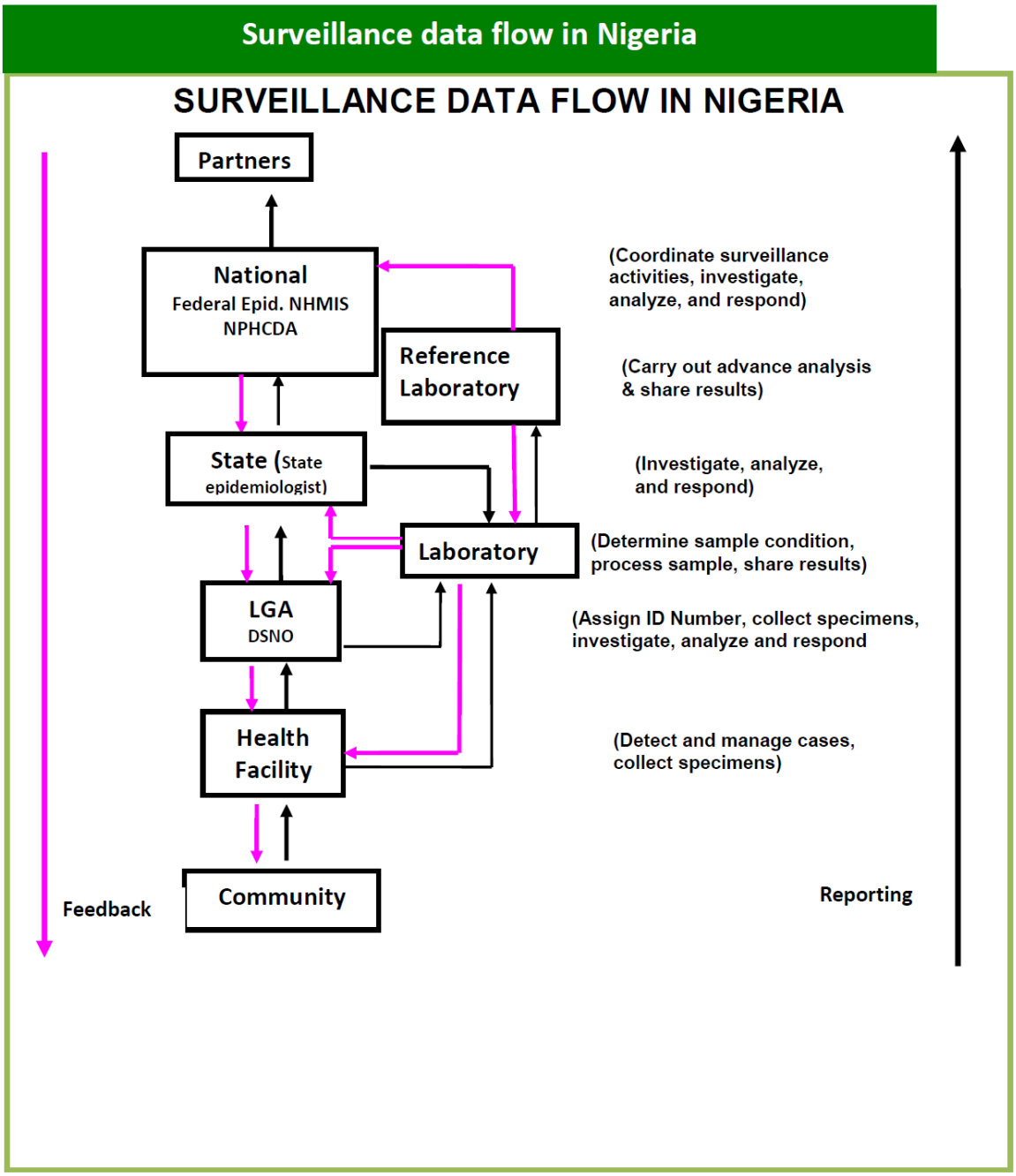
The information flow of the IDSR is presented in Figure 12 whilst that of the NHMIS is presented in Figure 13. This shows that the data flow across the two systems are independent of each other. Except at the health facility which is the least resourced and also has the responsibility for attending to patients, the two systems require two separate sets of health workers for the data to be reported.

The responsibility assignment matrix for the IDSR and NHMIS from the health facilities to the Federal level is presented in Table 18. At the health facilities where the forms are completed, a clinician or health records personnel is expected to complete the different tools for the IDSR and NHMIS independent of each other and forward to the LGA. Responsibility for managing the IDSR at the LGA is with the DSN Officer while the NHMIS is with the LGA Monitoring and Evaluation Officer. At the states, responsibility for the IDSR is with the state epidemiologists domiciled within the department of public health while the NHMIS is with the State HMIS officer within the Department of Planning, Research and Statistics. Similarly at the National level the two systems are managed by two separate officers. As such, it is evident that at the level of the health facility where a single officer is responsible for both systems, subsequent levels of management of the data are administered by at least two different officers.

Table 17: Responsibility Assignment Matrix for IDSR and NHMIS at different levels of the health system

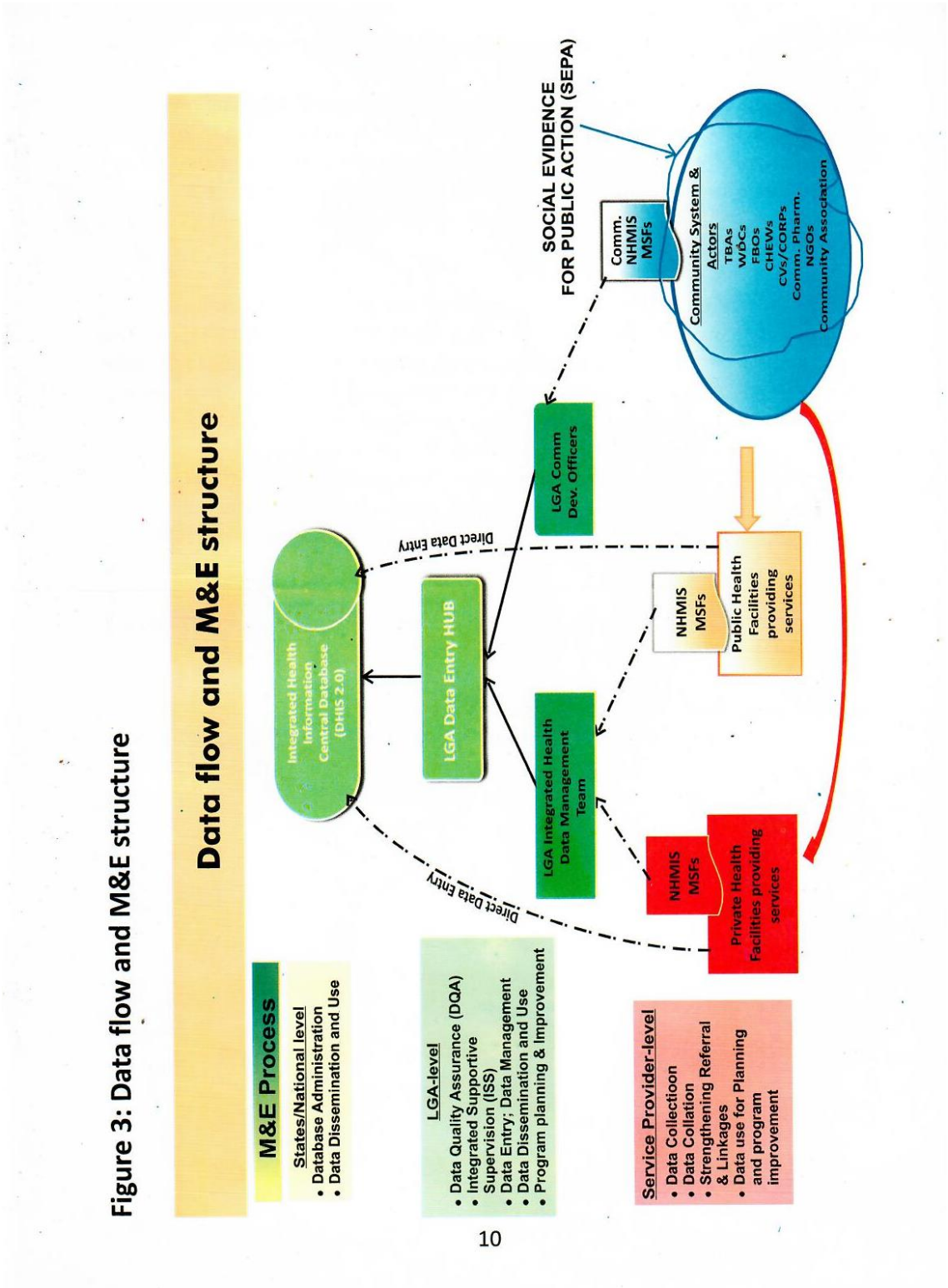
Location of Service	IDSR	NHMIS
At the Health Facility	Health Facility Worker (Clinician or Health Records Officer)	Health Facility Worker (Clinician or Health Records Officer)
At the LGA	LGA DSN Officer	LGA Monitoring and Evaluation Officer
At the State	State DSN Officer and State Epidemiologist	State HMIS Officer
At the National Level	FMOH Department of Public Health (Epidemiology)/ NCDC Officer	FMOH Officer (Department of Health Planning, Research and Statistics)

Figure 12: The IDSR Data Flow



Extracted from the Technical Guidelines for Integrated Disease Surveillance and Response in Nigeria (2010) – Page 20

Figure 13: The NHMIS Data Flow



Extracted from the National Standard Operating Procedure for the Collection and Management of Integrated Routine Health Data in Nigeria – Page 10

9.2.4 Data Transmission Platforms and Processes

The electronic platform in use was also a point of difference between the two systems as the IDSR was being transmitted through a Microsoft Excel template whereas the NHMIS is transmitted from the LGA through the National DHIS platform. The DHIS is a purpose built database developed by the University of Oslo and is popular with several low and middle income countries for routine data management. One state HMIS officer while describing the IDSR system explained that: "….they are not yet entering into the DHIS. They use an MS Excel format that they forward every month." Furthermore, another key informant reported that: "Presently, the software (IDSR forms) is on the DHIS and times without number when we met with the state epidemiologist, we have advocated that they utilize the software for the transmission of the data. The situation whereby when I need data on communicable disease and have to write to my neighbour will be a thing of the past if they begin to use the system for managing their data. But, they said at the national level, they have not given them the go ahead to input the IDSR data on the DHIS." Another key informant noted that "If we are able to do it the way we should do it, it would be very good. Where we are is that we have the (IDSR) module already on the platform we need to review it to make sure it is okay and there is an alert system." While it can be inferred from the statements by the officers that effort has been made to transit the data management process of the IDSR to the DHIS platform to run alongside the NHMIS, this was yet to be achieved. Even if this is achieved, the running of the two systems will remain parallel and only the transmission platform will be common across the two systems. A state epidemiologist indicated that: "We had a template through the West African Health Organization (WAHO), an internet based platform but for the past 2 years, we have not been able to access that platform." WAHO is the regional health organization established by the Economic Community of West African States. The WAHO

system is likely to further lead to vertical structures and disruption of the national system if implemented independently. However, it can be assumed that the system has been abandoned because participants reported not accessing it for the past two years.

Awareness of a DHIS module for the transmission of IDSR data was not universal as one state epidemiologist was unaware that the IDSR forms had been developed on the Nigeria DHIS platform. He stated that: “I am unaware that the national DHIS2 platform has the IDSR forms in place.” However, his colleague from the HMIS unit in the same state while discussing the DHIS noted that: “The IDSR module is there but no one is using it and there is no data. I think they (IDSR) have their own system. Not so sure. During the EVD outbreak, they had a system that was being used for reporting.” The knowledge gap on the transmission system between the two officers that ought to be working together shows poor communication and collaboration amongst the departments that ought to drive the health information system in the state.

One of the state epidemiologists felt the DHIS was inadequate for surveillance purposes and stated that: “Though the DHIS has a module for IDSR, we are not using this at the moment. I believe the system is not adequate for surveillance. Other program areas like immunization and malaria use it.” The varied opinion on the availability and adequacy of the DHIS for managing IDSR data is a major challenge to its acceptance and use. The statement also shows the continued verticalization of the HMIS along program lines.

Besides the challenge of parallel data transmission processes, a key informant raised issues of data security and loss which could occur under the existing system of transmitting record under the IDSR system. It was stated that: “The efficiency of using the DHIS to manage the IDSR data will be more effective than the current system as the data is resident on one

person's computer. Should you need the state data for any reason, until you go to the person concerned, the data cannot be accessed. Also, there is a risk of data loss should the computer be missing though they keep backups." These were further justifications given for the utilization of a centralized database management system such as the DHIS for the management of the IDSR records.

9.2.5 Resource Availability

Several key informants noted that poor staffing across the entire chain of the NHMIS was a major barrier to its performance. Regarding the contribution of private health facilities, a state HMIS officer noted that: "The policies include all health facilities. It is when implementing these policies that private health facilities are left behind. Firstly, there is shortage of staff and this makes you want to narrow down to where you believe you will get results." Another key informant, a state epidemiologist noted that: "Even at the level of the state, there should be more epidemiologists. There should be up to 5 or 6 (epidemiologists) manning each aspect of surveillance. There should be an epidemiologist dealing with issue of laboratories, there should be one in data management, there should be one in field surveillance, there should be one in emergency preparedness and response and they should have a chief at the head." Likewise, the respondents highlighted the challenge of only one DSN officer in each LGA if they are expected to visit the health facilities and retrieve the completed data collection tools. While the number of personnel was emphasized, the quality of those available has also been called to question in the documents that were reviewed (Bosch-Capblanch et al., 2017; Makinde, Adebayo, et al., 2012; Makinde, Enemuo, et al., 2012; Makinde, Onazi, et al., 2012). The poor collaboration between the two principal departmental structures managing the health data chain (Department of Public Health/ NCDC and the

DHPRS at the national level and in the states) results in overstretching of available resources across parallel systems which could be avoided through harmonization.

Lack of adequate budgetary allocation and release for RHIS management was highlighted by the respondents as another important limitation that prevented the RHIS from achieving its goal. One informant indicated that: “Based on the structure we have on ground which is similar to what operates in other states, we have disease surveillance and notification officers in each LGA. Health facilities (public and private) are expected to report all their data to the LGA officers who then send summary to the states. Ensuring that we get all these records to the officers is another kettle of fish because the logistics to cover all these facilities especially the private is not really there.”

Other statements made to highlight the funding challenge include: 1) “There is no adequate funding for surveillance in the state. We have only one vehicle for four state officers. Surveillance is not supported by development partners as well”, 2) “We occasionally use personal resources to ensure that we carry out Data Quality Assessments”, 3) “Surveillance is poorly funded for our day to day running including field work and supportive supervision, it is better in a way now. WHO supports with a stipend. We do not have a steady flow of resources. Other partners support us for various activities. We occasionally get funding when there is an outbreak/ epidemic. However, we should not be waiting for outbreaks before we act. We don’t get enough funding to support our routine activities. We do not even have cars to go to the field”, 4) “Funding is a major issue with disease surveillance at the LGA, state and I believe from the federal as well. If you want people to go out and monitor diseases, you must fund them. Some states have up to 3-4 international partners that are supporting disease surveillance. In my state we only have WHO assisting with stipends for field work” and 5) “I

don’t think the system is well funded. I think most of the funding comes from development partners. If you want something to succeed, you need to put your money where your mouth is. So I believe the government needs to put more resources in disease surveillance”. These were some of the statements made by the respondents highlighting the poor resource availability to carry out routine disease surveillance activities. A state epidemiologist narrated how he had to use personal resources and also obtained a loan from another colleague to fund the transportation of a sample for investigation of a suspected VHF case that had been identified in the specialist hospital in the state to the approved national laboratory for definitive diagnosis. The incident occurred after the EVD outbreak in the country that claimed several lives and drew response from the national government to contain it. Qualitative interviews also showed that funding support to states from development partners for disease surveillance varied from state to state.

9.3 Summary of Chapter

There are two health information systems in the country with some responsibility for disease surveillance and these are IDSR System and NHMIS. At the national level, the NHMIS is managed by the Department of Health Planning Research and Statistics of the Federal Ministry of Health while the IDSR was until recently managed by the Epidemiology Division within the Department of Public Health of the Federal Ministry of Health. The establishment of the Nigeria Centre for Disease Control shifted the responsibility for the management of the IDSR to the new institution at the national level. Similar relationship between departments of the two data collection systems existed across the 36 states of the Federation and the Federal Capital Territory. However, IDSR is managed by the Epidemiology Division of the Department of Public Health across the states since there are no State Centres for Disease Control. Despite

policy pronouncements to avoid duplication of effort between IDSR and NHMIS, the two systems have operated parallel structures since IDSR was established in 2005. Today, about 40% of the diseases and conditions covered by the IDSR are similarly captured under the NHMIS. There is limited progress with harmonization of effort between the two systems, which was evident from the different data collection tools and data management processes that lead to inefficiency. Furthermore, the systems are poorly funded with strong dependence on international aid.

