FACTORS INFLUENCING ANIMAL DISEASE REPORTING IN BORNO AND GOMBE STATES, NORTH EASTERN NIGERIA

BY

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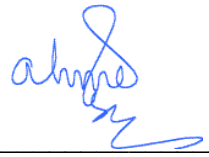
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DECLARATION

I declare that the work in the thesis entitled ''Factors Influencing Animal Disease Reporting in Borno and Gombe States, North Eastern Nigeria'' has been performed by me in the Department of Community Medicine under the supervision of Professor J. U. Umoh. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this dissertation was previously presented for another degree or diploma at any university.

Tsofo Ahmed Ibrahim  5/09/2012

Signature Date

CERTIFICATION

This project thesis entitled ‘’Factors Influencing Animal Disease Reporting in Borno and Gombe States, North Eastern Nigeria’’ by TSOFO Ahmed Ibrahim meets the regulations governing the award of the degree of Master of Public Health of Ahmadu Bello University, and is approved for its contribution to knowledge and literary presentation.

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ABSTRACT

Animal disease reporting in Nigeria is inefficient and characterized by late, inaccurate and gross under-reporting. Recently, most states of the country under reported and show a general inconsistency in disease reporting. However, there is dearth of documented information on the reasons for the observed inefficiency in Nigeria's animal disease reporting system. The aim of this study is to determine the factors influencing animal disease reporting in Borno and Gombe states, north eastern Nigeria. A cross-sectional study was used to obtain information from 40 disease reporting officers in Borno and Gombe states between March and April 2012. Structured questionnaires were used to collect data on socio-demographics of disease reporting officers, availability of reporting forms, knowledge of reporting forms and procedure, completeness and timeliness of reporting and feedback between levels of reporting. Frequencies and proportions were computed. Unsatisfactory knowledge of reporting forms and procedure (OR = 20.08, CI = 2.15 – 494.94) and poor problem solving initiative (OR = 252, CI = 35912.05) were found to have a statistically significant association with disease reporting performance. This study has shown that efficient disease reporting has more to do with personnel knowing exactly what they are supposed to do, their attitude in terms of commitment and attachment to their work, and their ability to take proactive measures in the face of difficulties. Measures should be taken to build the knowledge of disease reporting personnel on disease reporting procedures. Training content and methodology should be reviewed to emphasize acquiring practical competence through on the job learning. Disease reporting personnel should be encouraged to be more dedicated to their work through the provision of necessary incentives and enabling work environment. Adequate supportive supervision mechanism should be put in place to check staff performance, take corrective actions and provide on the job capacity building for disease reporting officers.

Key words: factors, animal disease reporting, north eastern Nigeria.

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ABBREVIATIONS

AU – IBAR	-	African Union – Inter African Bureau for Animal Resources
ASF	-	African Swine Fever
AVO	-	Area Veterinary officer
CI	-	Confidence Interval
DVM	-	Doctor of Veterinary Medicine
EU	-	European Union
FAO	-	Food and Agriculture Organization
GSEEDS	-	Gombe State Economic Empowerment and Development Strategy
HND	-	Higher National Diploma
HPAI	-	Highly Pathogenic Avian Influenza
KII	-	Key Informant Interview
LGA	-	Local Government Area
NADIS	-	National Animal Disease Information and Surveillance
NCD	-	Newcastle Disease
ND	-	National Diploma
OIE	-	Office International des Epizooties
OR	-	Odds Ratio
PACE	-	Pan african Programme for the Control of Epizootics
PVS	-	Performance of Veterinary Services
SPS	-	Sanitary and Phytosanitary
TADs	-	Transboundary Animal Diseases

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Animal diseases continue to pose serious threats to both human and animal health, not only as a result of their impact on livestock production systems and livelihoods, but also due to their zoonotic potential. In recent years, the occurrence of emerging and re-emerging infectious animal diseases of zoonotic importance such as the highly pathogenic avian influenza (HPAI) – H5N1 and pandemic influenza H1N1 2009 necessitated the efforts of governments, international organizations and communities towards the control and eradication of animal diseases[19].

The need to fight animal diseases at global level has since been recognized as an international priority. This is evidenced by the creation of the Office International des Epizooties (OIE) through the international agreement signed on January 25th 1924[2]. In May 2003 the office became the World Organization for Animal Health but kept its historical acronym OIE. One of the principal objectives of the OIE is to inform governments on the occurrence, evolution and distribution of animal diseases and zoonoses throughout the world and on the methods of control and prevention that are implemented[2].

Each member country undertakes to report the animal diseases that it detects on its territory. Presently the OIE system of notification and epidemiological information includes a list of 118 diseases notifiable to the OIE, known as 'the OIE list.' (OIE) This list includes 39 zoonotic diseases[2]. The African Union – Interafrican Bureau for Animal Resources (AU - IBAR) is responsible for the collection and dissemination of information on animal resources (population figures, trade figures) and animal disease control in Africa. Member states are required to report their disease situation to IBAR monthly and annually[21].

Nigeria is a member of both OIE and IBAR. To fulfill its domestic and international obligations on control of animal diseases and zoonoses, The National Animal Disease Information and Surveillance (NADIS) was established at the expiration of the EU funded PACE project as the epidemiology unit of the Federal Department of Livestock (FDL), and Nigeria began the implementation of the present system of disease reporting and surveillance in 2004.

Under this system all states in the country are required to submit monthly information on all OIE listed diseases, particularly Transboundary Animal Diseases (TADs) from veterinary clinics, abattoirs, livestock markets and control posts to NADIS, using specific tools and following appropriate procedure. Monthly disease reports from Area Veterinary Officers and Surveillance Agents are collated by state Directors of Veterinary Services and Federal Epidemiology Officers and sent to NADIS.

TADs can spread easily across borders and reach epidemic proportions, with significant economic, trade and food security consequences for many countries. Transboundary animal disease control/management, including exclusion, requires cooperation among several countries, therefore disease reporting and surveillance remains one of the key strategies for the control of animal diseases and zoonoses.

The number of reported outbreaks of animal diseases including zoonoses in Nigeria has increased over the years from 38 in 2004 to 307 in 2009[22]. Even though disease reporting has received considerable attention and has shown remarkable improvement under NADIS, the performance of states in monthly disease reporting has been unsatisfactory and under reporting still remains the consistently observed challenge.

Prior to the establishment of NADIS, the development and operational efficiency of animal disease reporting in Nigeria was reviewed[16]. The completeness and immediacy of data supply by the system for the period between January 1977 and December 1984 on two serious diseases of livestock (rinderpest and Newcastle disease) were critically examined[16]. The system was found to be characterized by late, inaccurate and gross under-reporting[16]. Less than 65% and less than 25% of the total outbreaks of rinderpest and Newcastle diseases respectively, were reported to national veterinary authorities. As much as 80.8% of all cases of rinderpest and 51.6% of Newcastle disease outbreaks were reported late[16].

An analysis of monthly disease reporting data at NADIS for 2004 to 2009 revealed under reporting by most states and a general lack of consistency in all the states of Nigeria[18]. The assessment of monthly reporting performance of states by NADIS revealed that Borno state recorded a 20% reporting performance in 2009, 22% in 2010 and 42% in 2011. In this assessment, only Gombe state had 100% reporting performance throughout the three years. Thirty of the 37 states under reported[22].

1.2 STATEMENT OF PROBLEM

The performance of states in disease reporting has been unsatisfactory, and under reporting remains a persistent problem. Under reporting occurs when a state submits less than the expected number of report forms for a particular reporting period, shows inaccurate or inconsistent reporting, all of which delays or denies availability of information on disease situation in that state.

Animal disease reporting in Nigeria is characterized by late, inaccurate and gross under reporting[16]. For the period January 1977 to December 1984, 80.8% of all cases of Rinderpest and

51.6% of Newcastle disease outbreaks were reported late[16]. Analysis of monthly disease reporting for 2004 to 2009 revealed under reporting by most states and a general inconsistency in all the states[18]. In 2009, 30 of the 37 states of the country under reported. This analysis showed that the north eastern state of Borno is one of the least reporting states, with no report in 2004, 2005, 2008 and only 3 reports in 2006, 4 in 2007, and 6 in 2009. The national average disease reporting was 22%[22].

Beyond the assessments of reporting performance of states and efforts by the epidemiology unit (NADIS) to improve reporting, there is currently a dearth of information on factors influencing reporting of animal diseases in Nigeria.

1.3 JUSTIFICATION

The north eastern geopolitical zone of Nigeria comprises six states (Borno, Yobe, Adamawa, Taraba, Bauchi and Gombe). Four of the states (Borno, Yobe, Adamawa and Taraba) share international borders with neighboring African countries. Borno state alone share three boundaries with Cameroun, Chad and Niger Republic. Massive livestock movement across these borders is a consistent occurrence. The implication of this is the consequent risk of importation of transboundary animal diseases (TADs) into Nigeria. Finding out the reasons for poor reporting in such a peculiar state will help in suggesting improvement measures thereby minimizing the risk.

The study will also identify gaps and inform prioritization of actions to improve reporting, in line with OIE requirements for a robust surveillance system and the implementation of the sanitary mandate.

Determination of the factors influencing animal disease reporting in north eastern Nigeria is crucial to the country's effort to improve reporting as a necessary strategy for disease control and prevention.

1.4 SCOPE OF THE STUDY

The study addresses factors associated with animal disease reporting in Borno and Gombe states. The study focuses on the following factors for good and poor reporting that are within the current disease reporting system:

1. Adequate supply of reporting forms
2. Knowledge of reporting forms and procedure
3. Problem solving initiative
4. Training on disease reporting
5. Number of trainings
6. Feedback
7. Place of residence/duty post
8. Job duration
9. Availability of animal health services
10. Functionality of veterinary clinics
11. Adequacy of disease reporting personnel

1.5 GENERAL OBJECTIVE

The general objective of the study is to determine the factors influencing animal disease reporting in Borno and Gombe states, north eastern Nigeria.

1.5.1 Specific Objectives

1. Assess the availability of necessary reporting tools in Borno and Gombe states.
2. Assess the knowledge and practice of personnel in the two states on the reporting tools and procedures.
3. Determine the completeness and timeliness of reporting across various levels in the states and between the states and federal level.
4. Assess the feedback between levels of reporting in the states and between the states and federal level.
5. Compare animal disease reporting by Borno and Gombe state in order to identify factors influencing disease reporting.

