



Animal Disease Reporting System in Ogun State, Nigeria: A Review of Current Practices and Challenges

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Abstract

An effective animal disease reporting system is crucial for understanding disease dynamics, prioritizing intervention strategies, and preventing the transmission of infectious diseases from animals to man. The efficient functioning of the veterinary health system depends on a well-organized and coordinated reporting structure that engages stakeholders at various levels, including professionals, and state, national, and international organizations. Such a system significantly influences disease prevention and control efforts in Ogun State and Nigeria as a whole. The rising incidence of zoonotic diseases globally, coupled with Ogun State's growing population, underscores the need for this study. This research examines the current animal diseases reporting system in Ogun State, Nigeria, identifies the stakeholders involved, evaluates the challenges, and proposes practical solutions. The study aims to guide stakeholders in addressing existing gaps and implementing appropriate measures to mitigate risks associated with population growth, encroachment on wildlife habitats, and the increasing demand for animal products. Furthermore, it emphasizes equipping the system to become better equipped to prevent and control emerging and existing diseases in Ogun State and Nigeria.

Introduction

Animal disease reporting is obtaining data about suspected cases of reportable animal diseases and passing this data to the appropriate authority. It is a part of disease surveillance and a continuous systematic process put in place for the collection of data, analysis, interpretation, and circulation of relevant information regarding an incidence of a disease promptly to the appropriate stakeholders (World Organization for Animal Health, 2024). One of the main purposes of animal disease reporting is to document public health measures and policies to prevent an outbreak and monitor the impact of interventions (German *et al.*,

2001; World Health Organization, 2022).

Nigeria is the most populous country in Africa with an estimated population of over 230 million (Worldometers, 2024) and has a high number of livestock produced annually, estimated at 258.5 million chickens, 88.2 million goats, 49.1 million sheep, 20.9 million cattle and 9.2 million pigs (Agramondis, 2024). The livestock sector accounted for the main source of foreign revenue before the discovery of oil (Adebayo *et al.*, 2022), though not the main source anymore, it still has a significant impact on the Nigerian economy. Due to the large human population in Nigeria, there is a high demand for meat and other animal products which the livestock sector can barely meet due to several internal and external factors (Agramondis, 2024). A pivotal aspect of a

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disease outbreak is the loss of animals leading to significant economic loss to the farmers and national economy. Those most affected are rural dwellers in closest contact with wildlife, putting them at risk of getting infected first if there is an outbreak of any zoonotic disease (Okpala *et al.*, 2021).

Ogun State is the 24th largest state in Nigeria by landmass, located in the south-western part of the country, with a population of over 6 million people (Ogun State Government, 2024). It is one of the states with the highest Gross Domestic Products (GDP) in Nigeria, and about 30% of its GDP are generated from crop and animal agriculture. Agriculture has a great impact on the economy of the state by providing jobs to about 70% of its labour force (Lopez, 2024) and contribute to the state's food security. Livestock farming (poultry, fishery and cattle) is key to the state's agricultural activities among other types of agriculture and agro-allied industries (Federal Ministry of Agriculture and Food Security, 2024).

Many developing nations are known to have a higher burden of infectious and zoonotic diseases than is reported (Munyua *et al.*, 2016). Zoonotic diseases are infectious diseases of animals that can spread to humans and cause illness in man and vice versa. Common examples of these diseases include Anthrax, Avian Influenza, Rabies, Brucellosis, Chagas disease, Lyme disease, Ebola, Lassa, and Monkeypox, amongst many others. (Centre of Disease Control, 2024). These diseases can be spread through direct contact with the bodily fluid of the affected animals, indirect contact or bites, affecting mostly children below 5 years, older people above 65 years, pregnant women, and immuno-compromised individuals (Centre of Disease Control, 2024).

It is however essential that countries prioritize zoonotic diseases local to them rather than the ones of global attention as these have more public health implications in their countries even though they might have been classified as neglected according to World Health Organisation (Munyua *et al.*, 2016, WHO, 2020). While outbreaks of zoonotic diseases might not only be from livestock, they can also be from other sources like rodents and wild animals, a more strategic approach in disease reporting would need to be taken like in the case of the anthrax outbreak in 2023 where

systematic monitoring of cattle was done even before manifestation of symptoms (Usman *et al.*, 2024).