CHAPTER 10: DISCUSSION

In this chapter, I discuss the results presented in Chapters 4 through 9 under three major themes: the legal framework, performance of the IDSR and Health Systems and Duplication of effort.

10.1 The Legal Framework

Strong and appropriate laws are an important first step towards achieving the IHR but many countries still do not have adequate laws for its implementation leading to a major gap, unfulfilled targets and non-compliance with international regulations. In Nigeria, this study found several legal instruments (laws, policies and guidelines) for disease surveillance dating as far back as 1926. The legal instruments were at different stages of enforcement as they included laws, policies, guidelines and bills awaiting enactment in the legislature. International legal instruments of the World Health Assembly such as Conventions, Agreements, Regulations and Recommendations also vary in terms of enforcement (Gostin et al., 2017; Gostin & Sridhar, 2014; Kates & Katz, 2011). The laws are the most potent of all the legal instruments having been adopted by the legislature and assented by the President (in case of national laws) or by the State Governors (in case of state laws). Policies on the other hand are usually crafted and agreed to within an institution e.g. the Ministry of Health. Guidelines are usually made for driving the implementation of a law or policy and do not stand on their own.

Though the different legal instruments were in place at the national level, the nature of governance in Nigeria makes their implementation at the state level often a challenge. Nigeria is a Federation with 36 semi-autonomous states and the Federal Capital Territory. These states and the FCT are further made of 774 local government areas (Federal Government of

Nigeria, 1999). Federalism in Nigeria has resulted in the decentralization of responsibilities to the lower tiers of government with the three level of governance sharing the responsibilities within the health system (Alubo & Akintunde, 2018). The State Governments oversee the responsibilities at the state while the Local Government Administrations oversee responsibilities at the LGA level. Despite the noble intentions of making the governance closest to the people in order to improve service delivery and performance, this has not been achieved (Alubo & Akintunde, 2018). Federalism can lead to unhealthy competition between different levels of governments as has been seen in some other countries. In Nigeria, some government responsibilities are exclusively under the Federal Government while others are shared with other tiers of government (Federal Government of Nigeria, 1999). Health is one of the responsibilities that falls under the concurrent responsibilities i.e. the three tiers of government are jointly responsible for addressing the health system. However, there are no well outlined guidelines on how the health system should be run across the tiers of government. Also, the enactment of national laws does not mean that states have the absolute responsibility to implement them unless they are first domesticated as state laws. Such has been demonstrated recently with the passage of the Child Rights Act (2003) at the National Assembly which subsequently resulted in several states passing state specific laws which was at variance with the Act passed at the national level especially regarding the age of consent for marriage (Braimah, 2014).

In this study, it was observed that some laws are outdated and need revision. The Quarantine Act of 1926 repeatedly mentions smallpox and the need to present a certificate for its inoculation at the point of entry into the country. However, smallpox is no longer an active disease and travellers need not be asked for legal documents on inoculation against it as

vaccines against this disease are no longer given. The IHR was slightly modified in 1981 to remove smallpox which was eradicated the year earlier (Gostin, 2004). However the disease has remained on the active laws of Nigeria. Whereas the disease should continue to be routinely monitored in case of reemergence, it should ideally not require presentation of documentation or proof of vaccination against. While it has not been reported, its presence provides room for the legal harassment of visitors by shadowy enforcement agents. As such, a review of the Quarantine Act so as to address the archaic list of diseases it targets and incorporate emerging global health security challenges is more than 30 years overdue. Although a Bill was drafted in 2004 with one of its aim being to repeal the Quarantine Act, it has not been passed into law and may never be attended to again since the sponsor of the Bill is no longer in the Senate.

Legislation is a continuous and active process which is still evolving in Nigeria. The country in its 58 years of existence has had several years of military rule where laws are made by pronouncements from Military leaders. Civil rule was restored in 1999 but despite the return to democratic processes the learning curve has been pretty steep. Studies have shown the inadequate capacity of policymakers to transform knowledge into policies and laws (Uneke, Ezeoha, Ndukwe, Oyibo, & Onwe, 2012a, 2012b). A statement attributed to the chairman of the Nigerian Senate committee on health (2015-2019), Dr Olanrewaju Tejuoso and colleagues: “Yet often a legislature and ministry meet only when there is a budget to defend or a disease outbreak to explain” in their paper titled ‘Health and the Legislature: The Case of Nigeria” shows the gap in relationship in the health governance mechanism in Nigeria over the years (Tejuoso, Alawode, & Baruwa, 2018). The poor interaction between the civil servants and the legislature shows that ideas on the policies and laws that will have the largest

impact on the Nigerian populace are hardly exchanged between these two categories of policymakers. The statement however signifies a ray of hope that the problem has been identified and will subsequently be addressed over time. The recent establishment of the legislators' network for Universal Health Coverage with the support of USAID, the World Bank, UKAID and the Bill and Melinda Gates Foundation further shows a positive commitment to increase the knowledge of the policymakers to enact laws that will positively impact the health of the citizenry of the country (Tejuoso et al., 2018).

The important role that legislation can play to improve healthcare delivery has not been adequately explored in Nigeria. Most states mentioned that they did not have state specific laws or policies on disease surveillance and were tapping into the federal laws and policies made at the national level. This further shows the gap in understanding of the federated nature of the country by the state legislature. It may also signify the order of priority given to general health issues or laziness on the part of the state legislators that were quick to pass modifications to the laws that altered the age of consent of marriage in the Child Rights Act based on religious and cultural sentiments. A study recently investigated the role of legislation in improving immunization coverage which according to the 2016/2017 Multiple Indicator Cluster Survey, full coverage at one year remains below 25% (National Bureau of Statistics & UNICEF, 2017; Onyemelukwe, 2016). The study found that legislation plays an important role in preventing diseases that require vaccination across the world (Onyemelukwe, 2016). Vaccinations are one of the world's most proven interventions for disease control. Yet, many parents fail to ensure that their children and wards are appropriately immunized against childhood killer diseases. The outbreak of Measles that occurred following a controversial

study in the UK that was previously mentioned and its outcome was an important reawakening point for several countries on the importance of legislation for vaccination.

Several key informants identified the need for more laws especially at the state level since the officers at that level were implementing laws passed at the national level. There was also poor understanding of the laws among different cadres of officers in the states. Most HMIS officers did not see the relationship between the National Health Management Information System and the disease surveillance system and were unaware of the laws or approaches to disease surveillance in their states. Notwithstanding the lack of awareness, many identified the shortcomings of poor enforcement of laws that had already been enacted. On the global scene, the argument provided by Nikogosian & Kickbusch (2016) on the need for more legal instruments was counteracted by Forman on the premise that there are several current instruments that have not attained the potential for which they were developed. Forman further noted the need to explore the contributions that these long standing legal instruments could make to global health before establishing new ones (Forman, 2018; Nikogosian & Kickbusch, 2016). Such arguments could be applied to the case of Nigeria. In states that are yet to domesticate national laws, effort should be geared towards ensuring that these laws or policies are enacted and appropriately implemented as their non-implementation will only result in a status-quo.

The IDSR policy (2005) remains the most comprehensive legal instrument on disease surveillance in Nigeria. This reveals the level of priority that has been placed on global health security in the country. If appropriately prioritized, it should have been upgraded and considered a national law. Yet, the level of understanding of the policy among health officers who should implement it was still limited 13 years after it came into effect. The poor

knowledge of disease surveillance laws and policies by the HMIS officers in the states reveal potentially missed opportunities for the synergistic effect that could otherwise have been achieved had the Department of Public Health and the Department of Health Planning, Research and Statistics in the states been working together. In addition, since the state officers affirmed that they were implementing national policies and laws, a better coordination between the DHPRS and the Department of Public Health/ NCDC at the federal level would have an overall greater effect on the performance of disease surveillance system across the country.

The national health information system policy (2014) and its accompanying five year strategy are the most recent legal documents that have significant influence on disease surveillance system in the country. As was initially stated, the IDSR is a component of the NHMIS system though both have evolved over the years. The 2014 National Health Information System (HIS) policy was modeled after WHO's Framework and Standards for Country Health Information Systems (Meribole et al., 2018; World Health Organization, 2008). Assessments completed prior to the development of the policy had highlighted the poor governance structure for the health information system and the need for the various Ministries, Departments and Agencies (MDAs) with a role in the HIS to work more collaboratively together (Federal Ministry of Health, Nigeria, 2014). The policy used evidence on the poor coordination of the different units of the country to propose the establishment of a National Health Data Governance Council (NHDGC). The policy has seen a delayed and staggered implementation but achieved an important milestone with the inauguration of the NHDGC in January of 2017 (Makinde & Oyediran, 2017). The NHDGC was proposed by stakeholders as a means of addressing the fragmentation that had characterized the National Health Information System which

emanated from the poor coordination across different Ministries, Departments and Agencies of the government. The NHDGC is chaired by the Honourable Minister for Health and has as its members, the heads of all the health data generating institutions/ units in the country. This mechanism would inadvertently bring together the leadership of the two departments under a technical forum to harmonize parallel structures that the two systems had created among others.

There were two Bills awaiting discussion in the Nigerian Senate in May 2018, the Public Health Bill (2004) and the more recent Bill for the Establishment of the Nigeria Centre for Disease Control (2018). The more recent NCDC Bill gained traction following the 2017 WHO led joint external evaluation of IHR core capacities of the Federal Republic of Nigeria. The report had identified lack of a legal backing for the NCDC as a major shortcoming of disease surveillance system. The long duration that the Public Health Bill (2004) had been awaiting discussion raises concerns on the unlikeliness of it coming up again as several years have gone by and it is unlikely that the sponsor of the Bill is still in the Senate in 2018. Such could be the fate of other Bills that are waitlisted for so long since the tenure of legislators is for four years and the sponsors may not return following elections. Since the outcome of the external evaluation was made known, the Senate in February 2018 held a public session to discuss another Bill for the establishment of the NCDC. Notwithstanding the delay, the NCDC has been functioning as the Nation's Public Health Institute for a few years (Njidda et al., 2018).

Nations fail to adhere to international regulations because of various reasons including sovereignty, self-interest and lack of capacity (Gostin, 2004). However, it is uncertain if such reasons have a role to play in the poor implementation of the IHR in Nigeria. Countries have a lot to gain by not reporting outbreaks as it can reduce commerce and may result in their

citizens being stigmatized whilst travelling to other countries. The recent "outbreak" and report of Lassa fever in Nigeria to WHO has raised fears among Muslims who plan to perform the 2019 Hajj pilgrimage as Saudi Arabia is considering barring Nigerians from the religious rites because of these developments (Suleiman, 2018). The inability of Muslim faithful who are about half the Nigerian population to be able to observe the Hajj pilgrimage can have political implications for the Nigerian government. Following the concern raised, the Federal Government subsequently called a press conference to declare the end of the emergency phase of the Lassa fever outbreak (Akinkuotu, 2018). Should Saudi Arabia eventually bar Nigerian pilgrims from attending the 2019 Hajj pilgrimage, this could be a promoter of non-adherence to the IHR by the country in the future. Lassa fever is endemic in Nigeria, with an estimated annual global disease occurrence of between 100,000 and 300,000 cases resulting in about 5,000 deaths (Makinde, 2016). From January 1 2018 to May 13 2018, there were a total of 1914 suspected cases across 21 states of which 428 were confirmed, 10 were probable and 1468 were negative (Nigeria Centre for Disease Control, 2018). The total number of cases reported was nowhere near the lower limit of the annual expected cases. As such, it is unlikely that Nigeria is having an outbreak but a more sensitized disease monitoring system. In addition, the NCDC which has been under the spotlight since the EVD outbreak of 2014 has been more active in collating and publishing weekly disease occurrence with poor historical data to compare with.

10.2 Performance of the IDSR

The IDSR system in Nigeria focuses mainly on reporting from hospitals and clinics to the health authorities. Only 40% of the private health facilities surveyed were reporting notifiable diseases with variations across states ranging from 17% to 60%. The variation seen across the

states may be dependent on the level of engagement of the private sector in each state. The relatively high performance seen in Lagos could be a result of the fallout of the EVD outbreak that ravaged the state following the importation of the virus into the country in 2014 and the response mechanisms that were subsequently instituted. The index case in that outbreak was managed in a private health facility in the state. However with the experience of the outbreak, a higher level of performance would have been expected. While over half of the private health facilities in Lagos were reporting, the level of performance remains below acceptable values. Studies of the notifiable disease system in Taiwan found that physicians in urban areas were more likely to be aware of the surveillance system and reporting notifiable diseases than their peers in less urban areas (Tan, Chang, Tseng, & Lin, 2007). This could also explain the higher proportion of health facilities reporting in Lagos, which is the most urban of the six states surveyed. However, the level of reporting was higher in Oyo than Lagos state.

Health records' officers/ health information managers are an important human resource in health facilities and they are responsible for collating the records of clients and preparing reports. They are also trained in coding of diseases according to the International Statistical Classification of Diseases and Related Health Problems (ICD). However, Nigeria as a country does not have adequate health records personnel to cover all the health facilities in the country (Makinde, Mami, Oweghoro, Oyediran, & Mullen, 2016). Furthermore, a previous study found that they had limited knowledge of computers and databases (Adeleke, Lawal, Adio, & Adebisi, 2014). Only 81 out of 507 health facilities reported having a health records officer with some level of training in health records management, which is an indication of the scarcity of licensed health information management professionals in the country. Despite the few number of health records officers reported, some of them had attended only short

courses and did not hold diplomas in health records/ health information management. Some of the assigned health records officers did not even have O' level certificates and yet, they were performing roles that required some level of technical expertise. As such, they may not have understood the IDSR forms and even if they had been completing the forms, it could have had an effect on the quality of the data submitted. Although this study did not assess the quality of data reported by health facilities due to certain limitations, qualified health records officers can make important contribution to effective implementation of disease surveillance systems.

Healthcare providers' knowledge about disease surveillance systems can influence whether facilities report notifiable diseases and the quality of such reports. The findings of this study show high knowledge of notifiable diseases among clinicians who were interviewed. However, the knowledge of a law or regulation that makes it compulsory for health facilities to report notifiable diseases to the authorities was not uniform among the clinicians. Lack of knowledge of legal requirements for reporting notifiable diseases and limited understanding of roles and responsibilities regarding disease surveillance on the part of the clinicians in the country pose challenges to enforcing compliance. It may also be an indication of poor enforcement of regulations on disease surveillance by the government over the years. Had the government been engaging with private health facilities, emphasizing the consequences of non-compliance and even taking action when grossly violated, many would have been aware of their responsibilities to routinely report notifiable diseases. However, commencement of enforcement of this regulation now will likely face resistance by the healthcare providers that are used to not reporting. Notwithstanding the inaction, the need

to enforce local, national and international regulations and the potential gains that they bring to disease prevention in the country are important incentives for pursuing the course.

A previous study conducted in Anambra state of Nigeria found high levels of awareness about disease surveillance (Nnebue et al., 2012). The respondents in the study were DSN officers who were government staff and were responsible for managing and ensuring that health facilities reported into the disease surveillance system. In contrast, low levels of awareness about disease surveillance among private providers included in the present study suggest that there is limited interaction between health workers in the two sectors. The healthcare providers at the health facilities should actually report to the DSN officers in the LGAs. Furthermore, the Anambra state study reported that though the respondents had some knowledge, it was not in depth as they could not correctly identify what each data collection tool was being used for (Nnebue et al., 2012). This is consistent with findings of this study that show that several respondents could not tell what forms are used in the reporting of notifiable diseases across the six states studied. It can be inferred that with poor knowledge of data collection tools by the DSN officers, it is unlikely that they can properly mentor healthcare providers in facilities under their jurisdictions on disease surveillance. The finding of poor knowledge of the forms for disease surveillance by private healthcare practitioners in this study could be a reflection of the poor training that they receive from the DSN officers. Furthermore, many of the respondents (health records officers and clinicians) mentioned the NHMIS tools alone or in combination with the IDSR tools when asked to identify three different data collection tools used for notification of diseases by their facilities. Whereas their responses were not absolutely wrong, NHMIS operates as a parallel system to what is generally regarded as the disease surveillance and notification system in the country. Hence

it was obvious that health providers were mixing up the two independent government led data collection efforts. Under NHMIS, reporting is done on a monthly basis, while under IDSR, it is done immediately (for epidemic prone diseases), weekly as well as monthly depending on the diseases and conditions that are being reported. Thus, it is important to consolidate both systems into one to improve efficiency, increase resources available overall and achieve the integration that was the initial aim of the IDSR system.