CHAPTER 2

LITERATURE REVIEW

2.1 PRINCIPLE OF ANIMAL DISEASE CONTROL

Disease is the inability to perform physiological functions at optimal level, provided that nutrition and other environmental needs are provided optimally[1]. Diseased animals include those that do not perform as expected in terms of production[3].

Animal diseases are dynamic, as shown by the emergence of new diseases and evolving strains of existing pathogens. There is therefore the need to put in place effective disease control strategies or modify existing ones[4].

Disease control refers to measures that are employed to reduce disease frequency in animal populations by eliminating or reducing the causes to a level of little or no consequence. Disease control describes all measures taken to combat illness in a population and eliminate causes of illness which may exist in the environment[5]. The aim of any animal disease control programme should be clearly defined, considering the nature of the disease involved. Disease prevention, control or eradication are options that can be pursued by the veterinary services of a state or country[6].

Once the goal of disease control has been decided, appropriate strategies are put in place to achieve the goal. The implementation and evaluation of disease control programmes require effective disease reporting, surveillance and monitoring as integral parts of control strategies[4].

2.2 DISEASE REPORTING

Disease reporting is the branch of epidemiology which deals with the collection, collation, storage and analysis of data on diseases. The information obtained through reporting is used to

take decisions and actions directed towards disease control. The planning and implementation of disease control and eradication programmes is dependent upon an efficient disease information system. It is for this reason that many countries including Nigeria have established animal health information systems. Animal disease reporting is coordinated internationally by bodies such as the OIE and AU-IBAR[7].

The purpose of any disease reporting is to provide qualitative or quantitative indicators or measure of the health status of animal population that will lead to monitoring and control of diseases[12].

In Nigeria detailed information on the incidence and distribution of diseases is of importance in the formulation, application and socio-economic appraisal of disease control measures[13]. It is in realization of the value of disease reporting that the Animal Disease Ordinance of 1952 and the Animal Disease Control Decree of 1988 were enacted. These legislations provide legal backing for the compulsory reporting of animal diseases according to their socio-economic and public health significance.

2.3 DISEASES SURVEILLANCE

Disease surveillance has been described as the collection and use of information necessary for the control of diseases. It implies the collection and interpretation of data with a view to detect changes in health status of the animal population. These may include existing data sources or new ones[8].

Disease surveillance has also been defined as the process of continuous systematic collection and analysis of data on prevalence and incidence of disease and the regular diffusion of that

information to delegated authority for action. They include notifiable disease outbreaks, abattoir reports and livestock trade reports, locally and internationally[7].

Disease surveillance should be a key component of all government veterinary services[9]. This is important for early warning of diseases, planning and monitoring of disease control programmes, provision of sound advice to farmers, certification of export for livestock and its products, international animal disease reporting and proof of freedom from disease. It is particularly important for animal disease emergency preparedness[10].

Two complimentary approaches are used for a comprehensive system of disease surveillance: active surveillance and passive surveillance.

2.3.1 Active surveillance

This is the purposeful and comprehensive search for evidence of disease in animal populations or verification that such populations are free of a specific disease[11]. Active disease surveillance may be comprehensive enough to cover all or detect any significant disease threat, or designated to monitor the process of a particular disease[10].

2.3.2 Passive surveillance

Passive surveillance is the routine gathering of information on disease incidents from sources such as reports from field officers, farmers, submission of diagnostic specimens to laboratories and results of laboratory investigations. Routine disease reports may also come from other sources such as abattoirs, and livestock markets[4]. However complete reliance on passive surveillance usually leads to significant under reporting of disease. It is essential that passive surveillance be complemented by a strong system of active surveillance, particularly for emergency animal diseases[9].

2.3.3 Epidemio-surveillance

Epidemio-surveillance is a system based on continuous information recording, making it possible to monitor the health status of a given population and the risk factors to which it is exposed, so as to detect pathological processes as they appear and study their development in time and space, with the objective of taking appropriate measures to control them[17].

The main objectives of epidemiosurveillance are to facilitate trade and access to (International) market, Protection of animals against exotic or new diseases, evaluation of disease control programmes and protection of human health[17].

2.4 ANIMAL DISEASE SURVEILLANCE: THE GLOBAL SYSTEM

The Office International des Epizooties (OIE) was established in 1924, and charged with the responsibility of collecting and sharing information on the occurrence, evolution and distribution of animal diseases all over the world. The OIE also informs member countries on the trade, food security and zoonotic consequences of animal diseases, as well as necessary control measures[2].

Each Member Country undertakes to report the animal diseases that it detects on its territory. The OIE then disseminates the information to other countries, which can take the necessary preventive action. This information also includes diseases transmissible to humans and intentional introduction of pathogens. Information is sent out immediately or periodically depending on the seriousness of the disease[2].

The OIE is recognised as a reference organisation by the World Trade Organization (WTO) and in 2010, had a total of 175 Member Countries and Territories. The OIE maintains permanent relations with 36 other international and regional organizations and has Regional and sub-regional Offices on every continent[2].

2.4.1 The OIE Pathway

The OIE PVS Pathway is a global programme for the sustainable improvement of a country's Veterinary Services' compliance with OIE standards on the quality of Veterinary Services. This is an important foundation for improving animal and public health and enhancing compliance with Sanitary and Phyto Sanitary (SPS) standards, at the national, regional and international levels.

To support these goals, there is a crucial need for appropriate legislation in the animal health and welfare field and its strict implementation through appropriate human and financial resources dedicated to national animal health and welfare systems allowing, in principle, for early detection of disease incursions, transparency and notification, rapid response to animal disease outbreaks and implementation of biosecurity and bio-containment measures, compensation strategies to indemnify animal owners hit by outbreaks, and vaccination, as appropriate.

Good governance of animal health systems based on a close public/private partnership is the responsibility of all governments. If one country fails, it may endanger its neighboring countries, the region, the continent and potentially the entire planet[14].

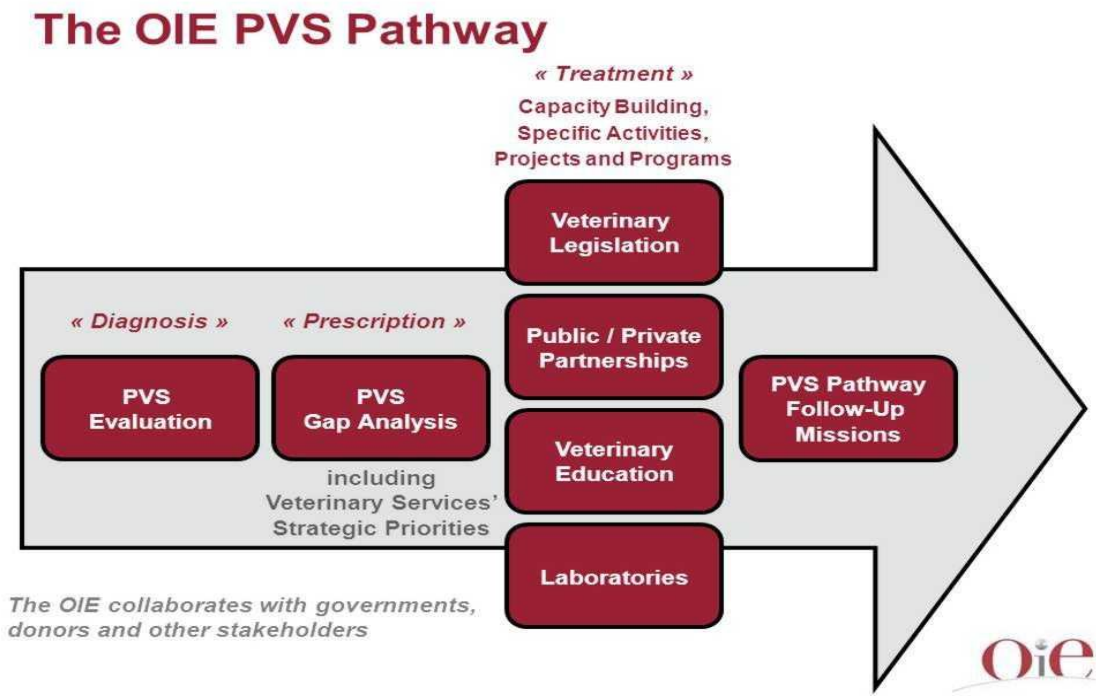


Figure 1: Chart illustrating the OIE PVS pathway, culled from the OIE website www.oie.int/pvs

2.4.2 The OIE reporting system

The OIE system of diseases reporting is categorized into three: The immediate notification, Six monthly reporting and annual reporting. These categories of reports are to cover a list of 118 diseases called the 'OIE list' [2]. See appendix 3 for the OIE listed diseases.

2.4.2.1 Immediate notification

Immediate notification is the core of the OIE Early Warning System as well as the notification requirements which came into force on 1 January 2005. This is aimed at helping OIE Member Countries fulfill their obligations relating to the immediate notification of a disease, infection or other significant epidemiological event occurring in their countries and the submission of follow-up reports. This, if well implemented, will improve the scope and efficiency of the OIE Early Warning System. Immediate notification requires that a member country notifies the OIE within 24 hours disease situations or epidemiological events of the following categories[15]:

i - The first occurrence of a listed disease or infection in the country or zone/compartment;

ii- The re-occurrence of a listed disease or infection in a country or zone/compartment following a report by the Delegate of the Member Country declaring the previous outbreak(s) closed;

iii- The first occurrence of a new strain of a pathogen of a listed disease in a country or zone/compartment;

iv- A sudden and unexpected increase in morbidity or mortality caused by an existing listed disease;

v- Emerging diseases with significant morbidity/mortality or zoonotic potential;

vi- Evidence of change in the epidemiology of a listed disease (including host range, pathogenicity, strain of causative pathogen), in particular if there is a zoonotic impact.

2.4.2.2 Weekly follow up reports

Once an immediate notification is sent, a situational update or follow up report is required weekly to provide information on the evolution of the disease, infection or exceptional epidemiological event until the situation is resolved or stabilized. See appendix… for the immediate notification form

2.4.2.3 Six monthly report

A six-monthly report on the situation (presence or absence) relating to diseases on the OIE list currently in force. In the event of outbreaks, information is to be provided on the control methods used.