Animal disease reporting has public health, agricultural, and economic effects on individuals, nations, and globally. Hence due to its multifaceted effect, the One Health approach was developed (German *et al.*, 2001). In the one health approach, all professionals involved with animal, human, and environmental health as well as policymakers, law enforcement agents, pet owners, and the community are expected to work together for the good of all. This holistic approach helps in preventing the occurrence of zoonotic diseases (Centre for Disease Control, 2024). It is however worth noting that only trained personnel are to collect testing samples and manage transmission risks. (World Organization for Animal Health, 2024). For better effectiveness in disease surveillance, a combination of approaches is usually required aside from disease reporting (passive surveillance), such as systematic data collection (active surveillance), rapid detection of unusual events (event-based surveillance), monitoring of specific species (sentinel) (World Organization for Animal Health, 2024).

More than ever in history, there has been more interaction between man and animals, be it wildlife, livestock, or domestic animals due to urbanization leading to encroachment into wildlife space, agricultural practices, and the act of keeping household pets (World Health Organization, 2024). These are not without disadvantages, as this close interaction puts man at risk of getting zoonotic diseases from animals. Over 60% of newly discovered infectious diseases affecting humans are zoonotic (World Organization for Animal Health, 2024). With the growing rate of antimicrobial resistance due to the gross abuse of antibiotics in the livestock industry, there are greater public health risks if an outbreak occurs (World Health Organization, 2024). The impact of poor and ineffective disease reporting systems is highly multifaceted, also causing socioeconomic disruptions of international trade and the livestock market, which in Nigeria accounts for about 10% of annual generated revenue (Agramondis, 2024). The Animal Disease Control Act of 2022, was enacted to prevent, detect, control, and eradicate infectious and contagious

transboundary and zoonotic animal diseases. (Nairametrics, 2022).

Problem Statement

The increasing proximity between people and animals in Ogun State, caused by increasing population, rapid urbanization, rapid forest encroachment, and the rising demand for animal produce, has significantly increased the risk of zoonotic disease transmission. This situation poses considerable threats to the lives of people and animals, potentially leading to ill health, loss of lives, economic setbacks, and disruptions in business activities. This problem is exacerbated by inadequate animal disease reporting systems in the State, insufficient funding to conduct appropriate disease surveillance, limited knowledge of disease surveillance, and a shortage of trained personnel. These limitations prevent timely and accurate reporting, delay response, and increase the chances of widespread zoonotic diseases. To adequately address this issue, it is therefore of utmost importance that the current animal diseases reporting system being utilized in Ogun State is evaluated, challenges associated with it identified, and possible improvements explored to guide in the enactment of informed structural and policy decisions to strengthen the disease surveillance system and prevent devastating consequences in cases of future outbreaks.

Objective: This review aimed at the current practices of the animal disease reporting system in Ogun state, Nigeria, the existing workflow, and identify key obstacles and challenges. The study also addressed insights for policy and operational improvements.

Scope: This review focuses on Ogun state, Nigeria with emphasis on the current disease reporting system and the accompanying challenges. This study evaluates the operational practices, stakeholder roles, and systemic changes associated with animal disease reporting in the context of the Animal Disease Control Act of 2022.

Materials and Methods

This is a narrative review of the animal disease reporting system currently being used in Ogun State, Nigeria, and its challenges. The authors utilized databases such as Google Scholar, PubMed, and

ScienceDirect, and institutional reports from World Health Organization (WHO), Food and Agriculture Organization (FAO), World Organization for Animal Health (WOAH), Centre for Disease Control (CDC), National Animal Health Reporting System (NAHRS), Federal Ministry of Agriculture and Food Security (FMAFS, formerly known as FMARD), Nigeria Centre for Disease Control (NCDC), Department of Veterinary Services, Ministry of Agriculture Ogun State to conduct an exploratory search to obtain relevant articles. During this review the following keywords were used for searching: Animal health, Animal diseases reporting, Animal Disease Act, Veterinary surveillance, Zoonotic diseases, Public health, Nigeria, Ogun State. The study used Boolean operators 'AND' and 'OR' to incorporate these keywords.