Reporting is dependent on the availability of the requisite data collection tools in the health facilities. Provision of these tools is the responsibility of the government. Unfortunately, several of the facilities in this study did not have the tools that were needed for them to report notifiable diseases to the LGAs. Another study in Malaysia found the absence of forms in private health facilities had a negative effect on knowledge of providers, the tools being used and knowledge of the process of completing the tools (Agarwal, Daher, & Mohd Ismail, 2013). The absence of the data collection tools in the facilities in Nigeria may similarly have been responsible for the poor knowledge of the health workers on the tools. It is likely that forms that are readily available in the health facilities would have been looked at repeatedly and clarifications sought on unclear sections thereby resulting in an improved knowledge and understanding of the disease surveillance system. The parallel efforts between the IDSR and the NHMIS may also be responsible as many healthcare providers were confused. Many of the facilities may have been reporting only through the NHMIS or trained on the NHMIS but felt both systems were the same.

Jacob John and colleagues (1998) proposed disease surveillance at the district level in their study titled “Disease surveillance at the district level: a model for developing countries” (Jacob John et al., 1998). This sort of system ensured that the government was close enough

to the health workers and was able to adequately and intermittently interact with them and could adequately provide feedback on the information submitted. Unfortunately, the district level in Nigeria which is the Local Government Area is actually the weakest level of the government and usually poorly funded and thus unable to perform their responsibilities adequately (Alubo & Akintunde, 2018). Evidence shows that staff at the LGA level do not have the requisite skills to process data and provide feedback to health facilities and consumers of health services (Makinde, Enemuo, et al., 2012; Makinde, Onigbanjo-Williams, et al., 2012). Engagement of private healthcare providers by the district officers is an important motivator for them to report to the authorities and the absence of such engagement can lead to non-adherence of reporting requirement. Previous studies show that the focus has been more at national and state levels as well as in public facilities and less at LGA level or among private providers (Bawa & Umar, 2009; Dairo et al., 2010). Neglect of lower levels of government and private providers limits the success of disease surveillance in the country. There is evidence that private health facilities have more patient encounters than pubic hospitals (International Finance Corporation, 2007). Thus, a huge amount of data is lost by their segregation from the disease surveillance system. Furthermore, the weakness in the analysis of surveillance data at the LGA level also results in missed opportunities for early detection of epidemic-prone diseases and delayed action, negating the important role that surveillance systems are designed to achieve. However, with the increased availability of electronic reporting systems, such shortcomings are progressively being addressed. In spite of such advances, the electronic systems require those with appropriate skills to manage them. They will need to have an understanding of the system and must be able to utilize the processed information that the system generates for prompt decision making. The absence of an electronic database system for the transmission of routine disease surveillance data is however a limitation to

utilizing decision support systems to achieve this goal immediately. As part of the next phase of strengthening the disease surveillance system, the transition to electronic transmission of IDSR data through the DHIS platform should be adopted.

Feedback from the government to the health facilities could be a crucial linkage in acknowledging that the data reported is being utilized and could also be a means of sensitization of the health providers to the disease trends happening within their vicinity. When this is done, healthcare providers are more likely to look out for such diseases should a suspected outbreak be reported within their area of practice. Such could lead to better detection of cases and the overall impact that disease surveillance can achieve. However, many healthcare facilities in this study did not receive feedback from the government and this could progressively result in loss of interest in reporting as regulations on compulsory reporting by the health facilities are not being enforced.

The most commonly mentioned notifiable diseases by the health providers – EVD, Lassa fever and polio – have recently resulted in outbreaks in the country. Thus, they have been repeatedly mentioned in both the print and digital media. It was therefore not surprising that a substantial proportion of healthcare providers interviewed identified these three diseases as the immediately notifiable diseases in the country despite other diseases being in the same category. This resulted in high knowledge and awareness about the diseases tracked by the surveillance system. Most clinicians in the health facilities were unaware that Malaria was one of the monthly notifiable diseases in the health facilities. Almost all the providers that stated that they had never attended to a case that needed to be reported to the higher authorities had actually attended to a case of Malaria within the preceding year. This again emphasizes the potential patchy knowledge of the healthcare providers on the notifiable

disease system in the country. A similar issue was reported in Taiwan of doctors being unaware that measles, tetanus, chicken pox and rubella were notifiable diseases (Tan, Yeh, Chang, Chang, & Tseng, 2009). Poor knowledge of notifiable diseases among clinicians has also been reported in the UK, South Africa and Australia as well, which negatively impacted on the performance of the surveillance system (Karim & Dilraj, 1996; Tan et al., 2007). Thus, strategies aimed at improving disease surveillance system should strive to enhance the knowledge of the clinicians including the provision of detailed guidelines and case definitions for common communicable diseases.

In Zambia, tertiary hospitals failed to report their routine data to the local governments leading to missed opportunities for improving understanding of local disease profile (Mandyata et al., 2017). The findings of this study show that there was no major difference in reporting notifiable diseases between tertiary and primary health facilities. However, key informants mentioned the direct relationship between some secondary and tertiary public health facilities with the State Hospital Management Boards (for state owned health facilities) and the Federal Ministry of Health (for Federal government owned health facilities) as disincentives for reporting to the LGAs. The possible explanation is the perception that LGAs are lower levels of governance with little technical expertise than the tertiary health facilities. Yet, the health facilities are situated within a LGA where the disease distribution is of importance to public health decisions within that jurisdiction. The poor compliance by these government owned secondary and tertiary facilities reduces the chance of achieving complete compliance with the disease surveillance system in the LGAs wherever they are located.

The IDSR strategy was initially designed to target 19 priority communicable diseases which are divided into 1) epidemic prone diseases 2) diseases targeted for eradication and elimination and 3) major endemic infectious diseases of public health importance (Perry et al., 2007). However, countries were advised to modify based on the diseases that were most prevalent in their environment. Over the years, the IDSR in Nigeria has expanded to cover 41 diseases and conditions. The NHMIS which was also designed to collect bi-annual data returns from the state has also been expanded and now collects large amounts of data on a monthly basis from the health facilities. Thus, the extension of the frequency of data collection to monthly intervals and from all health facilities should be reconsidered. A review of both systems may be necessary and subsequent action on which of the two systems to jettison taken on the basis of appropriate efficiency analysis.

The need to balance the amount of data to be provided by health facilities and the details needed by health departments to make meaningful decision is an important consideration across countries (Neave, Heywood, Gibney, & Leder, 2016). A key informant mentioned that the MSF had 233 data elements in addition to 13 registers that needed to be completed. This is an indication that the burden of data collection at health facilities could be a disincentive to reporting because of the competing priorities of attending to patients. In a similar study in Taiwan, private practitioners who felt the system was inconvenient were less likely to report into the disease surveillance system (Tan et al., 2009). As such, effort must be geared towards reducing the burden of data collection that is being placed on the health facilities so as not to discourage their participation in the system.

The respondents almost universally acknowledged to the importance of disease surveillance though they equally berated the disease surveillance system in the country for its poor

performance. Based on the recognized importance of the surveillance system, most providers stated their willingness to contribute to the disease surveillance system if provided a friendly environment to do so. However, most of the health facilities had an average of 12 staff members (including all clinical and non-clinical staff) which compounds the challenges of completing reporting tools due to inadequate human resources. A study conducted in India on knowledge, attitude and practices of private providers had similar findings. It highlighted private provider's strong agreement that a disease surveillance system was an important component of a health system. However, it also pointed out the lack of infrastructure including the staff that are needed or the time by the existing staff to complete the data collection tools (Phalkey, Kroll, et al., 2015). Participants suggested that continuing medical education covering disease surveillance system could help improve knowledge of private practitioners on the system. Furthermore, there were also suggestions that financial rewards could be offered to the private healthcare providers to encourage them to comply. It is noteworthy that reporting by private health facilities is a voluntary responsibility in the Indian state where the study was conducted unlike in Nigeria where it is a compulsory responsibility that is not being enforced. As such, the suggestion of a financial incentive may be tenable in India but not so in Nigeria. Key informants reported that the surveillance system was poorly funded and heavily reliant on donor support which makes any financial incentive given to private providers unsustainable.

Unlike in Uganda where the duration of practice of the physicians was significantly related to the likelihood of reporting notifiable diseases (Isabirye, 2011), the relationship between the length of period since graduation among the physicians and routine reporting of diseases in Nigeria was not statistically significant. This may be because the surveillance system has never

targeted the private sector thereby making older physicians as unaware of the disease surveillance system as the new graduates. The IDSR system was only introduced 13 years ago though it is also noteworthy that this system was preceded by another disease surveillance system that was started in the 1970s following a yellow fever outbreak. A systematic literature review highlighted the heavy focus of disease surveillance systems on public health facilities although there exist misunderstanding and mixing up of roles and responsibilities of public owned facilities and government officials charged with managing the countrywide health system (Phalkey et al., 2017). This suggests the need to clarify the role of government as a regulator of both public and private health facilities in Nigeria.

The National Health Act made a provision for states to consider requiring that private health facilities present evidence of compliance with the National Health Information System prior to being issued their annual licenses (Federal Government of Nigeria, 2014). Feedback from key informants showed that some states have begun implementing this suggestion. However, one of the state officers interviewed reported that the only requirement for renewal of licenses was proof of submission of NHMIS forms and suggested that the IDSR system be included as well. However, its implication remains a shift of the burden and responsibilities of the government that ought to address the fragmentation happening across its two systems to the less resourced health facilities.

Clear definition of roles and stakeholder engagement by the government will help in addressing the mistrust that has plagued the contribution of private healthcare providers to disease surveillance activities in Nigeria. Increasing emphasis of surveillance in undergraduate medical and nursing curriculum could be a potential way of improving the knowledge of private healthcare providers and by extension their performance as well. In addition,

leveraging public resources to support private sector involvement in disease surveillance could improve the overall performance of the system in developing countries. Regular training and retraining of private healthcare providers on the procedures for disease surveillance will go a long way in alleviating some of the challenges that have been identified. In addition, the recent adoption of Universal Health Coverage as an official policy target by the government of Nigeria and the adoption of private health facilities as vehicle of service delivery require strategic engagement that will make adherence to reporting obligations a necessity for these private health facilities to participate in this intervention (Makinde, Sule, et al., 2018). However, there is still need for deliberate efforts aimed at ensuring that data requirements do not impose unnecessary burden on health facilities to the extent of affecting their effective involvement in the process.

A recent study from South Africa compared the data from the national disease surveillance system with the laboratory surveillance system and found the latter had better quality data (Benson, Musekiwa, Blumberg, & Rispel, 2017). Although there is no guarantee that laboratories in Nigeria have better quality data, there is no established laboratory surveillance system in the country. As such, the opportunity for exploring the potential contribution of standalone and institutionalized laboratories in the disease surveillance system needs to be considered.

10.3 Health Systems and Duplication of Effort

Nigeria operates a decentralized health system and financing of the health sector follows this decentralized pathway. Accordingly, the Federal Government is responsible for tertiary care, State Governments are responsible for secondary care while the Local Governments are responsible for primary care (Alubo & Akintunde, 2018). Often pronouncements are made at

the national level and resources are expected to be committed by the sub-national governments that occasionally do not buy into such plans or did not plan for them due to budget limitations, which leads to poor implementation. Disease surveillance similarly has the three tiers of government involved with responsibilities for the financing of the system shared across them. However, these roles are not clearly defined especially regarding logistical issues like printing of data collection forms. The lack of an aligned political strategy across the three tiers of government is a challenge for the health system. This also has a negative effect on the overall ability of the health system to track communicable diseases across the country. An example of this was seen during the influenza outbreak of 2006. The national and state governments endorsed control strategies. However, resources to implement the strategies were expected to be provided by the lower levels of the government, but the resources were not readily available thereby delaying effective response to the outbreak (Breiman, Nasidi, Katz, Njenga, & Vertefeuille, 2007). A joint external evaluation of the IHR in Nigeria in 2017 that was led by WHO identified poor coordination across various tiers of government and different institutions as a major limitation to the success of disease surveillance in the country (World Health Organization, 2017b). While decentralization to make the government closer to the people is an excellent idea, it is not without its challenges. Decentralization of the health system in Georgia left the district offices with limited resources to fund an erstwhile functional surveillance system (Djibuti et al., 2007). Consistent with evidence from elsewhere, several informants in the present study also identified lack of resources as a major hindrance to effectively performing their duties. Thus, as part of any reform of the health system, there should be adequate consideration of how resources are adequately provided for routine disease monitoring across the system.

The Bill that is currently awaiting legislative approval to grant the NCDC a legal status provided an opportunity for the establishment of regional and state offices of the NCDC (which will be a federal institution when approved). However, this is likely to result in duplication of roles at the state level and bloated workforce for the federal government. It is not clear how the state epidemiologists that currently handle the responsibilities at the State Ministry of Health and the state NCDC officers would relate to each other when such a system is implemented. The resources that would be used in setting up these parallel offices could be better channelled into achieving other pressing goals. While these offices are yet to be set up, these are important considerations that need to be made before such decisions are finalized. The duplication that is currently seen across NHMIS and IDSR is an attestation that without appropriate governance mechanisms including a proper chain of command, a new structure at the state level will not bring about an improvement in the performance of the surveillance system. In addition, since the federal officers are unlikely to have direct contact with the health facilities and will probably be providing technical assistance to the states, alternate means of delivering these services, probably remotely and through intermittent technical visits should be explored. Although this sort of structure is seen with the National Primary Healthcare Development Agency, the National Population Commission and other federal agencies (Federal Government of Nigeria, 1992), it is not clear if an evaluation of the effectiveness of these regional and state level offices has ever been carried out. Despite the presence of the National Primary Healthcare Development Agency since 1992 with such regional and state level offices, primary healthcare delivery to majority of the population is still non-existent.

An assessment of implementation of IHR in Tanzania found that it had challenges as different responsibilities for the IHR fell under different departments within the Ministry of Health and Social Welfare which were not being properly coordinated (Bakari & Frumence, 2013). This also included the emergency and disaster preparedness unit which was located in the Prime Minister's office. There were also several bureaucratic processes before approvals for funds could be obtained, and response to an outbreak initiated, which negatively affected the performance of the surveillance system. Such poor coordination has also been seen across the departments managing the disease surveillance system in Nigeria with significant negative consequences. The introduction of another level of structure at the state level is unlikely to improve the coordination unless the entire system is revamped.

A study in Sabon Gari LGA found that there was no epidemic and response plan for the LGA (Abubakar et al., 2010). This is consistent with the finding of the lack of policies across all states that were included in the present study. States reported that they adopted the national guidelines on how the national policy would be implemented at that level. Following the adoption at the NCH, each state should have developed state specific policies and guidelines to show how the national policy will be implemented locally. It is noteworthy that the NCH does not have any constitutional or legal powers and thus pronouncements made by this body may be disregarded by the states (World Health Organization, 2017b). The observation in the literature that policies and guideline documents were not available at lower levels is indicative of poor documentation practices across the different levels of healthcare in the country.

Feedback from key informants revealed that there were limited interactions between the IDSR and the NHMIS teams at the state level and the two data collection systems interacted with health facilities independent of each other. This is a failure of governance systems since

the health system ought to be working together for a common purpose. An efficient governance of the health system will require that departments with cross-relationships regularly engage with each other in order to identify areas of synergy to achieve better outcomes with the same resources. This did not seem to be happening with the two departments that managed the two reporting systems especially across the states. The great opportunity that all the states followed one national guideline would have been paramount had there been a better coordination of the two different systems at the federal level. Respondents within the HMIS units in the states noted that they were implementing FMOH NHMIS guidelines and likewise the state epidemiologists noted that they were implementing the national policy on IDSR. The huge overlap demonstrated in the diseases tracked by the two systems shows that the systems can be further integrated to improve the overall performance of routine health information system in Nigeria. However, there is documented evidence that government departments in developing countries often resisted the integration of information systems (Umme & Chowdhury, 2018). The most critical resistance factor that was identified in a study conducted in Bangladesh was the poor awareness of the benefits of the HIS by policymakers. A well designed electronic system (possibly through the DHIS) with a single set of data collection forms could help reduce the burden of multiple parallel tools currently in use across health facilities in Nigeria. This could be further improved if the health facilities deployed electronic health record systems that could further facilitate an automated aggregation of reports and subsequent submission to the National Health Management Information System. The knowledge of the potential opportunities that a single DHIS platform could provide was not universal among state officers as one of them mentioned that the system could not be used to achieve the aims of disease surveillance In order to respond to the potential resistance to electronic reporting by government officers, a study conducted in

Bangladesh recommended creating awareness and training for the officers as important strategies for mitigating such resistance (Umme & Chowdhury, 2018).