2.4.2.4 Annual report

An annual report on the disease situation of the country relating to diseases on the OIE list.

2.5 AU - IBAR

The IBAR is the technical arm of the AU which provides advisory service, promote policy and advocacy, enhance capacity and develop programmes on matters relating to the development and use of animal resources in AU member states. One of the core functions of AU-IBAR is gathering and analysing data on animal resources and share/disseminate information to AU member states. AU member states report to IBAR disease occurrence in their territories on monthly basis and immediate notification for emergency diseases and baseline data on yearly basis. IBAR produces summaries and publishes yearbook for sharing/disseminating information on animal resources, particularly disease situation[21].

2.6 CHALLENGES OF DISEASE SURVEILLANCE IN DEVELOPING COUNTRIES

The international workshop organized by FAO on the Challenges of National, Regional and Global Information Systems and Surveillance for Major Animal Diseases and Zoonoses that took place in Rome in November 2010 agreed on the following:

The effective containment and control of epidemic diseases depends on early notification of disease events or outbreaks, and the capacity to forecast the spread of pathogens to new areas. Emergent zoonoses include H5N1 Highly Pathogenic Avian Influenza (HPAI) or Rift Valley Fever (RVF) and other transboundary threats such as Foot-and-Mouth Disease (FMD), Highly Virulent Porcine Reproductive and Respiratory Syndrome (PRRS) in South East

Asia and Peste des Petits Ruminants (PPR) in Eastern Africa. Early warning of animal disease outbreaks with a known zoonotic potential enables health authorities to advise at-risk populations. Public health measures – including behaviours to be avoided and controls to prevent human illness and mortality – can be implemented. For many zoonotic diseases, animals not only harbour the pathogens but act to amplify their effects, increasing the risk for humans[23].

The effects of endemic diseases and epidemics in livestock impact food security, food safety, people's livelihoods and trade, with the accompanying potential for disruption in each of these arenas alongside the animal and human suffering involved when an epidemic takes hold. Timely and good-quality information about disease events are needed in order to understand the disease situation, support decision-making, prevent potential disease incursion and respond quickly in an emergency situation[24].

A system that allows information-sharing among relevant agencies at national and regional levels is of vital importance, underpinning cooperation in the ongoing surveillance of disease pathogens and the human-animal health interface. Different agencies are involved in human health, animal health, agriculture and food safety but require shared access to the information available. Having access will enable them to ensure an integrated specific approach for understanding pathogen ecologies, and to develop control strategies for diseases such as zoonotic avian influenza – at national, regional and international levels[25].

Where information from national and reference laboratories may not be available in the public domain, there is insufficient integration of national, regional and global databases; and where availability of information may be constrained by political or trade implications, there are difficulties in sharing disease data[25].

That good animal health surveillance combines the process of detection with the transformation tools for converting rough data into information for taking action on disease control and risk management. In addition to their traditional role in promoting animal health and production, surveillance systems provide important early warning and tracking of zoonotic diseases, identify emerging diseases, and promote international trade. The implicit recognition was that animal health surveillance is a global public good that spans many sectors in our global economic system[23].

Challenges for surveillance at the human-domestic animal-wildlife interface were recognized, where ongoing surveillance has usually been absent. Surveillance in wildlife populations is an important way of assessing specific ecosystem health and this information can help protect the broader environment in specific or threatened ecosystems[26].

Finally, a lack of capacity at national, regional and international levels, in many regions, was recognized. Given this starting point, finding the resources for effective surveillance at all levels is a long-term and critical challenge to building better global health systems.

The OIE standards, such as the OIE Terrestrial Animal Health Code, and WHO International Health Regulations (IHR) for disease reporting should respond to the mandates of each organization. Continuing efforts should be made to assist FAO/OIE/WHO members to expand and improve their surveillance systems to include protecting livelihoods, improving and safeguarding food production, discovering disease, and detecting and responding early to novel pathogens[23].

The following were agreed upon to be the thirteen top limiting factors in conducting effective regional and international surveillance for animal (domestic and wildlife) and zoonotic diseases:

1. Lack of understanding of national and sub national decision-makers and stakeholders of the importance of surveillance.
2. Authorities too focused on individual mandates, instead of thinking collaterally to communicate, cooperate and collaborate.
3. Lack of leadership by international and regional bodies on surveillance.
4. Reluctance of many national governments to share data (aside from obligatory reporting).
5. Failure of sustainability of surveillance in developing countries due to dependence on project funding.
6. Lack of defined vocabulary for surveillance to facilitate data exchange.
7. Difficulties in linking and integrating data from public and animal health agencies.
8. Lack of coordination between neighbouring countries on surveillance activities.
9. Insufficient funding for surveillance.

10. Lack of data standards for reporting.
11. Insufficient training in surveillance methodologies.
12. Lack of effective laboratory capability in many countries.
13. Lack of epidemiological capacity (including human resources, tools, etc.) at the national and sub national levels.

2.7 HISTORICAL OVERVIEW OF DISEASE REPORTING IN NIGERIA

Animal disease reporting has been an age long practice which existed long before the modern veterinary services. There was little or no documentation of reports, and stories of epizootics were committed to human memory, and passed to future generations orally[16].

When the Veterinary Department was established in 1914, it assumed the role of coordinating livestock data. The Animal Disease Ordinance of 1917 allocated the reporting of 17 diseases to the then 24 provincial veterinary offices, and collation of information was carried out through four regional offices[6, 27].

Following the dissolution of the regional and provincial administrations and the establishment of 12, and then 19, states in 1967 and 1975, respectively, central collation was no longer possible and therefore stopped. The usual presentation of disease data for internal use or the benefit of international organizations was also no longer possible. Reorganization was carried out and the National Disease Reporting System was established, which became operational in 1977[6].

The EU Funded PACE programme which was a major development programme in the field of animal health was designed and implemented in Nigeria and 29 other African countries from 1999 to 2004. The idea behind the PACE Programme, which was coordinated by AU-IBAR, was to build on the headway made in the campaign against Rinderpest conducted by the Pan African

Rinderpest Campaign (PARC) from 1986 to 1999, to establish lower-cost national and continental epidemiological surveillance networks for the main animal diseases, provide the countries with the capacities needed to organize economically and technically justified control programmes and develop effective and sustainable distribution of veterinary products and services[28].

Under the PACE programme, the epidemio-surveillance system or network was established and disease reporting improved tremendously.

At the end of the PACE programme period in 2004, the National animal Disease information and Surveillance (NADIS) was established as a sustainability mechanism for the gains made by PACE. NADIS thus became the epidemiology unit of the Federal Department of Livestock, responsible for the coordination of disease surveillance.

2.8 THE NIGERIAN SURVEILLANCE NETWORK: NATIONAL ANIMAL DISEASE INFORMATION AND SURVEILLANCE (NAIDS)

In order to ensure an effective veterinary service in the country as indicated by the requirement of adequate disease reporting an epidemio-surveillance system called the National Animal Disease Information and Surveillance (NADIS) was put in place. This system is responsible for the collation, storage, analysis and transfer of all zoo sanitary and livestock data from all sources and areas of the country, while forwarding it to international organizations such as OIE, AU-BAR. To make the collation of these data easier at the National Coordination office at Abuja, seven zonal offices have been created at Calabar, Enugu, Ibadan, Jos, Kaduna, Sokoto and Maiduguri.

NADIS maintains and coordinates a network of 564 area veterinary officers and 295 surveillance agents throughout the country.