When the IDSR was adopted in the country in 2005, the reporting interval for data collection by the NHMIS was monthly while the IDSR was supposed to be immediate (upon discovery of an epidemic prone disease) and on a weekly basis with focused focus on infectious diseases (Federal Ministry of Health Nigeria, 2005). The IDSR system has over time expanded to cover other areas including non-communicable diseases, maternal mortality and perinatal mortality. Maternal and Perinatal mortality data should normally be handled by the Civil Registration and Vital Statistics system. However, poor performance of the system has led to the inclusion of these data in the IDSR system, which serves the immediate purpose of capturing mortality data but could in future lead to duplication of effort. Furthermore, the IDSR has introduced a data collection tool that requires monthly reporting. The NHMIS on the other hand evolved from vertical programs and retained the detailed registers of each disease program within the NHMIS tools. Thus, despite the initial plans that the IDSR was established to integrate the data collection from the vertical disease programs, these programs may have persisted as the NHMIS. Concerted efforts over the years have been targeted at the NHMIS which provide program monitoring data for several disease focused projects which are funded through development assistance in the country (Meribole et al., 2018).

A study of the nature of the NHMIS in Nigeria found that there were at least 24 different data collection tools for completion in health facilities with the MSF alone having 233 data elements (Bosch-Capblanch et al., 2017). Demographic information is copied multiple times across registers which results in a waste of time. Health workers complained that the effort it required to complete the data collection tools doubled their workload (Bosch-Capblanch et

al., 2017). However, the study focused predominantly on the NHMIS tools and did not assess the IDSR which collects similar pieces of information. The amount of time it takes to copy information (on the same diseases) that are being reported along alternate pathways to the LGA can be a disincentive to private healthcare providers who are in business for profits. It also does not show an efficient and coordinated leadership from the LGA/ health authorities when different tools are provided by different departments in the LGA office (that health facilities should see as one) requesting the same information in different ways. Since the process at the health facilities requires paper based forms, a properly integrated system will require fewer forms, which will ultimately lower the cost of producing the forms thereby saving the health system some significant financial resources.

The health facilities surveyed had an average of 12 staff members including doctors, nurses, health records officers and other non-clinical workers within the health facility. As such, many of the facilities are pretty small and may already be stretched by clinical responsibilities thereby making them view the disease surveillance system as an extra burden that the government places on private practitioners. Moreover, since LGA officers did not routinely provide feedback to health facilities they may lose interest in reporting with time. In Germany, one strategy that was adopted to improve the overall functionality of the national health information system was to reduce the number of diseases that health facilities needed to report on (Krause et al., 2005). Thus, the FMOH, NCDC and other stakeholders concerned with disease surveillance need to consider reducing the number of diseases being tracked, the number of forms filled and the amount of data being collected in the health facilities. This could be easily achieved through the integration of the IDSR and NHMIS systems. However, the data elements in the NHMIS are influenced by the disease programs

and the managers of these vertical programs need to be carried along with the overall picture of improving the performance of the surveillance system in the country. Also, the forms should be designed to be as simple as possible. The complexity of the forms for reporting was a deterrent to physicians completing them in South Africa and interference with other clinical duties because of the time taken to complete the forms affected adherence to reporting in Spain (Figueiras, Lado, Fernández, & Hervada, 2004; Karim & Dilraj, 1996). These lessons should be considered when revising the data collection tools for the NHMIS and IDSR systems in Nigeria.

An assessment of the early warning and alert system in Northern Nigeria in 2017 where there has been an insurgency over the last 10 years, found that the IDSR was unable to gather real-time weekly data from the health facilities, collected information on a limited number of diseases and lacked a means by which the epidemiological data collected could be promptly used to inform program decisions (World Health Organization, 2017a). The report concluded by recommending an expansion of the number of diseases covered to allow for monitoring a wider number of health events. Such recommendations must take into account the parallel systems operating in the country and determine whether the information is not already being captured by the existing tools. The government also needs to assess the cost effectiveness of such recommendations before adopting and implementing them. The slow response to and acceptance of disease surveillance in countries is negatively correlated with the volume of work. Thus, requiring clinicians to fill additional forms may end up negatively impacting disease surveillance system in the country.

In Ghana, application of an electronic District Health Information Management System for the transmission of data significantly improved the availability of IDSR reports (Adokiya et al.,

2015). While the electronic application system had the potential for improving routine analysis of the data, it fell short of promoting the use of the data for decision making (Adokiya et al., 2015). Decisions are made by policy-makers who often have limited capacity to use evidence to inform their decisions and who are also influenced by political affiliations (Uneke et al., 2015). In the study conducted in Ghana, there were wide discrepancies between weekly reported data despite the existence of a health information management system in the country, which may be indicative of poor management. Similar issues may have been recorded in Nigeria, although the absence of an electronic archive for IDSR data reported to the government to be compared with the source documents in the health facilities could not allow for such level of analysis. In addition, there was poor record keeping in the health facilities as many of them could not show evidence of prior reports submitted to the government. The data reported to SMOH by LGA was in aggregate form (number of health facilities in LGA reporting and total number of health facilities in the LGA) and did not include the names of facilities or distribution of diseases reported at health facilities. Several private healthcare providers who were interviewed in Nigeria had complained about lack of support and lack of provision of basic infrastructure from the government and as such did not see reason for reporting notifiable diseases to the government. This is similar to the situation in Ghana where health facilities were not actively engaged in the IDSR system because it did not generate income (Adokiya et al., 2015). The burden of also having to complete multiple, yet similar data collection tools for the same diseases across different systems, each with its registers also has a negative effect on compliance with reporting by the health facilities. Although many health facilities were yet to start reporting, their effective involvement may be affected by duplication of effort due to parallel systems.

The issue of funding of the surveillance system was raised by virtually all government officers interviewed. Each unit responsible for the management of the two systems (DPRS and Epidemiology) focused more on strengthening its own processes than on exploring how the available funds could provide more efficiency. The parallel systems adopted by IDSR and NHMIS could be further improved for greater efficiency and effectiveness of the disease surveillance system if the two systems were harmonized. Even if the two systems are retained and they work hand in hand, it will result in a doubling of the number of personnel available in each LGA and state offices. Likewise funds for logistics (transportation and other administrative costs) could be streamlined to generate savings on resources which could be used to address the challenges affecting the system. NHMIS as designed provides on-going programmatic level indicators for several donor funded projects. It may be necessary to revisit its usefulness as a nationwide data collection system since most of the health facilities in the country are not receiving donor funds for the delivery of the services tracked through the system. The comprehensive NHMIS tools may need to be targeted at the health facilities that are receiving funding from donor assisted projects and that have committed to reporting all these indicators to monitor their project performance. They are more likely to have received funds to cater for monitoring and evaluation activities under the project grant being implemented.

Cost analysis of the IDSR in three African countries (Eritrea, Burkina Faso and Mali) concluded that disease surveillance was a low cost public health intervention (Somda et al., 2009). However, the study could not quantify the benefits of the system in the respective countries. The existence of persistent parallel surveillance systems that were being funded by donors was identified as an important limitation that may have resulted in the underestimation of

the cost of disease surveillance system. However, there is empirical evidence that implementation of the IDSR can improve public health programmes (Somda et al., 2010). Thus, with a proper design, the IDSR can contribute to health systems strengthening in Nigeria. Poor funding of surveillance is almost a universal problem (Adokiya et al., 2015; Bakari & Frumence, 2013; Phalkey, Kroll, et al., 2015; Somda et al., 2009, 2010). Similar sentiments were expressed by participants in the present study. As such, efficient ways of utilizing available resources must be instituted which could include the harmonization of the parallel systems.

Evidence shows that the US President's Emergency Plan for AIDS Relief (PEPFAR) has had an impact on tracking HIV/ AIDS related indicators in Nigeria (Bosch-Capblanch et al., 2017). Similar program influences are seen across other disease priority areas like Immunization, Malaria and Tuberculosis that have led to expansion of data collection forms for these program areas. Similar issues have been reported in Namibia where the support from different development organizations have resulted in several silo information systems with each maintaining some component of the disease surveillance system (Angula & Dlodlo, 2018). Donors commit to supporting country systems but also need to monitor that their investments are achieving their desired goals. As such, there is always a need to create a balance between tracking donor-funded projects and strengthening a country's systems. The health system managers also need to be aware of these conflicting requirements when accepting terms of donor funds so that donor support does not overburden the health information system.

Though human resource shortage was identified in this study, the qualification of available personnel was another potential issue affecting their ability to analyze and prepare

intermittent reports that can be used to provide feedback to the health facilities. Donor-funded interventions aimed at strengthening the health system have stepped in to address knowledge gaps in low- and middle-income countries although the success of such interventions depends on support provided by the leadership of a given country. For example, the field epidemiology and laboratory training program (comprehensive masters training program) and schools of public health without walls are important initiatives that are supported by the US President's Global Health Initiative targeted at building the capacity of field epidemiology and laboratory professionals (Nsubuga, Nwanyanwu, Nkengasong, Mukanga, & Trostle, 2010). These programs contribute to improving the number of trained personnel that have enhanced the disease surveillance system in Nigeria.

The Sustainable Development Goals (SDGs) have 67 additional health indicators that need to be monitored (Thomas, Silvestre, Salentine, Reynolds, & Smith, 2016). There is no doubt that these will further stretch the national health information system that struggled to provide the evidence for monitoring the now defunct Millennium Development Goals. Stakeholders have emphasized the need for prioritizing country goals with the emphasis of using current health information system structures rather than initiating new ones to provide evidence for monitoring the SDGs (Nabyonga-Orem, 2017; Thomas et al., 2016). As part of initiatives aimed at ensuring that country systems are not overstretched, donors, philanthropists and academics are working together in a partnership known as the Health Data Collaborative to develop a common agenda towards monitoring the SDGs (Lippeveld, 2017). Such initiatives should go hand-in-hand with those aimed at ensuring that national health information systems are well coordinated and integrated with social and economic systems to allow for capturing outcome indicators to measure progress (Macfarlane, 2005).

There have been calls to consider disease surveillance as an integral component of health systems strengthening (Nsubuga, Nwanyanwu, et al., 2010). The importance of such calls have become of greater importance due to the overall importance that a functional health system can have on the surveillance system and vice versa. The goal of healthcare for all as envisioned in the SDGs will have a significant effect on reporting of notifiable diseases. Many sick people fail to present in health facilities because they cannot afford the out-of-pocket costs of the services. As a result they present in health facilities very late or when acute signs are already masked by various drugs obtained from alternative providers. This results in a delay in the notification of health authorities and potentially a delayed response leading to missed opportunities for early disease detection. The recent campaign for Universal Health Coverage in Nigeria involving advocacy for additional resources for healthcare needs to include a budget for monitoring the health system which embeds improving the functionality of the disease surveillance system.

10.4 Interrelationships between Chapter Sections

Section 10.1 addressed the first research question: “Are the policies and regulations establishing the IDSR in Nigeria (nationally and sub-nationally) adequate to ensure compliance with the system?” and the first study objective: “To examine the legislative/ legal framework for routine disease reporting in Nigeria (nationally and sub-nationally) and how it might affect compliance by private providers”. From the analysis carried out, several deficiencies in the legislative framework for the disease surveillance system were identified. These limit the system’s ability to achieve its objectives. The finding suggests that the legislative framework for disease surveillance requires further strengthening in order to protect the citizens of the country.

Section 10.2 addressed the second: “How well are private health practices reporting notifiable diseases in Nigeria?” third: “What are the factors affecting compliance with disease surveillance and notification system by private healthcare providers in Nigeria?”, and the fourth research questions: “Are there factors that can predict the knowledge of health facilities/ workers on the IDSR system in Nigeria?”. It starts by describing the level of compliance with disease surveillance reporting by private health facilities and then highlights the factors that affect compliance with disease surveillance across the country.

Section 10.3 details the health system challenges that affect compliance with reporting. It provides further explanation on the third and fourth research questions. The chapter highlights the duplication of effort across the two routine health information systems that operate in the country: IDSR and NHMIS systems. It highlights the overlaps between the two systems and identifies how the two systems could be harmonized to improve the efficiency of the National Health Information System as a whole. The section also highlights issues surrounding resources (both human and financial) that are needed to ensure the efficiency of the health information system in the country.

In tying all the findings of the study together, the conceptual framework described earlier in section 2.4 fits this investigation. The conceptual framework identified how the poor legal backing for the disease surveillance system, poor readiness of health facilities, inadequate knowledge of disease surveillance system and poor functionality of the health system all combine together to affect compliance with disease surveillance system in the country. It highlights how the interdependency of the different components of a health system has an effect on the performance of its dependent system as summarized by the systems theory.

The finding that policies at the national level were not being adopted by state legislators is consistent with diffusion of innovations theory. In a federation such as Nigeria, domestication of laws at the state level is crucial for their successful implementation. Thus, the poor understanding by policymakers of how roles interrelate can be a drawback to achieving the goals of disease surveillance system.

10.5 Limitations

The findings of this study could be influenced by certain limitations. The list of health facilities that was initially used for the LGA selection was from the National Master Facility List that was published in 2013. It had not been updated by the time of the study. Updated facility lists were also not available at state level. As such, new health facilities may have been established in some local governments and changed the distribution of the health facilities by the local government areas which could result in a different sampling frame from the one used for the study.

The unavailability of reported data on the IDSR both in the facilities and the state offices hampered quality checks and verification of reports. It also affected the ability to confirm the actual number of health facilities that were reporting. While a significant proportion of private health facilities stated that they did not report, the fear that such statements could be used against them may have resulted in some of them falsely claiming that they were, particularly given that most of them were aware of regulations that required that they report to the government. As such, the level of compliance with reporting notifiable diseases based on self-reports could be an overestimate. In addition, the information provided by health workers was based on reference to a single time-point although routine reporting should be on a continuous basis. Thus, reporting of notifiable diseases by a health facility could have

represented just a single incident thereby giving the false impression of compliance with disease reporting. Notwithstanding the limitations, this is the first comprehensive study on compliance with the routine disease reporting by private health facilities in Nigeria.

CHAPTER 11: CONCLUSIONS AND RECOMMENDATIONS

This study is the first comprehensive study to investigate compliance with routine disease reporting among private healthcare facilities in Nigeria. It provides an in-depth perspective including the legislative framework, performance of the facilities regarding reporting, factors associated with reporting and health system challenges that affect the routine health information system in the country.

The findings of the study show that the legislative framework for disease surveillance in Nigeria is weak, with the most recent comprehensive law targeting disease surveillance having been enacted in 1926. Although there have been several policies, these do not often have the weight to ensure compliance by private health facilities. State level policymakers were also not proactive in adopting and domesticating national policies, leaving these to pronouncements and agreements made at the NCH which does not have a constitutional mandate. This has resulted in the overall poor performance of the surveillance system and non-compliance with international health regulations.

In addition, there were several health system challenges that affected the implementation of the health information system including uncoordinated governance, duplication of data collection processes and systems and inadequate resources. However, the recent establishment of a governance structure for the health data value chain (the national health data governance council) holds an important opportunity for resolving the challenges facing the system. Likewise, the establishment of a Nigeria Centre for Disease Control might provide a new opportunity to revamp the disease surveillance system. However, the relationship with the FMOH which manages NHMIS needs to be clearly outlined to avoid duplication and unhealthy competition among different institutions.

Based on the findings of this study, the following are some recommendations for improving disease surveillance system in the country:

1. There is a need for legislative orientation (at national and state levels) on their role generally on the health system. Whereas a legislative forum to support the implementation of Nigeria's agenda for achieving Universal Health Coverage was recently formed, their role on other important health policy issues including global health security need to be equally emphasized.
2. Advocacy among legislators also needs to be stepped up by the Ministry of Health and the Civil Society on the laws that need to be passed to improve the efficiency of the health system. The advocacy and lobby initiatives must be supported by evidence. This seems to have started with the advocacy for the NCDC Bill and subsequent enactment of the law in 2018. However, more interactions are obviously needed. Advocacy must cover areas on laws that are needed for an efficient disease surveillance system and also the need to streamline laws so that they do not contradict one another.
3. FMOH and NCDC should leverage the National Health Data Governance Council which is chaired by the Minister of Health with membership that cut across all the institutions generating health data to provide a focused leadership for the health information system including disease surveillance in the country.
4. There is a need to revamp the entire NHMIS and differentiate between the routine indicators which should be reported by all health facilities and project-specific indicators which should be targeted at health facilities that are engaged in specific project services. This must also include a redesign of the electronic forms being used to capture information under NHMIS through the DHIS software to cater for all the

needs of the stakeholders. There is also need to harmonize NHMIS and IDSR into a single system so that the health facilities only have to deal with one set of data collection tools.

5. There needs to be adequate means at the state and LGA levels for enforcing laws developed to support adherence to disease surveillance and for the health system in general. The laws should also state who takes the responsibility for reporting notifiable diseases in the health facilities: health records officers, the attending physician or the health facility.
6. There is a need to include training on disease surveillance in medical and nursing schools and to ensure that tutors receive regular updates whenever there is a revision to the tools. The latest National Health Information System Policy makes provision for reviewing the NHMIS tools every two years and with every review, the trainers at the academic institutions need to equally be kept abreast with the new updates.
7. With the growth of the internet and Information and Communications Technology in Nigeria, the Federal Government (NCDC) should consider the use of multimedia files and remote training of states on disease surveillance rather than setting up regional and state offices which could amount to huge capital expenditure which will divert resources from conflicting priorities.

Frontiers for Further Research

The initial plan was to compare the level of reporting between private and public health facilities through secondary data analysis of routinely reported data. However, this could not be achieved as the data to respond to this objective was not readily available. As such, studies using data from both private and public health facilities can provide insights on how the two

sectors compare in terms of reporting and where resources are most needed to strengthen disease surveillance in the country.

Based on the challenges of governance and leadership in health information system identified in this study, there is a need for a critical assessment of governance structures with a view to identifying areas that require strengthening for proper management of the system. Such studies can assess the functionality of the National Health Data Governance council that was established by the National Health Information System Policy of 2014, its current status, level of performance and how the council could contribute to improving the health information system in the country. Such assessment could also examine the different actors in health information system in the country with a view to identifying areas of duplication that need to be harmonized for greater efficiency.

This study showed that duplication of effort has resulted in waste of resources. Whereas this study examined duplication between IDSR and NHMIS systems, evidence shows that there are more parallel systems operating in the country. As such, an assessment of duplication among all the parallel routine health information systems and their economic impact could provide evidence to convince decision makers to support harmonization of the processes based on the loss that duplication of effort results in. Such evidence can also be used for advocacy among donors for improving coordination with government to avoid duplication that results from funding parallel systems.

Private health workers demonstrated inadequate knowledge of the data collection tools and processes in the country. Several of them heard about the disease surveillance system while in medical schools and had never received training on the implementation of the system. In addition, the data collection tools have been revised over the years and they may be different

from what the health workers were previously exposed to while in medical and nursing schools. The problem was compounded by the inability of state and LGA officials to take ownership of national disease surveillance programs and domesticate national laws and policies and constantly engage health facilities. As such, there is a need for studies that identify feasible approaches for engaging private health facilities in disease surveillance in the country.

Another area for further investigation is the responsibilities of health records officers in completing disease surveillance forms in the country. This could entail examining the content of the training curricula, especially with respect to disease surveillance. This could help determine the training needs of health workers and whether the training curricula need to be improved.

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APPENDICES

LITERATURE REVIEW MATRIX APPENDIX

	Title & Source	Authors & Year	Data Source	Method	Level of Analysis	Findings	Missing Gaps
	Disease Notification Among Physicians in a Nigerian Tertiary Health Institution	Abdulraheem et. al (2004)	Cross Sectional Survey	Univariate Analysis	Individual	Knowledge of disease notification was low among physicians	Did not assess the legal system and did not look at the readiness of facilities to report
	Emergency preparedness and the capability to identify outbreaks: A case study of Sabon Gari Local Government Area, Kaduna state	Abubakar et. al (2010)	Cross sectional descriptive study	Univariate analysis	Individual	Poor timeliness and completeness of routine reports	No legal system assessment, no private health facility assessment.
	Assessment of integrated disease surveillance and response strategy implementation in	Abubakar et. al (2013)	Cross sectional descriptive study	Univariate analysis	Individual, health facilities	Poor implementation of the IDSR	Legal assessment, private health facility assessment

	Title & Source	Authors & Year	Data Source	Method	Level of Analysis	Findings	Missing Gaps
	selected Local Government Areas of Kaduna state						
	Disease Surveillance and Private Sector in the Metropolitans: A Troublesome Collaboration	Ahmadi et. al (2013)	Qualitative study	Key informant interviews, focus group discussions	Individual	Factors affecting reporting: complex forms, inadequate attention	External to Nigeria
	Challenges to the implementation of International Health Regulations (2005) on Preventing Infectious Diseases: experience from Julius Nyerere International Airport, Tanzania	Bakari & Frumence (2013)	Cross Sectional Descriptive Study	Thematic analysis	Individual	Poor coordination of parallel institutions, Poor knowledge of key personnel, inadequate legal backing for IHR	External to Nigeria
	The effect of training on the reporting of notifiable diseases among health workers in Yobe State, Nigeria	Bawa & Olumide (2005)	Quasi-experimental study	Univariate and Bivariate analysis	Individual	Training had a positive effect on knowledge for notifiable diseases	Did not assess the legal status of the
	The functional status of disease surveillance and	Bawa & Umar (2009)	Cross sectional survey	Univariate analysis	Individual	Low awareness and poor	No legal assessment, No

	Title & Source	Authors & Year	Data Source	Method	Level of Analysis	Findings	Missing Gaps
	notification system at the local government level in Yobe State, Nigeria					diagnostic support for disease surveillance system.	health system role, no private health facility inclusion
	The knowledge, attitude and practices of the reporting of notifiable diseases among health workers in Yobe State, Nigeria	Bawa et. al (2003)	Cross sectional survey	Univariate and Bivariate analysis	Individual	Poor knowledge of the disease surveillance system	No legal assessment, focused on public health facilities
	Comparing laboratory surveillance with the notifiable diseases surveillance system in South Africa	Benson et al (2017)	Comparative study	Univariate, Bivariate and Multivariate analysis	Laboratory, Health Facility	Laboratory reporting was better than clinic/ hospital reporting	External to Nigeria
	Systems Theory Approach to the Health Care Organization on National Level	Bielecki & Stocki (2010)	Argument	Discussion	Nil	Systems theory can be used to describe the different components of the health sector	Does not assess disease surveillance
	Disease surveillance and reporting in two south-western states in Nigeria: Logistic	Dairo et al (2010)	Cross sectional descriptive survey	Univariate analysis	Individual	High knowledge of DSN officers on disease notification process	Did not assess legal backing, did not look at health facilities or

	Title & Source	Authors & Year	Data Source	Method	Level of Analysis	Findings	Missing Gaps
	challenges and prospects						compare parallel reporting systems
	Public-private mix for TB and TB-HIV care in Lagos, Nigeria	Daniel et al. (2013)	Health Records	Univariate analysis	Health facility	High compliance with testing TB patients for HIV among Private not for profit facilities.	Did not assess legal backing, did not address IDSR performance or compare parallel reporting systems
	General practitioners role in the notification of communicable diseases - study in Malta	Gauci et. al (2007)	Cross sectional survey	Univariate and Bivariate analysis	Individual	High knowledge of GPs on notifiable diseases but poor compliance	External to Nigeria
	Measles case-based surveillance and outbreak response in Nigeria; an update for clinicians and public health professionals	Isere & Fatiregun (2014)	Guideline Review	Nil	Nil	Updates physicians on the new management for measles according to WHO guidelines	Did not assess the IDSR system
	An overview of disease surveillance and notification system in Nigeria and the roles of clinicians in disease	Isere et al (2015)	Review	Nil	Nil	Provides a description for the reporting of notifiable diseases in Nigeria.	Did not assess the IDSR system

	Title & Source	Authors & Year	Data Source	Method	Level of Analysis	Findings	Missing Gaps
	outbreak prevention and control						
	IDSR as a Platform for Implementing IHR in African Countries	Kasolo et al (2013)	Review	Nil	Nil	IDSR as an important means for achieving the IHR	External to Nigeria
	Notifiable disease reporting among public sector physicians in Nigeria: a cross-sectional survey to evaluate possible barriers and identify best sources of information.	Lafond et al (2014)	Cross sectional survey	Univariate analysis	Individual	Lack of infrastructure and logistics for reporting	Did not look at private sector physicians and did not assess the legal status of disease surveillance.
	The implementation of Integrated Disease Surveillance and Response in Uganda: a review of progress and challenges between 2001 and 2007	Lukwago et al (2013)	Evaluation	Univariate and Bivariate analysis	District and National	Improvements in performance of IDSR across years	External to Nigeria
	Assessment of the Routine Health	Makinde et al. (2012)	Cross Sectional Survey	Univariate analysis	Individual	Poor performance of the NHMIS	Did not assess the IDSR

	Title & Source	Authors & Year	Data Source	Method	Level of Analysis	Findings	Missing Gaps
	Management Information System in Imo State						
	Investing in health information management: The right people, in the right place, at the right time	Makinde et al (2016)	Document Review	Nil	Nil	Poor quality of health records officers	Did not assess performance of IDSR.
	Verification of Neonatal Tetanus Surveillance Systems in Katsina State, Nigeria	Nass et al (2017)	Health records	Univariate and Bivariate Analysis	Individual	Comparative findings between health facility records and IDSR reports	Did not assess legal status, and health system challenges.
	Continued Endemic Wild Poliovirus Transmission in Security-Compromised Areas	Nnadi (2017)	Report	Descriptive	Individual, State	Undetected WPV in circulation due to poor surveillance	Did not assess performance of IDSR.
	Challenges of data collection and disease notification in Anambra State, Nigeria	Nnebue et al (2014)	Cross sectional descriptive study	Univariate and Bivariate analysis	Individual	Poor performance of IDSR: untrained health workers, poor attitude, lack of logistical support	Did not assess legal status, and health system challenges.

	Title & Source	Authors & Year	Data Source	Method	Level of Analysis	Findings	Missing Gaps
	Awareness and knowledge of disease surveillance and notification by health-care workers and availability of facility records in Anambra state, Nigeria	Nnebue et al (2012)	Cross sectional descriptive study	Univariate and Bivariate analysis	Individual, LGA	Poor performance of the IDSR: high awareness of forms but no knowledge on what they are used for	Did not assess legal status, and health system challenges.
	Effectiveness of data collection and information transmission process for disease notification in Anambra State, Nigeria	Nnebue et al (2013)	Cross sectional descriptive study	Univariate and Bivariate analysis	Individual, LGA	Poor performance of IDSR: untrained health workers, poor attitude, lack of logistical support	Did not assess legal status, and health system challenges.
	Knowledge of disease notification among doctors in government hospitals in Benin City, Edo State, Nigeria	Ofili et al (2003)	Cross sectional study	Univariate analysis	Indivuidual	Poor knowledge of physicians interviewed on the disease surveillance system	Did not assess legal status, and health system challenges.
	From habits of attrition to modes of inclusion: enhancing the role of private practitioners in	Phalkey et al (2017)	Systematic Review	Thematic analysis	Individual manuscripts, Country level	Poor participation of private health practitioners in disease	External to Nigeria

	Title & Source	Authors & Year	Data Source	Method	Level of Analysis	Findings	Missing Gaps
	routine disease surveillance					surveillance across the world	
	Challenges with the implementation of an Integrated Disease Surveillance and Response (IDSR) system: systematic review of the lessons learned	Phalkey et al (2015)	Systematic Review	Thematic analysis	Individual manuscripts, Country level	Non sustainable financial resources,	External to Nigeria
	Ebola virus disease outbreak—Nigeria	Shuaib et al (2014)	Routine Records	Univariate	Individual	Ebola Outbreak Response	Did not assess the performance of the IDSR.
	Cost analysis of an integrated disease surveillance and response system: case of Burkina Faso, Eritrea, and Mali	Somda et al (2009)	Cost data/ Secondary data	Univariate and Cost modeling	Country	Average cost to implement the IDSR varied by country	External to Nigeria
	Health and the Legislature: The Case of Nigeria	Tejuoso et al (2018)	Viewpoint	Nil	Nil	A viewpoint on how the legislature and the health system have worked together over the years.	Did not assess the performance of the IDSR.

	Title & Source	Authors & Year	Data Source	Method	Level of Analysis	Findings	Missing Gaps
	Resistance to Integrate Information Systems in Healthcare Service: A Study on Developing Country	Umme & Chowdury (2018)	Review	Analytical hierarchy process	Thematic Analysis	The factors responsible for resistance to the integration of systems: the most important is the knowledge of decision makers.	Did not assess the performance of the IDSR.
	Research priority setting for health policy and health systems strengthening in Nigeria: the policymakers and stakeholders perspective and involvement	Uneke et al (2013)	Qualitative Meeting	Thematic Analysis	Individual	Research should focus on challenges of optimal access, effective service delivery and disease control.	Did not assess the performance of the IDSR.
	International Health Regulations (2005)	World Health Organization (2005)	International Regulation	Nil	Nil	Provides the regulations for disease surveillance	Did not assess the performance of the IDSR.
	Framework and standards for country health information systems	World Health Organization (2008)	Framework	Nil	Nil	Provides a framework for developing the	Did not assess the performance of the IDSR.

	Title & Source	Authors & Year	Data Source	Method	Level of Analysis	Findings	Missing Gaps
						health information system in a country	
	Technical Guidelines for Integrated Disease Surveillance and Response in the African Region	World Health Organization (2010)	Guidelines	Nil	Nil	Provides the guidelines for disease surveillance in the African Region	Did not assess the performance of the IDSR.
	Early warning, alert and response system in emergencies: a field experience of a novel WHO project in north-east Nigeria	World Health Organization (2017)	Routine Data	Univariate	Individual	The early warning system is inadequate to promptly detect diseases, an expansion of coverage was recommended.	Did not assess the performance of the IDSR.
	Joint external evaluation of IHR core capacities of the Federal Republic of Nigeria	World Health Organization (2017)	Interviews and literature review	Thematic Analysis	Individual, Institutional	Nigeria has a long way to go in meeting the IHR	Did not focus on the performance of the IDSR in private health facilities.

POLICY BRIEF APPENDIX

Policy Users:

Federal Ministry of Health, Nigeria Centre for Disease Control, State Ministries of Health (in Lagos, Oyo, Ogun, Ondo, Ekiti and Osun States), Civil Society Organizations, Private Healthcare Practitioners, Donors, Bilateral and Multilateral agencies, Implementing Partners.

Scope of Problem

Disease surveillance is an important component of a country's defenses against global health threats including bioterrorism. The World Health Organization in 1969 established the International Health Regulations (IHR) which was revised in 2005 to guide countries in developing disease surveillance systems. However, assessments following the Ebola Virus Disease (EVD) outbreak of 2014 identified several shortcomings in developing countries towards achieving the IHRs. Nigeria implements the Integrated Disease Surveillance and Response (IDSR) system as its strategy for achieving the IHR. Studies that have assessed the performance of the disease surveillance system in Nigeria have focused on public health facilities despite the private sector having more patient encounters. A systematic review of disease surveillance practice in private health facilities identified only one study from Nigeria and this study was based on a vertical disease program. There is a knowledge gap on the level of compliance with disease surveillance by private healthcare providers in Nigeria.

Approach and Results

This study used mixed methods to investigate the status of the legal instruments that established the IHR in Nigeria, the performance of private health facilities with complying with disease surveillance and the health system challenges affecting the performance of the IDSR

system. The legal instruments establishing disease surveillance in Nigeria are inadequate for its enforcement. There is poor compliance with the routine notification of infectious diseases by the private health facilities. Only 40% of private health facilities report into the disease surveillance system ranging from 17% to 60% across states. Healthcare providers have inadequate knowledge of the disease surveillance system. Poor funding significantly affects the performance of the surveillance system with most funding sourced from international donors. There are parallel systems collecting routine data from health facilities with a significant overlap of the diseases covered across them. The systems, the National Health Management Information System (NHMIS) and the IDSR are managed by the Department of Health Planning, Research and Statistics and the Department of Public Health of the Federal Ministry of Health respectively. This relationship also persists across State Ministries of Health. However, there is little coordination of effort across the two departments despite the IDSR policy pronouncement to avoid duplication of effort. The overlap results in inefficiency and a waste of resources.

Policy Implications

The lack of adequate legal instruments to guide the disease surveillance system means Nigeria is non-compliant with the IHR. The poor compliance with disease surveillance practice in private hospitals is a waiting time bomb that can lead to overwhelming outbreaks which could have been identified early and controlled with an efficient surveillance system. The overlap and duplication of effort between the NHMIS and IDSR has persisted for years, hampered progress in surveillance and resulted in a waste of resources. The government has not adequately financed the disease surveillance system and its entire operations need a revisit.