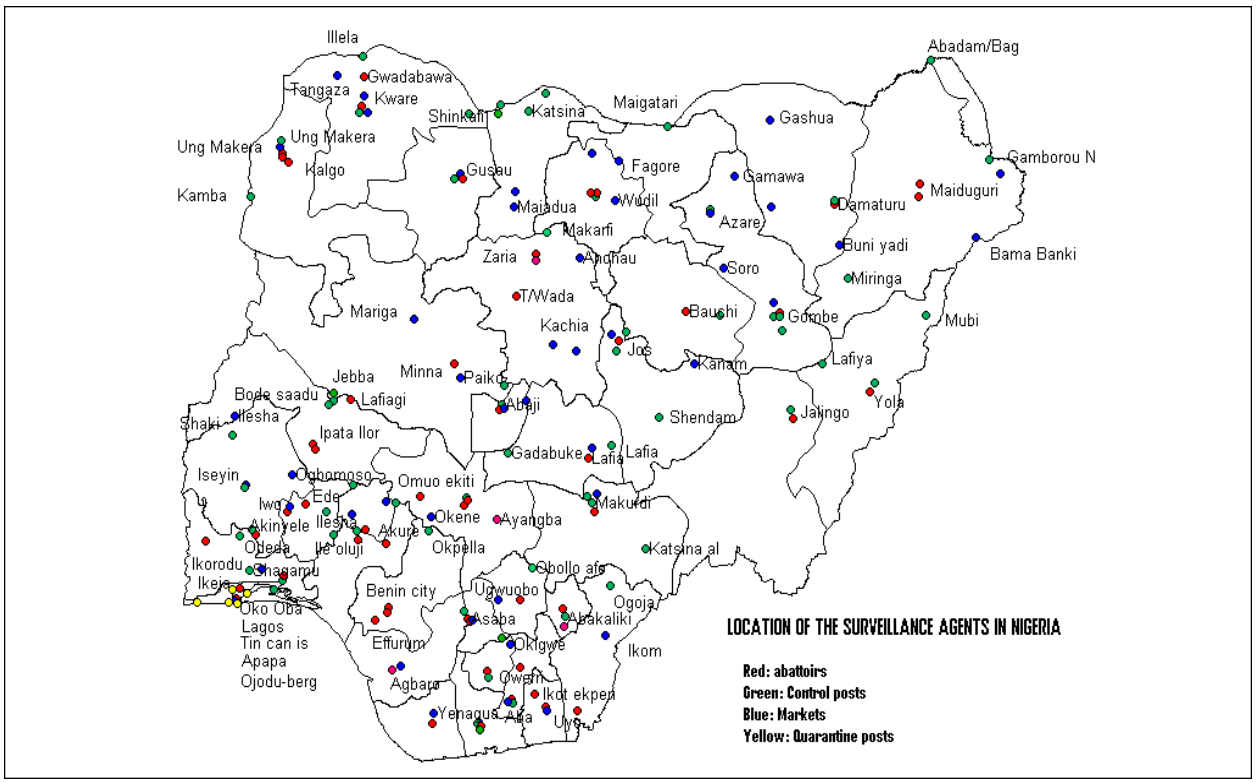


Figure 2: Map of Nigeria showing the distribution of surveillance sites

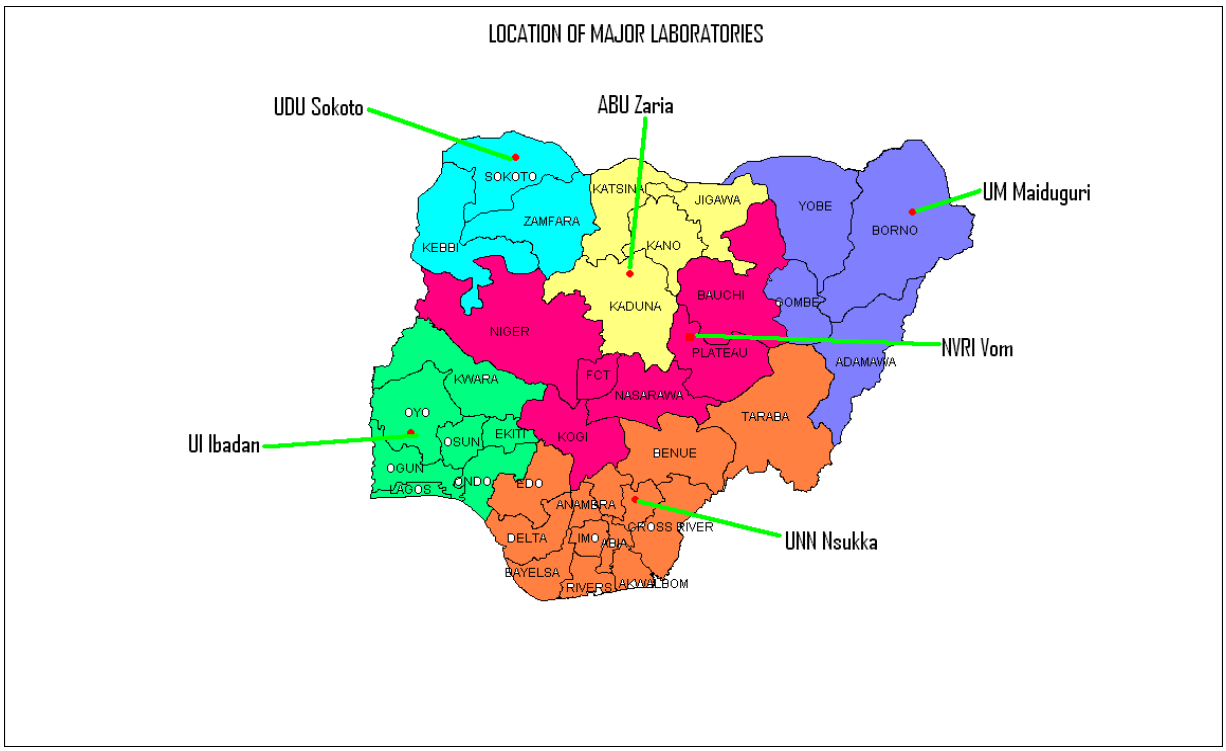


Figure 3: Map of Nigeria showing the distribution of surveillance laboratories

2.8.1 Operational and organizational structure of NADIS

There are four levels of operation in the network: Central, Zonal, State and Local levels. Located in Abuja is the Central Coordination office made up of a National Coordinator, four officers in charge of Epidemiology, Communication, Data and IT systems and Veterinary legislation and privatization. At the zonal level there is a zonal coordinating officer and two other officers responsible for Epidemiology and privatization. Each of the zonal office is responsible for a number of states. In each state of the federation there is a state NADIS coordinator while at the local level are the Area veterinary officers. In addition, one hundred and seventy surveillance agents located at various Abattoirs, Cattle markets and control posts across the country have been trained on disease surveillance and reporting techniques. These agents submit monthly Zoo sanitary information to the zonal coordinator who collates, validate, analyze and transmit to the National Coordination.

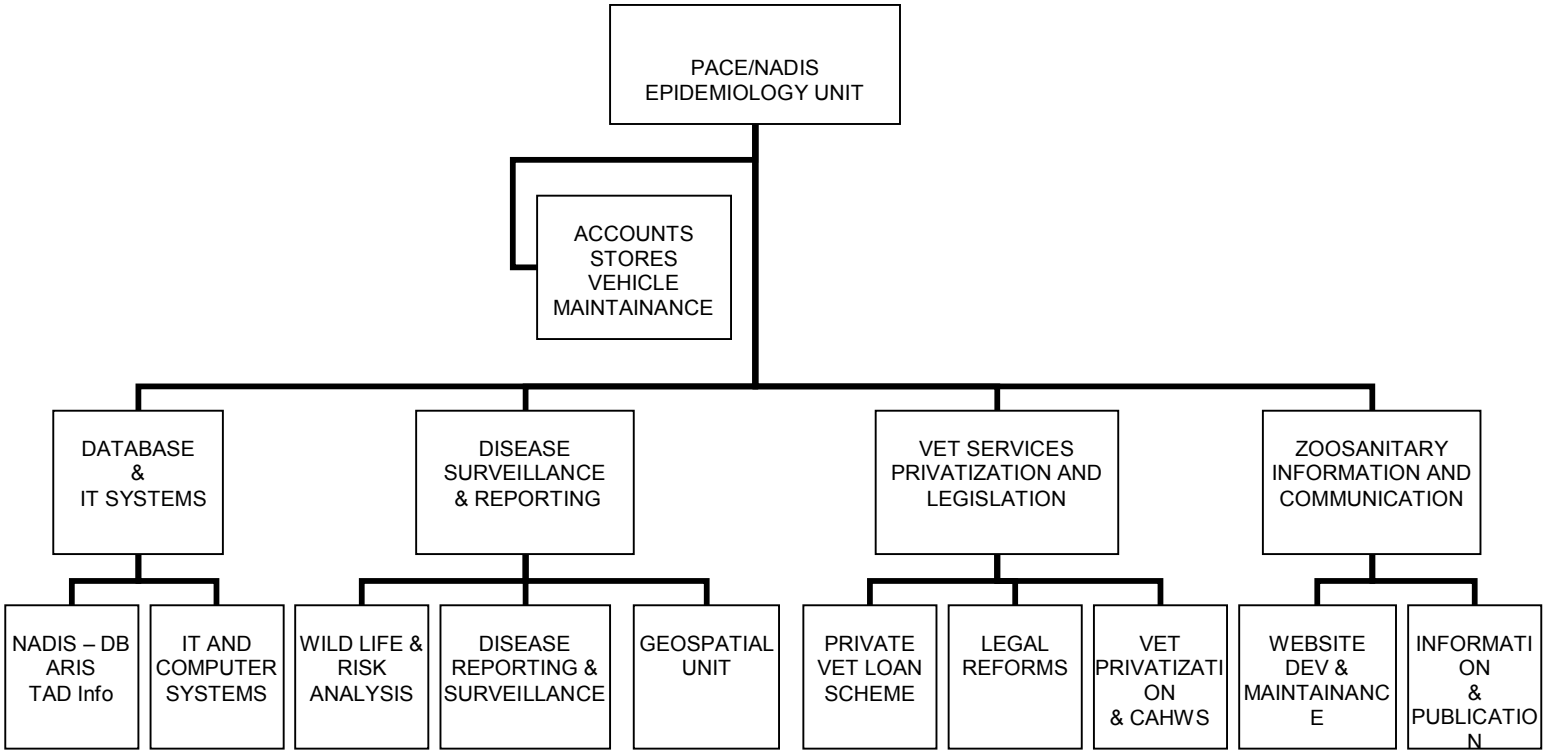


Figure 4: Structure of NADIS

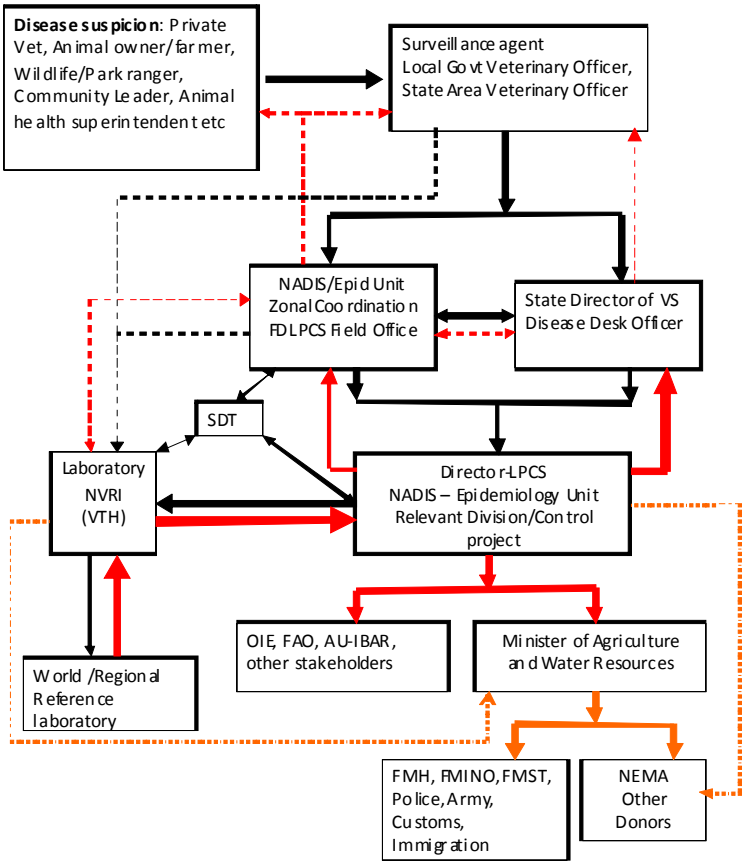


Figure 5: Nigeria disease reporting channel

2.8.2 Principal objectives of NADIS

The principal objectives of NADIS include:

1. Early detection of Transboundry animal diseases (TADS) such as Rinderpest, Contagious Bovine Pleuro Pneumonia (CBPP), Pest de petits ruminantes (PPR), New Castle Disease (NCD), African Swine fever (ASF) and Foot and Mouth Disease (FMD). These diseases were selected based on their economic importance in Nigeria.
2. To enable early detection and early reaction to these diseases.
3. Collect information about disease prevalence throughout the country and provision of strategic decision-making support.
4. Identification of resource needs (surveillance materials) in the field.
5. Measurement of surveillance system performance.
6. Transmission of data from the ground to the higher level of decision making and the distribution of feedback to all the stakeholders.