Recommendations

1. There is an urgent need to review the legal instruments that establish disease surveillance at the national level and in states.
2. The government needs to develop and implement strategies aimed at ensuring private health facilities comply with national policies and laws on disease notification.
3. There is a need for the harmonization and integration of the parallel systems that are in operation in the country with a detailed chain of command and oversight provided by the National Health Data Governance Council.
4. The government needs to commit adequate resources to disease surveillance as it provides an important avenue for disease identification and control with potential for reducing the devastating impact that can be associated with an outbreak.

RESEARCH TOOLS

Consent form (Health Facility Worker)

Introduction

Thank you for agreeing to participate in the study titled "Compliance with disease surveillance and notification by private healthcare providers in South-West Nigeria" being conducted by Dr. Olusesan A. Makinde. The study is being carried out as part of the requirements for the award of a doctoral degree at the University of the Witwatersrand in South Africa.

Consent

I _____ hereby consent to take part in this study titled "Compliance with disease surveillance and notification by private healthcare providers in South-West Nigeria". The details of the study have been explained to me and I have willingly agreed to be a part of the study.

As part of this study, I will be interviewed and my responses taken down. Questions that I will be asked will include information on my health facility's participation in the Integrated Disease Surveillance and Response System (IDSR), my knowledge about the IDSR and my opinion on the importance of this system. I will also be asked about the role and effort of the government in ensuring compliance with the IDSR system.

The information I provide will be used in preparing a dissertation report and in preparing manuscripts for submission to peer-reviewed journals. In addition, I have also been told that the information I provide will not be identified by my health facility or my name in the report being prepared. The information I provide will also not be used to victimize me or my health facility in the future.

I have willingly agreed to participate in this study following the detailed explanation and hereby consent to being part of the study. By consenting to this study, I agree to be interviewed by the researcher or his associate.

_____

Signature and Date

_____

Name

Consent form (Health Facility Worker)

Introduction

Thank you for agreeing to participate in the study titled "Compliance with disease surveillance and notification by private healthcare providers in South-West Nigeria" being conducted by Dr. Olusesan A. Makinde. The study is being carried out as part of the requirements for the award of a doctoral degree at the University of the Witwatersrand in South Africa.

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I have willingly agreed to participate in this study following the detailed explanation and hereby consent to being part of the study. By consenting to this study, I agree to be interviewed by the researcher or his associate.

_____

Signature and Date

_____

Name

Consent form (KII – Government Officer)

Introduction

Thank you for agreeing to participate in the study titled "Compliance with disease surveillance and notification by private healthcare providers in South-West Nigeria" being conducted by Dr. Olusesan A. Makinde. The study is being carried out as part of the requirements for the award of a doctoral degree at the University of the Witwatersrand in South Africa.

Consent

I _____ hereby consent based on the approval of the Honorable Minister of Health, Prof. Isaac F. Adewole, to take part in this study titled "Compliance with disease surveillance and notification by private healthcare providers in South-West Nigeria". The details of the study have been explained to me and I have willingly agreed to be a part of the study.

As part of this study, I have agreed to be a key informant in an interview which will be recorded. Issues to be discussed will include what I understand about the Integrated Disease Surveillance and Response System (IDSR), the laws, policies and guidelines in place to ensure compliance to the system, my role in ensuring compliance and the barriers to ensuring compliance with the system.

The information I provide will be used in preparing a dissertation report and in preparing manuscripts for submission to peer-reviewed journals. While my name will not be mentioned in the report, it is likely that I will be identifiable by virtue of my office.

I have willingly agreed to participate in this study following the detailed explanation and hereby consent to being part of the study. By consenting to this study, I agree to be a key informant in an interview led by the researcher or his associate. I also consent to have the session recorded.

_____

Signature and Date

_____

Name

Key Informant Interview/ FGD Guide for Disease Surveillance Specialists (National, State & Local Government Focal Persons)

1. How does Nigeria or this state (insert name) meet the International Health Regulations? Prompt if necessary,
    - The notifiable diseases
    - What systems are in place to ensure compliance?
2. What are the policies, guidelines or processes currently active in Nigeria and/ or this state to enforce compliance to the integrated disease surveillance and response (IDSR)?
    - Can I get copies of these policies, guidelines or processes?
    - Do you think these policies, guidelines and processes are comprehensive and well managed to detect epidemics early and take interventions to reduce their impact?
3. What contribution do private health facilities give to healthcare provision in Nigeria/ this state?
    - What is their coverage?
    - How many people (estimated) do they serve?
    - Do you think they attend to diseases of public health significance?
4. How do the policies/ guidelines for disease surveillance incorporate private healthcare facilities?
    - Is there a statute at the federal/ state that compel health facilities to report? If yes, can I get a copy?
    - Do you think this statute is well implemented?
    - How well do private health facilities report notifiable diseases in the country/ this state?
    - What specific challenges have you identified as a senior healthcare worker responsible for this observation in the state?

5. How can the efficiency of the reporting of notifiable diseases from private health facilities be improved? Prompt for the following
    - Do you think we have adequate legislation?
    - Do you think the system is currently well funded across governments? Probe for federal, state and LGA funding.
    - What do you think about the adequacy of the district health information system which houses the database for collecting the data?
    - Do you think there is duplication of efforts across program areas causing gridlocks and overburdening of the system?
6. Reflecting on the Ebola Virus Outbreak of 2014, would you say there was prompt response to the epidemic following the presentation of a case in a private hospital?
    - Prompt identification
    - Response to the case
    - Protection for the en

Data Use

7. How do you use the data from disease surveillance in the state/ country?
    - How frequently is it analyzed?
    - Do you produce any products from these data? What is the role of the epidemiologic bulletins in disseminating information from the disease surveillance and response system?
    - Is this being routinely done?
8. Can you tell us of some notable infectious disease outbreaks in the country/ state in the past? (mention the years if known)
    - How were these identified and what measures were taken to address them early and prevent a recurrence or reduce the potential impact should another episode occur?

Compliance to Disease Surveillance by Private Healthcare Providers: Questionnaire for Health Facility Assessment

Health Facility Details

1. Serial Number _____
2. State : _____
3. Local Government Area _____
4. Name of Health Facility _____
5. Level of Care Offered
    1) Primary
    2) Secondary
    3) Tertiary
6. Address of Health Facility _____
7. National Health Facility Identifier _____
8. Year of establishment _____
9. Do you have a health records officer? 1) Yes 2) No

Can I speak with your records officer please?

Health Records Officer

10. Do you have formal training in health records management?
    1) Yes 2) No

11. If yes, can you elaborate on the type and level of training that you have received?
    _____
    _____
    _____
    _____

12. Are you licensed by the health records officers' registration board of Nigeria?

    1) Yes 2) No

13. How long have you held this position (in years)? _____
14. Does this facility routinely report notifiable diseases to the national health information system? 1) Yes 2) No

15. If yes, what are the data collection tools (DCTs) used in the reporting of notifiable diseases in the country? Mention three of them?
    a. _____
    b. _____
    c. _____
16. Does this health facility have the tools for reporting notifiable diseases in Nigeria?
    1) Yes 2) No
17. Can I see them please? Data Collection Tools sighted and appropriate.
    1) Yes 2) No
18. Did you report routine data (including the IDSR) to the national health information system in 2015?
    1) Yes 2) No

Physician Assessment

19. Year of Basic Qualification _____
20. Do you have any additional qualification 1) Yes 2) No
21. Specify additional qualification _____
22. Year of additional qualification _____
23. How long have you worked in this facility? _____
24. Are you or any other physician in this health facility trained in disease surveillance and response?
    1) Yes 2) No 3) Don't know
25. If you have received training on disease surveillance, when was the training you received?
    1) Medical school training
    2) Post-graduate training (MPH or Residency)
    3) Short-course after graduation
26. Can you please specify the year _____

Awareness of the integrated disease surveillance response system

27. Can you mention any 3 diseases that are under immediate notification in Nigeria
    1) _____
    2) _____
    3) _____
    4) I don't know them
28. What forms are used to report these notifiable diseases?
    1) _____

2) _____
3) _____
4) I don't know them

29. If you don't know, have you ever seen the forms used to report notifiable diseases?
    1) Yes 2) No

30. If yes , when was the last time you saw them?
    1) I see them regularly but not taken note of their names
    2) Over the last year
    3) As a medical student
    4) I cannot remember exactly when I last saw them.
31. Do you think it is your responsibility as a physician to report notifiable diseases to the health authorities?
    1) Yes 2) No

32. Have you ever attended to cases that you think should be reported to the authorities to forestall an outbreak?
    1) Yes 2) No

33. Did you succeed in reporting to the health authorities the last time you had such presentation?
    1) Yes 2) No

34. If yes, how difficult was it to report to authorities?
    1) Very easy
    2) Easy
    3) Difficult
    4) Very difficult
35. What actions did the health authorities take following your report?

    _____

    _____

    _____

    _____

36. Are you aware of any law/ regulation that require that health facilities/ physicians report notifiable diseases to the LGA/ state authorities in their jurisdiction?
    1) Yes 2) No

37. How would you describe the system for infectious disease surveillance and response in Nigeria?

1) Excellent
2) Good
3) Indifferent
4) Poor
5) Non-existent

38. Are there specific challenges that you think need to be addressed to make this disease surveillance system work?

1) Yes 2) No

39. If yes, can you elaborate further on them?

_____

_____

_____

_____

40. Who are you to report notifiable diseases to if this occurs?

_____

_____

_____

41. Do you have any link/ contact information for the local government authorities or state in charge of notifiable disease?

1) Yes 2) No

42. Do you receive routine report on disease outbreaks within your LGA or state from the health authorities?

1) Yes 2) No

43. Should health facilities be provided ongoing report on disease outbreaks within their jurisdiction?

1) Yes 2) No

44. Are you willing to report notifiable diseases to the authorities if provided a conducive environment?

1) Yes 2) No

Data Comparisons

45. Did you have at least one case (suspected or confirmed) of each of the following diseases within the last one year?
    a. Malaria 1) Yes 2) No
    b. Tuberculosis 1) Yes 2) No
    c. Cholera 1) Yes 2) No
    d. Diarrhea (with blood) 1) Yes 2) No
46. Present the records pulled from the national routine health information system (for three indicators) and compare with documents submitted by the health facility. – for the period 1st January 2015 to 30th June 2015
    a. Number of hemorrhagic cases seen (Yellow Fever, Lassa Fever
    b. Number of Malaria cases seen
    c. Tuberculosis
    d. Cholera
    e. Number of cases of Diarrhea (with blood)

Focus Group Discussion Guide for Investigating Physician Groups and/ or Hospital Owners on Compliance toward reporting of Notifiable Diseases

1. What role do private healthcare providers play in offering healthcare services to the population in this state/ Nigeria?
    - Any specifics on services offered on infectious diseases of public health significance such as Ebola, Lassa fever, Influenza, Malaria, Tuberculosis, Neglected Tropical Diseases etc.?
2. Are you aware of laws in this state or country that compel private health facilities to report notifiable diseases to health authorities in LGA and/ or states?
3. Do you think infectious disease surveillance and reporting is currently practiced as it should be in Nigeria or this state?
    - As private healthcare providers, do you report diseases to the local authorities where your practices are located?
4. Do you think there are benefits in reporting notifiable diseases to the health authorities?
5. What do you think are the challenges to the current system which threatens its implementation?
6. Are there specific issues that need to be addressed in order to improve the performance of this system?

Template for Data Extraction for Routine Disease Surveillance Data from the National Health Information System for Comparison with Findings at Health Facilities

Health Facility:												
	Month 1		Month 2		Month 3		Month 4		Month 5		Month 6	
	Data base	Actual	Data base	Actual	Data base	Actual	Data base	Actual	Data base	Actual	Data base	Actual
Indicator 1												
Indicator 2												
Indicator 3												

Participant Information Sheet

Greetings and thank you for taking the time to learn more about what I am trying to do.

I am Olusesan A. Makinde a Nigerian Physician/ Researcher with Viable Knowledge Masters, Nigeria and also a doctoral student at the University of the Witwatersrand in South Africa. As part of requirements to fulfill my doctoral degree, I am carrying out a study titled "Compliance with disease surveillance and notification by private healthcare providers in South-West Nigeria".

The main objective of this study is to determine the level of participation of private health facilities in the Integrated Disease Surveillance and Response System (IDSR) in Nigeria. The IDSR is the system that Nigeria uses to achieve the International Health Regulations (IHR). The IHR is a set of regulations that the World Health Assembly uses to implement its constitutional responsibility to prevent the international spread of diseases. The functionality of the IDSR is an important component of identifying outbreaks early and deploying mechanisms to intervene and reduce their impact. However, the level of functionality of the IDSR in Nigeria has been questioned. This study has been designed to address this lacuna in information especially in private health facilities where about 60% of the Nigerian population receive healthcare services. Appropriate use of knowledge gained and recommendations from this study will also be useful to better control infectious diseases of public health significance.

As part of this study, I am interviewing some key personnel in the Federal and State's Ministry of Health, and Local Government Authorities. Those to be interviewed at these locations will include the Director, Disease Surveillance and Notification, the Chief Consultant Epidemiologist, the Health Management Information System Officer and any other key personnel that will provide me useful data and information in fulfilling the objectives of the study. In addition, I will analyze data from the openly available Health Management Information System and collect primary data across private health facilities in the Southwest of the country. I will also carry out focus group discussion among hospital owner groups across the six states to discuss the status and barriers to routine disease reporting. At the health facilities, I will interview the health facility manager, the health records officer and the Physician (or other clinician in the absence of a physician) providing service at the health facility. You have been selected to participate in this study as a key stakeholder who can provide important information to help fulfill the study objectives. Questions I will ask are related to your job. Information collected during this exercise will be de-identified during analysis. Findings from this assessment will not be used to victimize any health facility or health worker but will be useful in proffering evidence based improvements for the disease surveillance system in the country.

I am inviting you to join me in assessing the status of compliance of private health facilities with the disease surveillance and notification system in Nigeria. During the course of the study, I will record the key informant interviews and the focus group discussions. These will be transcribed and de-identified during analysis. The knowledge gained from this study will be far reaching in proposing ways at improving the system and protecting better, the Nigerian population and health workers from infectious disease outbreaks and their impact. A dissertation report and publishable manuscripts will be prepared from this study for wide

dissemination. In these reports, your health facility or the respondents interviewed will not be identified. The summary of the findings will also be made available to all participants who provide us their email addresses.

Should you have any additional questions or concerns, you may contact me or my supervisor at the phone number or email below.

Thank you.

Olusesan A. Makinde
Principal Investigator, Viable Knowledge Masters and Doctoral Student, University of the Witwatersrand, South Africa. Phone: 08033455724, Email: makindeo@viableknowledgemasters.com

Supervisor
Prof. Clifford O. Odimegwu,
Demography and Population Studies Program, Schools of Public Health and Social Sciences, University of the Witwatersrand, South Africa, Email: clifford.odimegwu@wits.ac.za Phone: +27 11 717 4056

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Perspective

As Ebola winds down, Lassa Fever reemerges yet again in West Africa

Olusesan Ayodeji Makinde[1,2]

[1] *Viable Knowledge Masters, Abuja, Nigeria*
[2] *Demography and Population Studies Programme, University of the Witwatersrand, Johannesburg, South Africa*

Key words: reemerging infectious disease; Lassa fever; Nigeria; outbreak.

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The longest and most impactful Ebola virus disease (EVD) outbreak is finally slowing down, which has so far infected 28,638 people and claimed 11,316 lives [1]. This EVD outbreak covered the largest geographic area to date, spreading to eight countries across three continents in its rage. Two other countries appeared on the EVD map following a medical evacuation and the return of an EVD volunteer to her country, before subsequently developing the disease [1]. The outbreak has lasted an unprecedented 22 months and challenged previously held beliefs about the virus after reemerging, following an initial declaration of the outbreak's end in Liberia and Sierra Leone [2]. Its reemergence in Liberia was attributed to the persistence of the virus in the semen of an individual who had clinically recovered from the disease [1].

The outbreak spread to Nigeria in 2014, resulting in twenty infections and eight deaths [1]. As Nigeria joined the world to watch the end of the outbreak, another hemorrhagic fever reappeared in the country [3]. Lassa Fever, which was first identified in Nigeria in 1969 has reemerged [4] and like Ebola, it is caused by a virus but of the Arenaviridae family. Globally, it is estimated that between 100,000 and 300,000 Lassa fever cases occur annually, mostly asymptomatic, resulting in 5,000 deaths [4,5]. However, a heightened level of awareness has been causing anxiety and panic in Nigeria, coupled with unavailable data on the annual disease trend in the country. By 22 January 2016, the virus had already been reported across 17 of Nigeria's 36 states and Federal Capital and had infected 212 individuals, resulting in 72 fatalities at a case fatality rate of 34% [6]. There is fear of the outbreak spreading rapidly across the country.

Unlike EVD, which has fruit bats residing in the forest as its reservoir, the host for Lassa fever is the multimammate rat, found across Nigeria including in homes. This means a greater risk of Lassa fever transmission to humans compared to EVD, arising from the closer proximity of the host to humans. Though this is not the first Lassa fever outbreak in Nigeria, very recent memory of the intractable EVD has raised the level of awareness and anxiety on hemorrhagic fevers.

There is limited information on the ecological distribution of rodents in Nigeria. However, following personal observation, many freely roam the streets of many of Nigeria's cities, including Lagos. The first EVD case in Nigeria and its containment success were recorded in Lagos state. Yet, should Lassa fever present in Lagos, it is unlikely that the success quickly recorded in the control of the EVD will be repeated. This is due to the fact that the reservoir of the virus freely lives among people.

Lagos state harbors about 21 million people, 11.6% of the Nigerian population, despite covering only 0.38% of the country's landmass [7]. Thus, the population density in Lagos is very high. Overcrowding promotes dirt and allows rat populations to grow. In order to address the risk of Lassa fever spreading in Lagos and across Nigeria, there is an urgent need to control rat population in human settlements. Furthermore, the efficiency of the Integrated Disease Surveillance and Response (IDSR), the system for routinely monitoring infectious diseases which was adopted by Nigeria in 1998 as a means of implementing the International Health Regulations has been called to question [8]. There is an urgent need to reposition the IDSR to be able to provide ongoing levels of infectious

diseases, such as Lassa fever, in order to identify when an aberration to the status quo has occurred.

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Corresponding author

Viable Knowledge Masters,
22 Olusegun Obasanjo Street,
Peace Court Estate, Lokogoma
Abuja, Nigeria.
Email: sesmak@gmail.com

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Research

A qualitative inquiry on the status and adequacy of legal instruments establishing infectious disease surveillance in Nigeria

Olusesan Ayodeji Makinde[1,2,&], Clifford Obby Odimegwu[1]

[1]Demography And Population Studies Program, Schools of Public Health and Social Sciences, University of The Witwatersrand, Johannesburg, South Africa, [2]Managing Partner, Viable Knowledge Masters, 22 Olusegun Obasanjo Street, Peace Court Estate, Lokogoma, Abuja Federal Capital Territory Nigeria

[&]Corresponding author: Olusesan Ayodeji Makinde, Demography and Population Studies Program, Schools of Public Health And Social Sciences, University of the Witwatersrand, Johannesburg, South Africa

Key words: Disease outbreaks, infectious diseases, legislation, Nigeria, regulation, surveillance

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Abstract

Introduction: The threat of devastating disease outbreaks is on the rise with several outbreaks recorded across the world in the last five years. The intractable Ebola Virus Disease outbreak in West Africa which spread to Nigeria was a reawakening point. This study aims to review the status and adequacy of the legal framework for disease surveillance in Nigeria. Methods: a mixed methods approach comprising of document reviews and key informant interviews was used in data collection. **Methods:** A mixed methods approach comprising of document reviews and key informant interviews was used in data collection. **Results:** Fourteen key informants from the federal ministry of health (FMOH) and six States were interviewed. Five legal instruments were identified and reviewed. The Quarantine Act of 1926 remains the active National Law on disease surveillance in Nigeria. An Integrated Disease Surveillance and Response Policy (IDSR) was developed in 2005 as the means for achieving the International Health Regulations (IHR). All six states claimed to have adopted the national IDSR policy though none could present a domesticated version of the policy. Key informants were concerned that Nigeria does not yet have an adequate legal framework for disease surveillance. **Conclusion:** The legal instruments establishing disease surveillance in Nigeria require strengthening and possibly enactment as a National Law in order to address emerging disease threats.

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Introduction

Infectious disease outbreaks have been known to occur for ages with devastating impact. In 541 AD, grain merchants' from Egypt transported rats infested with an unknown organism at that time into the Eastern Roman Empire causing the Plague of the Justinian period [1]. This outbreak left over 30 million people dead with significant economic impact [1]. Likewise, the black plague of the 14th century was noted to be responsible for the death of 30 percent of Europe's population, estimated at between 75 and 200 million people [2]. Early in the 19th century and long before the development of the microscope, an outbreak of another unknown disease in London with a high fatality was traced by John Snow to the water p.umps, after he was able to map clustering of cases around some particular pumps [3]. He contained the epidemic by removing the handles of the water pumps stopping people from getting water from the contaminated sources. Lately, emerging and re-emerging infectious diseases are posing threat to human populations with fear of outbreaks of these diseases spreading globally and causing significant morbidity and mortality. The Human Immunodeficiency Virus which was first identified in the 1980s is now a pandemic which though has been well curtailed in its acute form by drugs, remains without a cure [4]. The World Health Assembly (WHA) in 1969 adopted the International Health Regulations (IHR) as its legal instrument for implementing its constitutional responsibility for controlling the international spread of infectious diseases. The IHR was an evolution of the International Sanitary Regulations previously adopted by the fourth WHA in 1951. The IHR was revised in 2005 with the purpose and scope "to prevent, protect against, control and provide a public health response to the international spread of disease in ways that are commensurate with and restricted to public health risks and which avoid unnecessary interference with international traffic and trade" [5]. Several African countries including Nigeria implement the Integrated Disease Surveillance and Response (IDSR) strategy as their means for meeting the IHR [6]. The IDSR is a strategy that was first proposed in 1998 by the World Health Organization (WHO) Regional Office for Africa as a framework for a coordinated and integrated surveillance and response.

Nigeria has a population of about 180 million people with limited resources to tackle all her health challenges. As a result, health indices in the country are not among the best in the world. Life expectancy at birth is 54.5 years which is lower than the regional average (60 years) and far lower than the global average (71.4 years) [7]. Various factors including mortalities arising from infectious diseases of public health significance contribute to the low life expectancy in Nigeria. Pneumonia and other neonatal infections remain major killers among children while perinatal infections also contribute significantly to maternal mortality. The country has been affected by the outbreak of various communicable diseases in the past. Some notable ones include the Lassa fever outbreak in the 70's, Yellow fever in the 80's, the Avian influenza outbreak of the early 2000s, recurrent Cerebrospinal Meningitis and recently the Ebola Virus Disease (EVD) outbreak following an imported case in 2014 [8-12]. Polio which was also thought to have been at the verge of elimination has again reemerged [13]. The ability to identify and respond to outbreaks promptly thereby limiting their impact rests on the availability and implementation of appropriate laws, policies, processes and systems to help detect the outbreaks early and take action that will mitigate the spread of such infectious diseases. However, the reliability of surveillance systems in the country in this regard has been questioned [10, 14, 15]. Following the recent EVD outbreak, concerns about the adequacy and out-datedness of laws for disease surveillance in the country have been raised [16]. Thus, it is necessary for an inquiry to be carried out to investigate the adequacy of the legal instruments that guide the surveillance system in the country. The study examines the status and adequacy of national and sub-national legal instruments that govern disease surveillance in Nigeria. The knowledge generated will provide policy makers, public health experts and researchers information useful in advocating for improvement in the legal framework for disease surveillance in the country.

Methods

This article reports part of a larger research effort to investigate the compliance with disease surveillance and notification by private healthcare providers in Nigeria and the factors that may be affecting their performance. A brief description of the entire study has been previously published [17]. The objectives of the entire study are: to examine the legislative/legal framework for routine disease reporting in Nigeria (nationally and sub-nationally) and how it might affect compliance by private providers; to determine the level of reporting of notifiable diseases by private providers, the completeness of information and how these compare with the public sector; to determine the knowledge and perceptions of private

healthcare providers on the importance of routine disease reporting in Nigeria; to identify the barriers to routine disease reporting by private healthcare practitioners/facilities in Nigeria. This article addresses the first objective of the study and employed document reviews and key informant interviews (KII) as the data collection method. A KII guide was developed to drive the interactive sessions. All key informants were interviewed by the principal investigator and the interviews took place between August 2016 and July 2017. Nigeria is a Federation of 36 States and the Federal Capital Territory (FCT). These states and the FCT are grouped into six geopolitical zones of between five and seven States in each zone (North West, North East, North Central, South West, South East and South-South). Of the six geopolitical zones, the South West has the largest concentration of private healthcare facilities of 38% (4338 /11395) based on the 2011 Master Health Facility List [18]. This geopolitical zone was purposively selected for an in-depth investigation based on the main objective of the larger study to focus on private health facilities. Within the South West, a total sample of all the states Lagos, Oyo, Osun, Ogun, Ekiti and Ondo States was included in the study.

Key government officers with responsibilities for disease surveillance and the National Health Management Information System (NHMIS) at the national level and in the six selected States were targeted for interview. The national IHR focal person and the NHMIS officer were identified as key informants at the national level. In each State, the State epidemiologist and the State Health Management Information System (HMIS) officer were identified as key informants. This was a total sample since each State has only one State Epidemiologist and one HMIS officer. The State epidemiologists are responsible for monitoring of all infectious diseases and events of public health importance in the State and manage the State IDSR program while the State HMIS officers are responsible for managing the NHMIS in their State. The KII guide was made up of eight exploratory questions. The guide covered questions on the processes in place for meeting the IHR in Nigeria and in each State; laws and policies in place to ensure compliance with the IHR, contribution of private health facilities to healthcare delivery and the incorporation of private healthcare facilities in the laws on disease surveillance in the country. It also included questions on the perceptions of respondents on the performance of the IDSR and data use. Legal instruments establishing disease surveillance (Laws and Policies) were initially identified by the researchers during the document review and probed for during the KII. Additional documents were identified during the KII. Those identified during the KIIs were also retrieved and reviewed to understand their content and shortcomings. Ethical Approval for the study was obtained from the National Health Research Ethics Committee in the Federal Ministry of Health, Abuja, Nigeria (NHREC Approval Number NHREC/01/01/2007-18/03/2016) and the Wits Human Research Ethics Committee (Non-Medical) of the University of the Witwatersrand, Johannesburg, South Africa (Approval number H16/05/09). In addition, approvals were obtained from the Honorable Minister for Health before national officers were interviewed and from the Commissioners of Health in each State before going ahead with the study in their State. Furthermore, written consent was also obtained from the officers before they were interviewed and this followed the provision of detailed information on the purpose of the study. A participant information sheet which explains the goal of the study and expected outcome was shared with each participant ahead of the interview. The KIIs were recorded using a digital voice recorder and subsequently transcribed verbatim. The transcripts were then used to generate themes based on the objectives of the study. Coding and analysis was manually done by the principal investigator.

Results

Different legal instruments establishing or reinforcing disease surveillance in the country were identified during the study. Some of the legal instruments were identified during the literature reviews and before the KIIs while some were identified and/or reinforced during the KIIs. In total, six documents were identified and subsequently retrieved and studied. Fourteen key informants were interviewed during the period: two officers from each State (State epidemiologist and State HMIS officer) across the six States of investigation, the national IHR focal person and the NHMIS officer. The interviews lasted between 20 and 45 minutes. The identified documents during this process are presented in Table 1.

Legal instruments on disease surveillance in Nigeria: This section provides a brief summary of the identified legal instruments for disease surveillance in the country.

The quarantine act: The Quarantine Act of 1926 remains the active law governing public health in emergencies in Nigeria today [19]. The named diseases in the document include Small Pox. The

penalty allotted to defaulters of the Act is N200 (0.7 US Dollars) fine or six months jail time.

The national policy on IDSR and technical guidelines for IDSR: The IDSR policy of 2005 is the most recent comprehensive legal instrument reinforcing disease surveillance in Nigeria. The IDSR was adopted to replace the Disease Surveillance and Notification system which had been put in place following a Yellow fever outbreak in 1986/87. The adoption of the IDSR was believed to be the needed change to revamp the ability to predict and detect disease outbreaks in the country. The policy noted that it would be reviewed every five years or as deemed fit by the Minister of Health in consultation with the National Council on Health. It identified the need for the coordination with the NHMIS to avoid duplication. The technical guidelines listed the 41 diseases and conditions of importance to be tracked in Nigeria. It also contained samples of the forms to be used in tracking infectious diseases in the country.

The national health act: The National Health Act is not focused on disease surveillance but provides some further support towards the implementation of the NHMIS. Part IV section 35 subsection (1) states that "The Federal Ministry of Health shall facilitate and coordinate the establishment, implementation and maintenance by State ministries, local government health authorities and the private health sector of the health information system at the national, State and local government levels in order to create a comprehensive NHMIS." It further goes on to provide the Minister with the power to determine the class of data that can be collected and the need for the Minister and State Commissioners to publish annual reports on the health of the citizenry.

National health information system policy: The policy prescribes a health data governance structure for the country with the Minister as the chair of the National Health Data Governance Council (NHDGC). The heads of all the health data generating institutions in the country including the National Population Commission, the National Bureau of Statistics and the different departments in the Ministry are members of the NHDGC. It also proposes the creation of State Health Data Governance Councils to be chaired by the Honorable Commissioner of Health in each state with similar representativeness of members across the data generating units in the State. The policy was designed to drive a good coordination and governance of the health information system.

The national public health bill: Though it was discovered that a Public Health Bill had been waitlisted since 2004 in the Nigerian Senate for possible enactment as a Law, this Bill is yet to be ratified by legislators [20].

Key informant's perspectives on legal instruments: The key informants interviewed buttressed the finding from the document reviews that the IDSR policy of 2005 is the most recent comprehensive legal instrument guiding disease surveillance in the country. A key informant noted that "States actually agreed at the National Council on Health (NCH) years back to implement the IDSR strategy and that is what we have on ground". The NCH is the highest policy making body in Nigeria with regards to health and is made of the Minister for Health, Minister of State for Health, the Commissioners of Health across the 36 states of the Federation, the Secretary of Health and Human Services of the Federal Capital Territory and the Permanent Secretary at the Federal Ministry of Health [21]. Besides the IDSR policy, another legal instrument identified by key informants was the National Health Act. An informant noted that "We are capitalizing on the National Health Act. The Act has a section on disease surveillance". Several key informants held opinions that other laws governing infectious diseases were as old as the country and not useful with current disease challenges. It was stated by a key informant that "The public health laws are already outdated. They were drafted back in 1958." Another informant noted that "The public health laws in Nigeria are old and the penalties spelt out in them are so meager (five Naira), as such, it is not relevant to deter offenders." A key informant highlighted that small pox which was eradicated in 1980 remains one of the diseases highlighted in the main public health law in the country which makes it archaic. Key informants from the States noted that their States were aligning with the Federal Governments' policy on infectious disease control. One informant highlighted that "There is no specific law or guideline apart from the Federal Ministry of Health document on the IDSR. This is what has been adopted in our state." An informant opined that "We have adequate laws that can help us in meeting the IHR. However enforcing their implementation is the problem." Contrary to this view, most informants do not believe that Nigeria and their specific states (for the state officers) have adequate laws on disease surveillance. They believe that a revision of existing laws was necessary to address emerging issues. Notwithstanding, they all agreed to the poor implementation of existing laws. It was noted by an informant that there were ongoing efforts to strengthen legislation on infectious disease control in his State. He noted that

following the EVD outbreak of 2014, a Bill to enact a law on cremation of suspected infectious disease cases has been under discussion in the legislature. However, progress to enact the law has been slow. This draft Bill was not available to the research team upon request as it was stated to be a confidential document.

Discussion

Nigeria is a Federation with three tiers of government: the federal government, state governments and the local governments [22]. The Federal Government is responsible for the national administration, State Governments oversee the states and Local Government Authorities oversee the smaller local government areas within the states. Constitutional responsibilities on health cut across the three tiers of government [22,23]. Laws, policies and guidelines at the Federal level do not necessarily bind the States to implement them unless they are first adopted as a State law. Since the return of Nigeria to democratic governance in 1999, several health-related laws have been enacted by the federal government some of which have been ratified by the State legislatures following modifications. Such includes the Child Rights Act 2003 which has been ratified in some States with variations to the original law passed at the national level [23]. The National Health Act of 2014 also makes extensive provision for States to enact laws within their territories to govern their health system [21]. Thus from practice, it can be inferred that national laws on health do not necessarily bind the States. Two classes of legal instruments were identified in the course of the study and these are: Laws and Policies. Laws are the higher of the two having been ratified by legislators in parliament before being signed into Law by the president or a State governor. On the other hand, policies are of lesser authority and are developed for specific purposes often by civil servants in the ministries and do not necessarily undergo the rigor of review, adoption and ratification by legislators. Non-compliance with Laws can be regarded as a violation with potential consequences that can include criminal charges and jail time while non-compliance with policies does not necessarily confer the same status. More so, policies can be changed easily by successive governments threatening their continuity and ability to achieve their goals [24]. Multiple cadres of legal instruments are also available at the WHA (Convention agreements, Regulations and Recommendations) and have different uses and authorities [25]. Previous studies have revealed inadequate capacity among policymakers to transform research to policies and laws in Nigeria worsened by poor knowledge of researchers to adequately understand health policy needs and tailor their studies to address the knowledge gap [26, 27]. Such poor capacity among policy and lawmakers might be responsible for the little attention given to the enactment of laws targeted at Global Health Security within the country's territory.