2.8.3 Major responsibilities of NADIS

The responsibilities of NADIS include the following:

1. Disease surveillance and reporting network.
2. Laboratory networking.
3. Collation, Analysis and Reporting of national Animal Health situation.
4. International Reporting of Disease situation and Liaison with OIE and other international organizations.
5. Risk Analysis and Projections.
6. Development of Emergency /Contingency Plans and Control Strategies against major TADs.

7. Processing of disease/infection freedom certification.
8. Capacity building – Trainings, Provision of equipment and other materials.
9. Communications/zoo sanitary information

2.84 Major stakeholders

1. Headquarters, and Field offices (37)
2. National Veterinary Research Institute (NVRI)
3. Veterinary Council of Nigeria
4. State veterinary services – 564 Area Veterinary Officers and 295 Surveillance agents.
5. Local Government Agriculture Departments/Veterinary Supervisors
6. Private Veterinarians, Private Laboratoriess
7. Universities – Veterinary Teaching Hospitals
8. Farmer and marketers associations; concerned individuals

CHAPTER 3

MATERIALS AND METHODS

3.1 STUDY AREA

The study was carried out in Borno and Gombe states. The two states are located in the northeastern part of the country and are contiguous to each other. Borno state lies within latitude 10 – 14^{o} North, and longitude 11.30 – 14.35^{o} East with an estimated population of 4.7 million people. It shares borders with Yobe, Adamawa and Gombe states and international boundaries with Niger, Chad and Cameroon. The state has 27 LGAs, and is located in the sahelian vegetation zone which is a transitional eco-region of semi arid grasslands and shrubs lying between Sudan savannah to the south and the Sahara desert to the north.

Gombe state is located between latitudes 9^{o} 30' and 12^{o}30' North and longitudes 8^{o}45' and 11^{o}45 East. It lies in the centre of the north east and shares a common boundary with all the other states (Adamawa, Bauchi, Borno, Taraba and Yobe) in the zone. The state's total land area is 20,265 square kilometers with a population of 2.03 million people. The vegetation of the state is generally guinea savannah with concentration of woodland in the south east and south west. Gombe is generally warm with average maximum temperature of 30^{o}C. The wet season is April to October and the dry season is November to March. Average rainfall is 850mm[20].

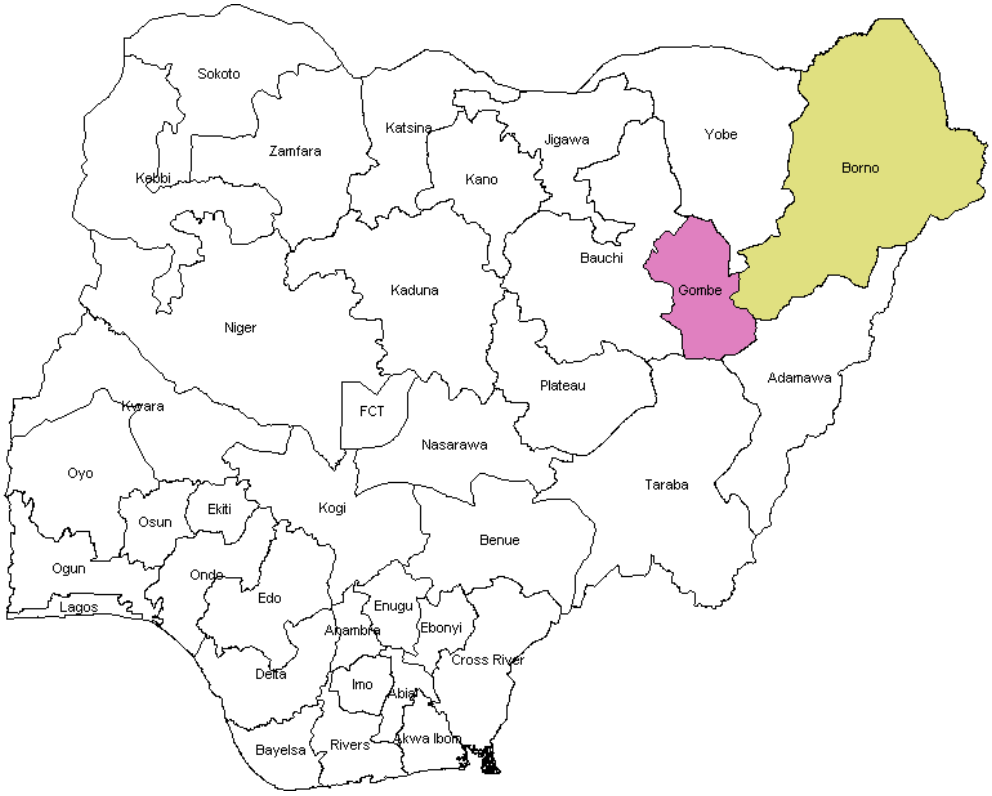


Figure 6: Map of Nigeria showing the study sites (Borno & Gombe states)

3.2 STUDY DESIGN

The study is cross-sectional study

3.3 STUDY POPULATION

Officers responsible for animal disease reporting in the two states, which included Federal Epidemiology Officers, State Directors of Veterinary Services, State Disease Reporting Officers, Area Veterinary Officers and Surveillance agents were the study participants.

The two states (Borno and Gombe) were selected based on their low and high reporting in 2009, 2010 and 2011 to represent poor reporting and good reporting respectively. All officers responsible for disease reporting in the two states were included in the study. Disease reporting officers were recruited into the study through their respective authorities.

3.4 DATA COLLECTION

A structured questionnaire was used to collect data on availability of disease reporting forms, knowledge of reporting forms and reporting procedure and feedback mechanism.

Information on timeliness and completeness of reporting was also collected using the questionnaire and was compared with the national disease reporting guide.

The national disease reporting guide requires every local government area veterinary officer to submit two disease report forms (monthly disease report form for AVOs and monthly abbatoir report form) every month. Each state of the federation will submit these two forms on monthly basis for all the LGAs in the state to NADIS. Reports from the

LGAs should reach the state Director of Veterinary Services not later than 5th of the following month. The state should in turn submit to the national level before 15th of the month.

The performance of states in disease reporting is measured using performance indicators such as number of monthly disease report forms received versus number expected, number of abattoir report forms received versus number expected, timeliness of reporting, accuracy and completeness of reporting. Based on these indicators, Borno state has performed poorly for the last consecutive 3 years, while Gombe state, being one of the contiguous states to Borno has shown good reporting performance during the same period.

3.5 DATA ANALYSIS

Data was analyzed using Epi info version 3.5.3. Data entry and cleaning was done prior to analysis. Data was summarized and presented in tables and charts. Univariate and bivariate analyses were performed.

Knowledge was categorized into two knowledge levels: satisfactory and unsatisfactory. Five questions were asked about knowledge of disease reporting forms and procedure and respondents who answered three or more (3, 4 and 5) questions correctly were classified as having satisfactory knowledge, while respondents who answer less than three (0, 1 and 2) questions correctly were considered to have unsatisfactory knowledge. Frequencies of personnel with different levels of knowledge in the two states were computed. Frequencies and proportions of adequacy/inadequacy of reporting tools, completeness, timeliness and feedback were also computed.

Actions taken by respondents when they have shortage of reporting forms were categorized into good initiative and poor initiative. Actions that led to timely submission of reports despite shortage of report forms were considered as good initiatives, while actions that did not lead to submission of reports as required were considered to be poor initiatives.

Forty (40) Area Veterinary Officers and Surveillance Agents were interviewed.

CHAPTER 4

RESULTS

4.1 DEMOGRAPHIC INFORMATION

Fourty disease reporting officers in Borno and Gombe states participated in the study. They represent 25 (62.5%) Area Veterinary Officers, and 15 (37.5%) Surveillance Agents. (See table 4.1) All the respondents were males with 53.9% aged between 45 and 54, as shown in table 4.2.

The educational qualifications of the study participants were DVM (50%), HND (40%) and ND (10%). Educational qualification of respondents by state were DVM (65.2%), HND (21.7%) and ND (13%) in Borno state, and DVM (29.4%), HND (64.7%) and ND (5.9%) (See figure 4.2). Nineteen (47.5%) of the respondents do not reside where their duty stations were located. (See table 4.3)

Table 4.1 Categories of disease reporting personnel in Borno and Gombe States, 2012.

Category of personnel	Borno	Gombe	Total
Area Veterinary Officers	14	11	25 (62.5%)
Surveillance Agents	9	6	15 (37.5%)
Total	23	17	40 (100%)

Table 4.2: Age distribution of diseases reporting officers in Borno and Gombe states, 2012

Age group (Yrs)	Frequency (n = 39)	%
35 – 44	11	28.2
45 – 54	21	53.9
55 and above	7	17.9
Total	39	100

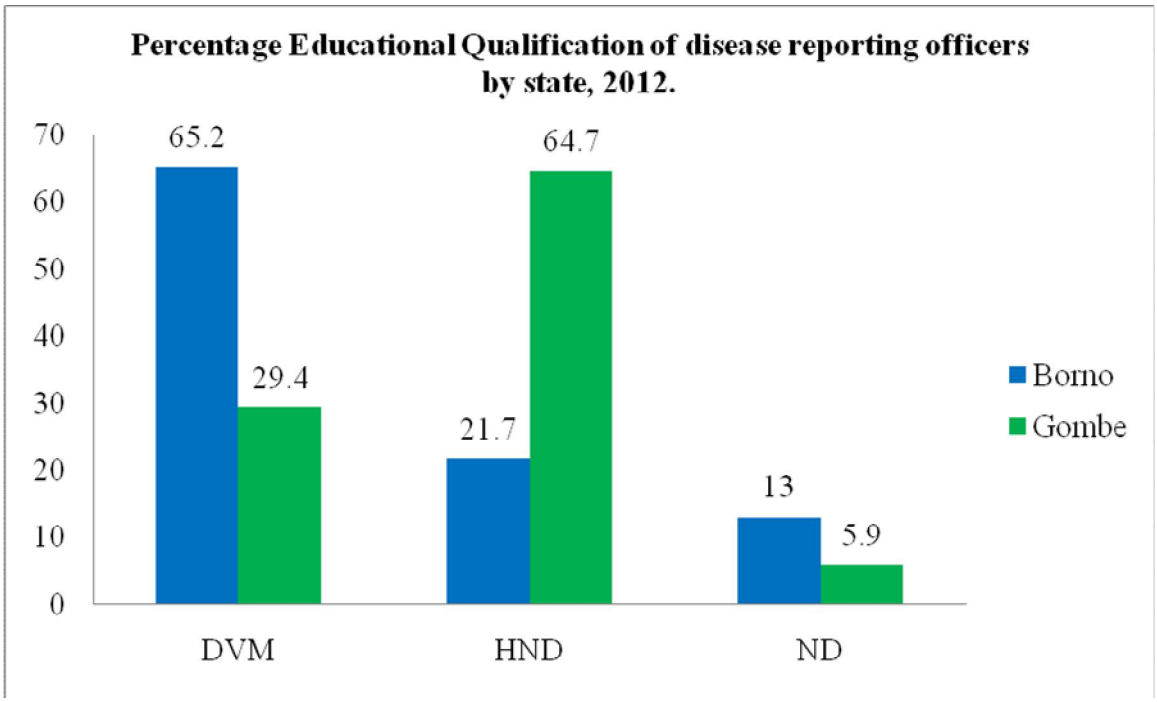


Figure 7: Percentage Educational Qualification of disease reporting officers by state, 2012

Table 4.3: Place of residence versus duty post of disease reporting officers in Borno and Gombe states, 2012.

Place of residence same as duty post	Borno	Gombe	Total No. (%)
Yes	12	9	21 (52.5)
No	11	8	19 (47.5)
Total	23	17	40 (100%)

4.2 AVAILABILITY OF DISEASE REPORTING FORMS

Only 9 (39.1%) disease reporting officers in Borno state, and 2 (11.8%) disease reporting officers in Gombe state had adequate supply of disease reporting forms (table 4.4).

Seven (31.8%) and 13 (76.4%) reporting personnel in Borno and Gombe states respectively were supplied reporting forms annually (table 4.5).

Shortage of report forms were reported to higher levels by 52.6% and 6.6% of officers in Borno and Gombe states respectively, while 93.3% of officers in Gombe state made use of photocopy to solve problem of shortage, and none in Borno state use photocopy (table 4.6).

About 93.3% of respondents in Gombe state takes good initiative (photocopy), no respondent in Borno state takes this type of initiative.

Table 4.4: Adequacy of supply of disease reporting forms by state, 2012

Adequate supply of disease reporting forms	Borno No (%)	Gombe No (%)
No	14 (60.9)	15 (88.2)
Yes	9 (39.1)	2 (11.8)
Total	23 (100)	17 (100)

Table 4.5: Supply of disease reporting forms by state, 2012

Supply of diseases reporting forms	Borno No (%)	Gombe No (%)
Monthly	4 (18.1)	0 (0)
Quarterly	6 (27.2)	1 (5.8)
Every 6 months	5 (22.7)	3 (17.6)
Annually	7 (31.8)	13 (76.4)
Total	22 (100)	17 (100)

Table 4.6: Problem solving by disease reporting officers, Borno state, 2012

What do you do when you have shortage of reporting forms?	Borno No. (%)	Gombe No. (%)
Write draft and transfer into the form later	1 (5.2)	-
Report to the zonal officer/director	10 (52.6)	1 (6.6)
Use plain paper to report	2 (10.5)	-
Do nothing/sit and wait	4 (21)	-
Include in my monthly narrative report	1 (5.2)	-
Write in my daily record book	1 (5.2)	-
Photocopy	-	14 (93.3)
Total	19 (100)	15 (100)

Table 4.7 Problem solving initiative of disease reporting officers by state, 2012

Problem solving initiative	Borno No (%)	Gombe No (%)
Poor initiative	19 (100)	1 (6.7)
Good initiative	0 (0)	14 (93.3)
Total	19 (100)	15 (100)

4.3: KNOWLEDGE OF REPORT FORMS AND REPORTING PROCEDURE

Twenty (90.9%) and 16 (94.1%) respondents in Borno and Gombe states, respectively, found the disease reporting forms easy to fill. About 56.5% of reporting officers in Borno state have unsatisfactory knowledge of the reporting forms and procedure, while only about 6% in Gombe state have unsatisfactory knowledge. 6 (27.3%) of officers in Borno state do not observe any deadline, compared to only 1 (5.9%) in Gombe state. Only 1 (5.9%) officer in Borno state knows the correct deadline for submitting monthly report to the next level compared to 14 (87.5%) in Gombe state (Table 4.8).

Table 4.8: Knowledge of deadlines for disease reporting by state, 2012

Deadline	Borno No (%)	Gombe No (%)
End of every month	12 (70.6)	2 (12.5)
First week of every month	3 (17.6)	0 (0)
Not later than 25th of the preceding month	1 (5.9)	0 (0)
Not later than 5th of the preceding month	1 (5.9)	14 (87.5)
Total	17 (100)	16 (100)

4.4 LOGISTICS AND FEEDBACK

Twenty one (91.3%) and 16 (94.1%) in Borno and Gombe states, respectively, submitted report forms to the next level in person (Table 4.9). Only 3 (17.6%) officers in Gombe state received feedback after submitting reports compared to none in Borno state (4.10). 20 (90.9%) reporting officers in Borno state did not submit report forms at one time or another compared to only 3 (17.6%) in Gombe state (4.11). The most mentioned (13 times) reason for non submission of reports was shortage of reporting forms, followed by logistic reasons and no diseases to report (4.12).

Table 4.9: Submission of disease reporting forms to the next level by state, 2012

How do you submit report forms	Borno No (%)	Gombe No (%)
Submit in person	21 (91.3)	16 (94.1)
Submit via a third party	2 (8.7)	1 (5.9)
Someone comes to collect	0 (0)	0 (0)
Total	23 (100)	17 (100)

Table 4.10: Feedback for submitting report to the next level

Do you usually receive feedback	Borno No (%)	Gombe No (%)
No	21 (100)	14 (82.4)
Yes	0 (0)	3 (17.6)
Total	21 (100)	17 (100)

Table 4.11: Non submission of report forms by state

Are there times that you do not submit report forms as required	Borno No (%)	Gombe No (%)
No	2 (9.1)	14 (82.4)
Yes	20 (90.9)	3 (17.6)
Total	22 (100)	17 (100)

Table 4.12: Reasons for non submission of report forms

Reasons for non submission of reports	Number of times mentioned
No diseases to report	4
Lack of feedback	2
Lack of incentives	3
Logistic reasons (transport)	9
Shortage of reporting forms	13

4.5 JOB DURATION AND TRAINING

Eight (47.1%) officers in Gombe state have been on the job for 1 – 5 years, while 13 (56.5) officers have been on the job for over 10 years in Borno state (Table 4.13). 6 (26.1%) and 4 (23.5%) officers in Borno and Gombe states, respectively, have never been trained on disease reporting (table 4.14). 22 (73.3%) officers participated in a disease reporting training 1 – 3 years back, 7 (23.3%) over 3 years ago and 1 (3.3%) less than a year ago (table 4.15).

Table 4.13: Job duration of disease reporting officers by state, 2012

Job duration	Borno No (%)	Gombe No (%)
< 1 year	1 (4.3)	2 (11.8)
1 - 5 years	5 (21.7)	8 (47.1)
6 - 10 years	4 (17.4)	3 (17.6)
> 10 years	13 (56.5)	4 (23.5)
Total	23 (100)	17 (100)

Table 4.14: Training of personnel on disease reporting, Borno and Gombe states, 2012.

Have you ever been trained on disease reporting	Borno No (%)	Gombe No (%)
No	6 (26.1)	4 (23.5)
Yes	17 (73.9)	13 (76.5)
Total	23 (100)	17 (100)

Table 4.15: Last participation in disease reporting training

When last did you participate in a disease reporting training	Frequency	%
< 1 year	1	3.3
1 - 3 years	22	73.3
> 3 years	7	23.3
Total	30	100

4.6 AVAILABILITY OF ANIMAL HEALTH SERVICES AND DIAGNOSTIC EFFICIENCY

Ten (71.4%) and 10 (90.9%) LGAs in Borno and Gombe states, respectively, have veterinary clinics (Table 4.16). Seven (70%) and 8 (72.7%) veterinary clinics in Borno and Gombe states, respectively, are not equipped and functional (table 4.17). About 91.6% of monthly reported diseases are diagnosed from their clinical presentation. Laboratory diagnosis is completely lacking (table 4.18).

Table 4.16: Availability of veterinary clinics in Borno and Gombe states, 2012

Is there a veterinary clinic in your LGA?	Borno No (%)	Gombe No (%)
No	4 (28.6)	1(9.1)
Yes	10 (71.4)	10 (90.9)
Total	14 (100)	11 (100)

*Only AVOs (clinicians) were asked this question

Table 4.17: Functionality of veterinary clinics in Borno and Gombe states, 2012

Is the clinic equipped and functional?	Borno No (%)	Gombe No (%)
No	7 (70)	8 (72.7)
Yes	3 (30)	3 (27.3)
Total	10 (100)	11 (100)

* Only respondents (AVOs) who have clinics in their LGAs responded to this question

Table 4.18: Nature of diagnosis of monthly reported diseases, Borno and Gombe states, 2012

Diagnosis	Frequency	%
Suspicion	2	8.3
Clinical presentation	22	91.6
Total	24	100

* Only AVOs were asked this question

4.7 REPORTING PERSONNEL AND REPORTING BY PRIVATE VETERINARIANS

Fourteen (58.3%) LGAs have only one staff member working on disease reporting (table 4.19). Twenty two (91.7) respondents said the number of personnel is inadequate for efficient disease reporting in their LGAs (table 4.20). 10 out of 24 (41.7%) of the respondents indicated that there were private veterinarians practicing in their LGAs. In 7 (70%) LGAs with private veterinarians, they have not been integrated into disease reporting (table 4.21).