The Quarantine Act and the National Health Act are the current Laws that govern disease surveillance in the country. However, it is archaic having been established as a Law in 1926, several decades before the IHR came into effect. One of the diseases identified in the document was eradicated over 35 years ago, highlighting the need for a revision. The National Health Act which was signed into Law in 2014 identified the need for the strengthening of the NHMIS in order to be able to deliver on its mandate. The level of detail in the National Health Act for disease surveillance is considered inadequate by most respondents as it was not enacted for this purpose. The availability of various legal instruments at the national level for different diseases and conditions do not necessarily mean that these are being adhered to in the States which are a different administrative level of government. The states are independent and thus, ratification is necessary where the Law is not on the exclusive list of issues addressed solely by the Federal Government. This is similar to the concern raised by Gostin and colleagues (2017) where they made an assertion that development of global legal instruments does not mean they are being implemented by member states. Responsibility still rests on member states to adopt them and their inaction cannot be easily sanctioned since there is no law enforcement body to prosecute defaulters. Strategies that are being used to make the states more responsive to federal laws include incentivizing for results as is seen on the World Bank funded Saving One Million Lives-Program for Results [28]. However, the effectiveness of this strategy still needs further evaluation. Many of the respondents do not think that Nigeria has adequate laws on disease surveillance which is worsened by the poor implementation of existing laws. This has also been echoed in the literature following the EVD outbreak of 2014 [16]. A Public Health Bill was discovered to be awaiting assent in the Nigerian Senate since 2004. This Bill sought to establish a Public Health Emergency Planning Commission with the hope that this institution will improve the responsiveness of the system to public health emergencies. The long delay in finalizing this Bill is a huge challenge to the health sector. However, it was also observed that several other Bills were awaiting review. While the establishment of an agency may provide some opportunities for structured response to infectious diseases,

the unavailability of adequate Laws for the system will make it unable to achieve its goal. A Nigeria Center for Disease Control (NCDC) supported by the US Centers for Disease Control and Prevention (CDC) has been in operation since 2012 [29]. However, this operated as a US CDC supported project of the government. Early in 2017, the Federal Executive Council (chaired by the President) approved a memo to adopt the NCDC as a standalone government institution and a request has been sent to the legislature for ratification [30]. It is unclear if the effort to establish the NCDC will nullify the public health bill which has been awaiting reading on the floor of the Senate since 2004. Notwithstanding it is noteworthy that information on the NCDC first surfaced in 2008 [29]. The long delay before it received attention is a concern that must be addressed. The IDSR strategy which was developed to implement the IHR is still governed by a policy, the lesser of the two legal instruments. The Quarantine Act predates the IDSR policy and both documents do not necessarily align on diseases that are to be tracked. While many officers interviewed generally agreed that they were implementing the national policy on IDSR since it was adopted at a NCH meeting several years earlier, none could show any document ratifying the IDSR by their State legislature or detailing how IDSR should be implemented in their State by their Ministry of Health. This is a major shortcoming as it has been established that national laws and policies on health do not necessarily bind the States. As such, State specific Laws or policies addressing disease surveillance are necessary to strengthen the commitment towards disease surveillance in each State.

Conclusion

The legal framework establishing disease surveillance in Nigeria requires strengthening and possible enactment as a law to give it the authority it deserves as well as to update it to address emerging Global Health Security challenges. State governments should domesticate policies or laws on disease surveillance to demonstrate buy-in and improve their commitment to its implementation. Lawmakers and Policymakers need to be educated on the importance of prompt attention to laws on Global Health Security.

What is known about this topic

- The threat of devastating disease outbreaks is on the rise globally and countries need an efficient surveillance system for detecting and responding to outbreaks to mitigate their impact;
- The first step towards a reliable system is a legal or regulatory framework that establishes and enforces the surveillance system in a country;
- Disease surveillance is poor is several low and middle income countries including Nigeria and efforts are required to improve their performance.

What this study adds

- This study provides a snapshot of the status and the adequacy of the legal and regulatory framework which establishes disease surveillance in Nigeria;
- It also highlights concerns by key stakeholders that Nigeria does not have an adequate legal or regulatory framework for addressing disease surveillance and those currently available are not being implemented.

Competing interests

The author declare no competing interest.

Authors' contributions

Olusesan Ayodeji Makinde and Clifford Obby Odimegwu jointly conceived the manuscript. Olusesan Ayodeji Makinde drafted the first version of the manuscript while Clifford Obby Odimegwu reviewed and contributed to it. Both authors have read and approved the final version of the manuscript. All the authors have read and agreed to the final manuscript.,

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Table

Table 1: Legal instruments on disease surveillance in Nigeria

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Table 1: Legal instruments on disease surveillance in Nigeria			
	Legal Instrument	**Year**	**Purpose**
1	Quarantine Act	1926	The purpose of the Quarantine Act was to "provide for and regulate the imposition of quarantine and to make other provisions for preventing the introduction into and spread in Nigeria, and the transmission from Nigeria, of dangerous infectious diseases
2	National Policy on IDSR in Nigeria	2005	IDSR was adopted as the means of achieving the IHR in 1998 following a decision reached at a WHO Regional Committee for Africa meeting in Zimbabwe but did not come into effect in Nigeria until 2005. The IDSR policy was developed to guide and provide the necessary environment for the planning, implementation, monitoring and evaluation of an IDSR by all tiers of the government including parastatals, private health sector, non-governmental organizations and partners.
3	Technical Guidelines for IDSR in Nigeria	2013	Technical guideline for the implementation of the IDSR was developed in 2013 and followed the international guidelines released by WHO Regional Office for Africa three years earlier.
4	National Health Act	2014	The National Health Act of 2014 is a health law enacted to strengthen the national health system.
5	National Health Information System Policy	2014	The National Health Information System Policy (2014) came into being as a revision of the National Health Management Information System Policy of 2007. It was developed to provide guidance for strengthening of the HIS in the country.
6	Bill for an Act to Establish the Nigeria Public Health Act	2004	The Bill seeks to establish a Public Health Emergency Planning Commission and to repeal the Quarantine Act of 1926

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ISDS INTERNATIONAL SOCIETY FOR DISEASE SURVEILLANCE

Disease Surveillance by Private Health Providers in Nigeria: A Research Proposal

Olusesan A. Makinde*[1] and Clifford O. Odimegwu[2]

[1]Viable Knowledge Masters, Abuja, Nigeria; [2]University of the Witwatersrand, Johannesburg, South Africa

Objective

To investigate the compliance of private health facilities to the integrated disease surveillance and response (IDSR) system in Nigeria.

Introduction

The outbreak of the Ebola Virus Disease (EVD) in Africa in 2014 presented a major threat and concern across the world, spreading to two other continents (Europe and North America). Though the epidemic is on a downward trend, there is a need to evaluate the performance of the systems in place to detect and control such outbreaks and determine the need for improvement in countries affected.

With its first traceable case reported to have been in Guinea, the outbreak spread to Nigeria through an air traveler from Liberia which led to an outbreak in the country that luckily, was quickly contained (1). This imported case was initially managed at a private health facility (PHF) eventually leading to 20 cases and eight deaths, four of which were health workers from the initial managing PHF (1). Despite effort to contact the authorities about the suspected imported case by the PHF, it reportedly took some time before the health authorities could be reached and action at control instituted. This might suggest an inefficiency of the IDSR system which was previously adopted by Nigeria as a means of implementing the International Health Regulation (IHR) of 1969. The IHR is a set of regulations that the World Health Assembly uses to implement its constitutional responsibility to prevent the international spread of diseases.

Hemorrhagic fevers like EVD ought to be reported immediately upon suspicion to the health authorities but the delay despite effort suggests this system is not efficient. This is important as PHFs are noted to attend to over 60% of the Nigerian population. Thus, it is important to carry out an assessment of the IDSR system in PHFs to forestall a repeat episode and limit the impact of outbreak of infectious diseases in future.

Methods

This study will be carried out in the South-West of Nigeria where about 40% of PHFsin the country are located (2). We intend to carry out a mixed-methods study which will include desk reviews, key informant interviews, focus group discussions, analysis of routine data, a cross sectional study of health workers and health facility assessments. Desk review will be completed to understand the legislation and policies establishing the IDSR in Nigeria and opportunities for improvement. Key informants at the federal, state and local government level will be interviewed to understand more about the regulation and implementation of the IDSR across the different levels of governance in the country. Routine health data will be pulled from the national health information system to assess reporting of PHFs. In addition, health facility assessments will be completed along with assessment of the knowledge of health workers in PHFs on the country system for notifiable diseases.

Results

The study will critically assess the legislation that establishes the IDSR as the means of implementing the IHR in Nigeria. It will provide the status of implementation of the regulation for implementing the IHR. The study will further assess the knowledge of private healthcare providers on the IDSR system in Nigeria and the factors that affect their compliance with this regulation. Furthermore, it will provide information for the readiness of PHFs to report notifiable diseases and will also investigate the differences in reporting rate between public and private health facilities.

Conclusions

The study will provide a snapshot of the status of PHFs on participation in the IDSR in Nigeria and factors that may be affecting them. It will also highlight areas of inadequate legislation and system failures and will make proposals aimed at addressing these shortfalls.

Keywords

Surveillance; Communicable Diseases; Research Proposal; Global; Nigeria

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***Olusesan A. Makinde**
E-mail: makindeo@viableknowledgemasters.com

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Status of Legislation and Factors affecting Disease Surveillance in Nigeria: A qualitative inquiry

Olusesan A. Makinde*[1, 2] and Clifford O. Odimegwu[1]

[1]University of the Witwatersrand, Abuja, Nigeria; [2]Viable Knowledge Masters, Abuja, Nigeria

Objective

Assess the legal framework establishing disease surveillance in Nigeria and identify major factors affecting the performance of the surveillance system.

Introduction

The outbreak of infectious diseases with a propensity to spread across international boundaries is on an upward rise. Such outbreaks can be devastating with significant associated morbidity and mortality. The recent Ebola Virus Disease outbreak in West Africa which spread to Nigeria is an example(1). Nigeria like several other African countries implements the Integrated Disease Surveillance and Response (IDSR) system as its method for achieving the International Health Regulations (IHR). Yet, compliance to the IDSR is questioned. This study seeks to investigate the legal instruments in place and the factors affecting performance of the disease surveillance in the country.

Methods

The study reports the first objective of a larger study to investigate compliance to disease surveillance by private health providers(2). An investigative search of the literature for legal instruments on disease surveillance in Nigeria was carried out. In addition, key informants were identified and interviewed at the national level and in selected states. The six states in the South-West were identified for an in-depth study. The IHR focal person and the National Health Management Information System officer were interviewed at the national level. The state epidemiologists and the state health management information system (HMIS) officers across the six states were interviewed. Each state has only one state epidemiologist and one HMIS officer as such it was a total sample. In all, 14 key informants were interviewed.

Results

Six legal instruments were identified as seen in table 1. The most recent comprehensive legal instrument on infectious disease control in Nigeria is a 2005 policy on IDSR. This is further supported by the National Health Act of 2014. However, the National Health Act is not detailed for infectious disease control. The substantive law which governs infectious diseases in Nigeria, the Quarantine Act was enacted almost a century ago during the colonial era in 1926. None of the states studied has an active law on infectious disease surveillance as noted by key informants. While all states refer to the IDSR policy, none has formally ratified the document. There are two independent overlapping data collection systems on infectious diseases: the IDSR and the National Health Management Information System (NHMIS). Data on malaria, HIV and tuberculosis are among data collected across the two systems. This was identified by key informants as a problem since the data collection forms differed across systems and almost always result in differing statistics. In addition, this duplication causes overburdening of frontline workers expected to fill the parallel data collection tools and results in inefficiency of the system. Funding of the surveillance system was identified to be inadequate with significant reliance on international partners.

Conclusions

A review of the national law on disease surveillance to address emerging global health security challenges is necessary. State legislators need to enact or ratify national laws on infectious disease monitoring and control in their states. The duplication across the NHMIS and the IDSR surveillance system requires harmonization to improve efficiency. Government needs to invest more resources in disease surveillance.

Legal instruments for disease surveillance in Nigeria

Serial Number	Legal Instrument	Type of Document	Year of Document	Purpose
1	Quarantine Act	Law	1926	The purpose of the law was to "provide for and regulate the imposition of quarantine and to make other provisions for preventing the introduction into and spread in Nigeria, and the transmission from Nigeria, of dangerous infectious diseases
2	National Policy on IDSR in Nigeria	Policy	2005	IDSR was adopted as the means of achieving the IHR in 1998 following a decision reached at a WHO Regional Committee for Africa meeting in Zimbabwe but did not come into effect in Nigeria until 2005. The IDSR policy was developed to guide and provide the necessary environment for the planning, implementation, monitoring and evaluation of an IDSR by all tiers of the government including parastatals, private health sector, non-governmental organizations and partners.
3	Technical Guidelines for IDSR in Nigeria	Guideline to a policy	2013	Technical guideline for the implementation of the IDSR was developed in 2013 and followed the international guidelines released by WHO Regional Office for Africa three years earlier.
4	National Health Act	Law	2014	The National Health Act of 2014 is a health law enacted to strengthen the national health system.
5	National Health Information System Policy	Policy	2014	The National Health Information System Policy (2014) came into being as a revision of the National Health Management Information System Policy of 2007. It was developed to provide guidance for strengthening of the HIS in the country.
6	Bill for an Act to Establish the Nigeria Public Health Act	Bill	2004	The Bill seeks to establish a Public Health Emergency Planning Commission and to repeal the Quarantine Act of 1926

Keywords

Legislation; Outbreak; Nigeria; Policy; Surveillance

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***Olusesan A. Makinde**
E-mail: sesmak@gmail.com

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7th ANNUAL SCIENTIFIC CONFERENCE AND GENERAL MEETING

Abstracts for Presentation

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Oral Presentation -1

Title: Compliance with disease surveillance and notification by Private Healthcare Providers in South-West Nigeria

Authors: Olusesan A. **Makinde** [1,2,3], Clifford O. **Odimegwu** [1]
Affiliation: 1 University of the Witwatersrand, Johannesburg, South Africa
2 Viable Knowledge Masters, Abuja, Nigeria
3 Viable Helpers Development Organization, Abuja, Nigeria

Corresponding Author:
Email: sesmak@gmail.com

Background:

Infectious disease outbreaks with a propensity to spread over large geographic areas are happening more frequently. The Ebola Virus Disease (EVD) outbreak of 2014 was a reawakening point in sub-Saharan Africa with calls for countries to assess their capacity for meeting the International Health Regulations. Private health facilities are largely patronized in Nigeria and non-inclusion in the disease surveillance system will result in a biased surveillance system. This study assesses the compliance with disease surveillance by private healthcare providers in South-West Nigeria.

Methods

A cross sectional study was carried out across the six states in the Southwest of the country. Sample size was proportionally allocated to the states. A purpose designed questionnaire was applied across selected private health facilities in the states. Frequency analysis and logistic regression was done using "R".

Results

Only 40% of the private health facilities surveyed report into the disease surveillance system which varied across the states (Lagos (51%), Oyo (60%) Osun (30%), Ogun (17%), Ondo (23%) and Ekiti (35%)). Over 50% of clinicians were aware that reporting diseases was a legal responsibility. Sixty-six percent of the facilities did not have the requisite reporting tools. Over 90% of clinicians that stated that they had not attended to a case that required reporting had attended to a case of malaria in the preceding year. Availability of reporting tools, having an assigned health records officer and high knowledge were the statistically significant predictors of reporting by the private health facilities.

Conclusion

Disease surveillance by private health facilities is poor and could be worse than what was seen in this study because it was based on self-reports and many were aware of the legal implications of non-reporting. There is an urgent need to address disease surveillance compliance by private health facilities in Nigeria.