Table 4.19: Number of disease reporting personnel per LGA

Number of officers per LGA	Frequency	%
One	14	58.3
Two	5	20.8
Three	5	20.8
Total	24	100

* The respondents are AVOs

Table 4.20: Adequacy of disease reporting personnel

Is the number of personnel per LGA adequate for efficient disease reporting?	Frequency	%
No	22	91.7
Yes	2	8.3
Total	24	100

* Only AVOs were asked

Table 4.21: Integration of private veterinarians in disease reporting

Have private veterinarians been integrated into your disease reporting?	Frequency	%
No	7	70
Yes	3	30
Total	10	100

* Only AVOs that have private veterinarians practicing in their LGAs responded to this question

4.8: DETERMINATION OF FACTORS ASSOCIATED WITH REPORTING PERFORMANCE

Bivariate analysis was performed to test the association between reporting performance and the following factors:

Adequate supply of reporting forms

Knowledge of reporting forms and procedure

Problem solving initiative

Training on disease reporting

Number of trainings

Feedback

Place of residence/duty post

Job duration

Availability of animal health services

Functionality of veterinary clinics

Adequacy of disease reporting personnel

Out of the eleven factors tested with bivariate analysis, only two were found to have a statistically significant association with diseases reporting performance; knowledge of reporting forms and procedure, OR = 20.08, CI = 2.15 – 494.94 and problem solving initiative, OR = 252, CI = 35912.05 (See table 4.22)

Table 4.22: Factors associated with reporting performance

Factor	Odds ratio (OR)	95% Confidence Interval (CI)
Adequate supply of reporting forms	0.21	0.03 -1.34
Knowledge of reporting forms and procedure	**20.80**	**2.15 - 494.94**
Problem solving initiative	**252.00**	**11.6 - 35912.05**
Training on disease reporting	1.15	0.22 - 6.23
Number of trainings	4.38	0.60 - 39.23
Feedback	4.29	0.33 - 119.37
Place of residence/duty post	1.03	0.24 - 4.36
Job duration	0.24	0.05 - 1.14
Availability of animal health services	4.00	0.30 - 112.60
Functionality of veterinary clinics	0.88	0.09 - 8.37
Adequacy of disease reporting personnel	1.20	0.0 - 51.72

CHAPTER 5

DISCUSSION

Effective disease reporting has been described as a factor that determines the success of any disease control programme[16, 29].

This study documented the non availability of disease reporting forms in the two study sites. This finding is inconsistent with the standard for disease reporting in Nigeria[15]. The finding is also in disagreement with the OIE requirement for member countries to use standard forms for animal disease reporting[31]. The shortage of reporting forms found in this study is consistent with the finding of Kamoru in a similar study in Ogun state, Nigeria[30].

Our study found that more than half of the disease reporting officers in Borno state have unsatisfactory knowledge of the disease reporting forms and procedure. This finding is consistent with the finding of Kamoru[30], but disagrees with the OIE guidelines that require reporting officers to have excellent knowledge of disease occurrence and reporting for effective animal disease control[31].

In Borno state the study found disease reporting to be incomplete and untimely. This is in agreement with similar finding by Ogundipe *et al*[16]. However, it is inconsistent with provisions of the disease reporting guide in Nigeria[15].

The poor feedback between levels of reporting documented in this study agrees with the finding of Ogundipe *et al*[16]. However, it negates the prescribed reporting channel which provides for feedback[17].

In the two study sites our study documented poor logistic arrangement for disease reporting, poorly equipped veterinary clinics, complete absence of laboratory diagnosis, non integration of private veterinarians in disease reporting and inadequate manpower.

Kamoru (2009) has earlier described the high level of inadequate manpower, inadequate facilities, lack of well equipped laboratories, poor transportation system, lack of awareness by farmers on disease reporting, non payment of compensation to farmers on losses due to outbreaks of NCD and ASF, non enforcement of disease reporting on private veterinarians, and lack of assistance to private veterinarians to account for the gross notification inefficiency observed in Ogun state, south western Nigeria[30].

Results of the bivariate analysis performed in this study for eleven factors associated with disease reporting performance showed that only two factors; knowledge of report forms and reporting procedure, and problem solving initiative were statistically significantly associated with reporting performance.

This study also found that training, frequency of the trainings and availability of animal health services, even though very important components of disease surveillance, did not however have statistically significant association with reporting performance. This finding has confirmed that efficient disease reporting has more to do with personnel knowing exactly what they are supposed to do, their attitude in terms of commitment and attachment to their work, and their ability to take proactive measures in the face of difficulties.

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

6.1 CONCLUSION

Animal disease reporting in Nigeria has been described to be inefficient, characterized by late, inaccurate and gross under-reporting since 1985[16, 29]. Recently, most states of the country were also described as having under reported, and showing a general inconsistency in disease reporting[18]. However, not much has been done to document the reasons for the observed inefficiency in Nigeria's disease reporting system.

In conclusion, this study has established two factors to have statistically significant association with the performance of disease reporting in Borno and Gombe states of Nigeria; Knowledge of disease reporting procedure and ability of reporting personnel to use their initiatives in managing difficulties.

6.2 RECOMMENDATIONS

(i) Measures should be taken to build the knowledge of disease reporting personnel on

disease reporting procedures. Training content and methodology should be reviewed to

emphasise acquiring practical competence through on the job learning.

(ii) Disease reporting personnel should be encouraged to be more dedicated to their work through the provision of necessary incentives and enabling work environment.

(iii) Availability of necessary reporting tools should be ensured. Provision of these tools should be decentralized and handled by states and LGAs.

(iv) Private veterinarians should be integrated into disease reporting at all levels.

(v) The staffing with respect to disease reporting should be improved at the LGA level.

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APPENDICES

Appendix 1

Person Interviewed _____ ID Number _____ Date _____

Verbal Informed Consent for evaluation of animal disease reporting

My name is Ahmed Tsofo, a postgraduate student of ABU Zaria.

I am conducting a study on the factors influencing animal disease reporting in Borno and Gombe states, as my university postgraduate thesis.

I want to learn about disease reporting in your state, and your thoughts on how to improve it. I will do this by asking you series of questions.

Your participation is voluntary, and your responses will help us assess and proffer recommendations on improving disease reporting.

The questionnaire will take about 30 minutes to administer.

Do you have any questions?

If not, do you agree to participate in the study?

☐ Yes ☐ No

Area Veterinary Officers Questionnaire

ID Number _____ State _____ LGA _____

Interview Date _____ /_____ / 2011 Interviewer _____

Section A: Personal Information

1. Name:
2. Age (in yrs):
3. Sex: ☐ Male ☐ Female

4. Education level:

☐ Quranic
☐ Primary
☐ Secondary
☐ Tertiary

5. Place of residence:

6. Duty post:

Section B: Availability of disease reporting forms

7. Do you have adequate supply of disease reporting forms? ☐ Yes ☐ No

8. Who supplies you with reporting forms?

☐ Area veterinary office

☐ Zonal veterinary office

☐ Director of veterinary services

☐ Federal epidemiology officer

☐ NADIS zonal office

☐ NADIS headquarters

☐ Others, specify ----------

9. How regularly are you supplied with reporting forms?

☐ Monthly
☐ Quarterly (3 months)
☐

Every 6 months

☐ Annually

10. Do you experience shortage of reporting forms? ☐ Yes ☐ No (Go to question 13)

11. If yes, how often do you experience shortages?

☐ Sometimes

☐ Always

12. What do you do when you have shortage of reporting forms? ----------
---

Section C: Knowledge of report forms and reporting procedure

13. How many forms are you dealing with as Area Veterinary Officer?

☐ One

☐ Two

☐ Three

☐ Four

14. Which of the following forms do you use for disease reporting

☐ Monthly disease report form for AVOs

☐ Disease suspicion form

☐ Monthly disease report form for surveillance agents

☐ Monthly abattoir report form

15. Are the reporting forms easy to fill? ☐ Yes (go to question 17) ☐ No

16. If No, what is difficult about the forms?

☐ The forms are too complex

☐ Too many diseases to report on

☐ Forms are difficult to understand

☐ Forms are poorly printed

☐ Others (specify) ----------

17. How often do you fill out and submit your report forms

☐ Daily

☐ Weekly

☐ Monthly

☐ Annually

☐ No specific time

18. Where do you submit the report forms after filling

☐ Zonal veterinary office

☐ Director of veterinary services

☐ Federal epidemiology officer

☐ NADIS zonal officer

☐ Others (specify) ----------

Section D: Logistics and Feedback

19. How do you submit the forms

☐ Submit to the next level in person

☐ Send forms via a third party

☐ Someone comes over to collect the forms

20. Do you usually observe any deadlines for submitting reports to the next level

☐ Yes ☐ No (go to question 22)

21. If yes, what are the deadlines

……

22. Do you usually receive feedback when you submit reports to the next level

☐ Yes ☐ No

23. Are there times that you do not submit report forms as required

☐ Yes ☐ No (go to question 25)

24. If yes, what are the reasons you don't submit report forms sometimes (respondent can tick more than one option)

☐ It becomes monotonous

☐ Shortage of reporting forms

☐ No diseases to report on during the period

☐ Lack of incentives

☐ Logistic problem (transport)

☐ Lack of feed back

☐ Others (specify) ----------

Section E: Training/Capacity Development

25. How long have you been an AVO ? _____

26. Have you ever been trained on disease reporting (reporting forms and procedure)

☐ Yes ☐ No (go to question 31)

27. If yes, how many times did you participate in a disease reporting training

☐ Once ☐ Twice ☐ Thrice

☐ More than three times

28. Who provided/facilitated the trainings in 27 above (you can tick multiple options)

☐ Zonal veterinary office

☐ State Government (Directorate of veterinary services)

☐ Federal Epidemiology officer

☐ NADIS zonal office

☐ NADIS Headquarters

☐ Others (specify) ----------

29. When last did you participate in a disease reporting training

☐ Less than 1 year

☐ Over 1 year

☐ Over 3 years

30. Who provided/facilitated the training in 29 above

☐ Zonal veterinary office

☐ State Government (Directorate of veterinary services)

☐ Federal Epidemiology officer

☐ NADIS zonal office

☐ NADIS Headquarters

☐ Others (specify) ----------

Section F: Availability of animal health services, public patronage and diagnostic efficiency

31. Is there a veterinary clinic in your LGA? ☐ Yes ☐ No (go to question 33)
32. Is the clinic equipped and functional? ☐ Yes ☐ No

33. Do you usually receive disease reports from the public? ☐ Yes (go to 35) ☐ No

34. If NO, why does the public not report diseases?

☐ Lack of awareness on disease reporting

☐ Ignorance of where to report to

☐ Lack of confidence on the authorities

☐ Other reasons (Specify)
……..

35. How do you diagnose the diseases that you report?

☐ ☐ ☐

Suspicion Clinical presentation Laboratory diagnosis

Section G: Reporting personnel and reporting by private veterinarians

36. How many disease reporting personnel work in this LGA? ----------

37. Is this number adequate for efficient disease reporting from this LGA? ☐ Yes ☐ No

38. Are there private veterinarians practicing in this LGA? ☐ Yes ☐ No

39. If Yes, how many? ----------

40. Have they been integrated into your disease reporting? ☐ Yes ☐ No

41. If Yes, do they usually submit disease reports to you? ☐ Yes ☐ No

42. How often do private vets submit disease reports?

☐ Weekly

☐ Monthly

☐ Quarterly

☐ Non specific

Appendix 2

Person Interviewed _____ ID Number _____ Date _____

Verbal Informed Consent for evaluation of animal disease reporting

My name is Ahmed Tsofo, a postgraduate student of ABU Zaria.

I am conducting a study on the factors influencing animal disease reporting in Borno and Gombe states, as my university postgraduate thesis.

I want to learn about disease reporting in your state, and your thoughts on how to improve it. I will do this by asking you series of questions.

Your participation is voluntary, and your responses will help us assess and proffer recommendations on improving disease reporting.

The questionnaire will take about 30 minutes to administer.

Do you have any questions?

If not, do you agree to participate in the study?

☐ Yes ☐ No

Surveillance Agents Questionnaire

ID Number _____ State _____ LGA _____

Interview Date _____ /_____ / 2011 Interviewer _____

Section A: Personal Information

29. Name:
30. Age (in yrs):

31. Sex: ☐ Male ☐ Female

32. Education level:

☐ Quranic
☐ Primary
☐ Secondary
☐ Tertiary

33. Place of residence:

34. Duty post:

Section B: Availability of disease reporting forms

35. Do you have adequate supply of disease reporting forms? ☐ Yes ☐ No

36. Who supplies you with reporting forms?

☐ Area veterinary office

☐ Zonal veterinary office

☐ Director of veterinary services

☐ Federal epidemiology officer

☐ NADIS zonal office

☐ NADIS headquarters

☐ Others, specify ----------

37. How regularly are you supplied with reporting forms?

☐ Monthly
☐ Quarterly (3 months)
☐ Every 6 months
☐ Annually

38. Do you experience shortage of reporting forms? ☐ Yes ☐ No (Go to question 13)

39. If yes, how often do you experience shortages?

☐ Sometimes

☐ Always

40. What do you do when you have shortage of reporting forms? ----------
---

Section C: Knowledge of report forms and reporting procedure

41. How many forms are you dealing with as a surveillance agent?

☐ One

☐ Two

☐ Three

☐ Four

42. Which of the following forms do you use for disease reporting

☐ Monthly disease report form for AVOs

☐ Disease suspicion form

☐ Monthly disease report form for surveillance agents

☐ Monthly abattoir report form

43. Are the reporting forms easy to fill? ☐ Yes (go to question 17) ☐ No

44. If No, what is difficult about the forms?

☐ The forms are too complex

☐ Too many diseases to report on

☐ Forms are difficult to understand

☐ Forms are poorly printed

☐ Others (specify) ----------

45. How often do you fill out and submit your report forms

☐ Daily

☐ Weekly

☐ Monthly

☐ Annually

☐ No specific time

46. Where do you submit the report forms after filling

☐ Area veterinary office

☐ Zonal veterinary office

☐ Director of veterinary services

☐ Federal epidemiology officer

☐ NADIS zonal officer

☐ Others (specify) ----------

Section D: Logistics and Feedback

47. How do you submit the forms

☐ Submit to the next level in person

☐ Send forms via a third party

☐ Someone comes over to collect the forms

48. Do you usually observe any deadlines for submitting reports to the next level

☐ Yes ☐ No (go to question 22)

49. If yes, what are the deadlines ----------

50. Do you usually receive feedback when you submit reports to the next level

☐ Yes ☐ No

51. Are there times that you do not submit report forms as required

☐ Yes ☐ No (go to question 25)

52. If yes, what are the reasons you don't submit report forms sometimes (respondent can tick more than one option)

☐ It becomes monotonous

☐ Shortage of reporting forms

☐ No diseases to report on during the period

☐ Lack of incentives

☐ Logistic problem (transport)

☐ Lack of feed back

☐ Others (specify) ----------

Section E: Training/Capacity Development

53. How long have you been a surveillance agent _____

54. Have you ever been trained on reporting forms/reporting procedure

☐ Yes ☐ No (go to question 31)

55. If yes, how many times did you participate in a disease reporting training

☐ Once ☐ Twice ☐ Thrice

☐ More than three times

56. Who provided/facilitated the trainings in 27 above (you can tick multiple options)

- [ ] Local Government
- [ ] Zonal veterinary office
- [ ] State Government (Directorate of veterinary services)
- [ ] Federal Epidemiology officer
- [ ] NADIS zonal office
- [ ] NADIS Headquarters
- [ ] Others (specify) ----------

43. When last did you participate in a disease reporting training

- [ ] Less than 1 year
- [ ] Over 1 year
- [ ] Over 3 years

44. Who provided/facilitated the training in 29 above

- [ ] Local Government
- [ ] Zonal veterinary office
- [ ] State Government (Directorate of veterinary services)
- [ ] Federal Epidemiology officer
- [ ] NADIS zonal office
- [ ] NADIS Headquarters
- [ ] Others (specify) ----------

Appendix 3

OIE Listed diseases

Multiple species diseases

- Anthrax
- Aujeszky's disease
- Bluetongue
- Brucellosis (*Brucella abortus*)
- Brucellosis (*Brucella melitensis*)
- Brucellosis (*Brucella suis*)
- Crimean Congo haemorrhagic fever
- Echinococcosis/hydatidosis
- Epizootic haemorrhagic disease
- Equine encephalomyelitis (Eastern)
- Foot and mouth disease
- Heartwater
- Japanese encephalitis
- New world screwworm (*Cochliomyia hominivorax*)
- Old world screwworm (*Chrysomya bezziana*)
- Paratuberculosis
- Q fever
- Rabies
- Rift Valley fever
- Rinderpest
- Surra (*Trypanosoma evansi*)
- Trichinellosis
- Tularemia
- Vesicular stomatitis
- West Nile fever

Cattle diseases

- Bovine anaplasmosis
- Bovine babesiosis
- Bovine genital campylobacteriosis
- Bovine spongiform encephalopathy
- Bovine tuberculosis
- Bovine viral diarrhoea
- Contagious bovine pleuropneumonia
- Enzootic bovine leukosis
- Haemorrhagic septicaemia
- Infectious bovine rhinotracheitis/infectious pustular vulvova ginitis
- Lumpy skin disease
- Theileriosis
- Trichomonosis
- Trypanosomosis (tsetse-transmitted)

Sheep and goat diseases

Equine diseases

- Caprine arthritis/encephalitis
- Contagious agalactia
- Contagious caprine pleuropneumonia
- Enzootic abortion of ewes (ovine chlamydiosis)
- Maedi-visna
- Nairobi sheep disease
- Ovine epididymitis (*Brucella ovis*)
- Peste des petits ruminants
- Salmonellosis (*S. abortusovis*)
- Scrapie
- Sheep pox and goat pox

- African horse sickness
- Contagious equine metritis
- Dourine
- Equine encephalomyelitis (Western)
- Equine infectious anaemia
- Equine influenza
- Equine piroplasmosis
- Equine rhinopneumonitis
- Equine viral arteritis
- Glanders
- Venezuelan equine encephalomyelitis

Swine diseases

- African swine fever
- Classical swine fever
- Nipah virus encephalitis
- Porcine cysticercosis
- Porcine reproductive and respiratory syndrome
- Swine vesicular disease
- Transmissible gastroenteritis

Avian diseases

- Avian chlamydiosis
- Avian infectious bronchitis
- Avian infectious laryngotracheitis
- Avian mycoplasmosis (*M. gallisepticum*)
- Avian mycoplasmosis (*M. synoviae*)
- Duck virus hepatitis
- Fowl typhoid
- Highly pathogenic avian influenza and low pathogenic avian influenza in poultry as per Chapter 10.4. of the *Terrestrial Animal Health Code*
- Infectious bursal disease (Gumboro disease)
- Newcastle disease
- Pullorum disease
- Turkey rhinotracheitis

Lagomorph diseases

- Myxomatosis
- Rabbit haemorrhagic disease

Bee diseases

- Acarapisosis of honey bees
- American foulbrood of honey bees
- European foulbrood of honey bees
- Small hive beetle infestation (*Aethina tumida*)
- *Tropilaelaps* infestation of honey bees
- Varroosis of honey bees

Fish diseases

- Epizootic haematopoietic necrosis
- Epizootic ulcerative syndrome
- Infection with *Gyrodactylus salaris*
- Infectious haematopoietic necrosis
- Infectious salmon anaemia
- Koi herpesvirus disease
- Red sea bream iridoviral disease
- Spring viraemia of carp
- Viral haemorrhagic septicaemia

Mollusc diseases

- Infection with abalone herpes-like virus
- Infection with *Bonamia exitiosa*
- Infection with *Bonamia ostreae*
- Infection with *Marteilia refringens*
- Infection with *Perkinsus marinus*
- Infection with *Perkinsus olseni*
- Infection with *Xenohaliotis californiensis*

Crustacean diseases

- Crayfish plague (*Aphanomyces astaci*)
- Infectious hypodermal and haematopoietic necrosis
- Infectious myonecrosis
- Necrotising hepatopancreatitis
- Taura syndrome
- White spot disease
- White tail disease
- Yellowhead disease

Amphibians

- Infection with *Batrachochytrium dendrobatidis*
- Infection with ranavirus

Other diseases

- Camelpox
- Leishmaniosis