Only studies published in English between January 2019 and November 2024 that have met the eligibility criteria were included in this narrative review.

The inclusion and eligibility criteria were:

- Must have recruited data from Ogun State, Nigeria
- Must be on reporting systems and disease surveillance or related to their effects
- Must be written in the English language

The exclusion criteria include:

- Low-quality papers with poor methodology
- Papers written in other languages
- Papers that exceeded that time frame
- Duplicate studies or those derived from the same data set.

Current Practices in Animal Disease Reporting

The current flow of data in the diseases reporting system used in Ogun state is seen in Figure 1. At the moment stakeholders involved in reporting diseases in Ogun State include: Farmers, Animal owners, Butchers, Private Veterinarians, Government Veterinarians, the Chief Veterinary Officer of Nigeria (CVON), Local government, State government, Federal government; Professional organizations and bodies involved include: Federal Ministry of Agriculture and Food Security (FMAFS formerly known as FMARD), Federal Ministry of Health (FMOH), Veterinary Council of Nigeria (VCN), National Veterinary Research Institute (NVRI),

Nigeria Centre for Disease Control (NCDC), Regional Disease Surveillance System Enhancement (REDISSE), and International organizations such as World Health Organization (WHO), World Organization for Animal Health (WOAH; formerly known as Organization of International Epizootics, OIE), African Union Inter-African Bureau for Animal Resources (AU-IBAR). (Kwaghe *et al.*, 2017). Figure 1 further explains the direction of the flow of disease reports as a two-way communication flow system, which is very essential for the effectiveness of the reporting system.

At the state level, involved stakeholders report on different frequencies:

1. **Daily:** Daily reports are obtained from slaughter slabs, clinics, and cattle markets during practice. Whatever observation is made during meat inspection, ante-mortem inspection, and while taking slaughter statistics is documented and reported.
2. **Monthly:** Disease reporting is done using the National Animal Disease Information System (NADIS) forms (Figure 2 and Figure 3). There are various types of NADIS forms designed for different purposes, including forms for vaccination, abattoirs, disease outbreaks, and suspicious cases. Once completed, these forms are collated and sent to the Ogun State branch of the Federal Ministry of Agriculture and Food Security. The state branch then forwards them to the headquarters in Abuja, which, in turn, submits them to international organizations.
3. **For Suspected cases of reportable diseases:** Reports are made immediately using the NADIS suspicious case form (Figure 4), not having to

wait until the end of the month. Samples accompanied by the filled NADIS form, are transferred to the National Veterinary Research Institute (NVRI), Vom, Plateau State, the Federal Ministry of Agriculture and Food Security (formerly FMARD) Abuja is then informed of the suspected case and that a sample is being sent to NVRI. Moreover, once the result is out, the CVON will be notified and if the result comes out positive, the CVON will send the report to international bodies. Then, at the same time send feedback to the Director of Veterinary Services in Ogun State to take appropriate action. The response flows downwards as shown in the flow diagram in Figure 1, all under the supervision of the DVS.

4. **In Outbreaks:** The report is done immediately using the NADIS outbreak form (Figure 4) and the data is sent immediately through the disease reporting flow in Figure 1.

In 2023, in an attempt to make the process of animal disease reporting and surveillance timely, the Federal Ministry of Agriculture and Food Security (FMAFS) introduced veterinary doctors and technologists who are surveillance officers in some south-western states like Ogun State, Oyo State, and Kwara State to the NADIS web-based app (Kwara State Government, 2023; The Southern Examiner, 2023). The training was also conducted on the use of the application, tablets and phones were provided for surveillance agent officers. However, this effort has not produced significant results, as the application is currently non-functional, forcing stakeholders to rely on paper forms alone.

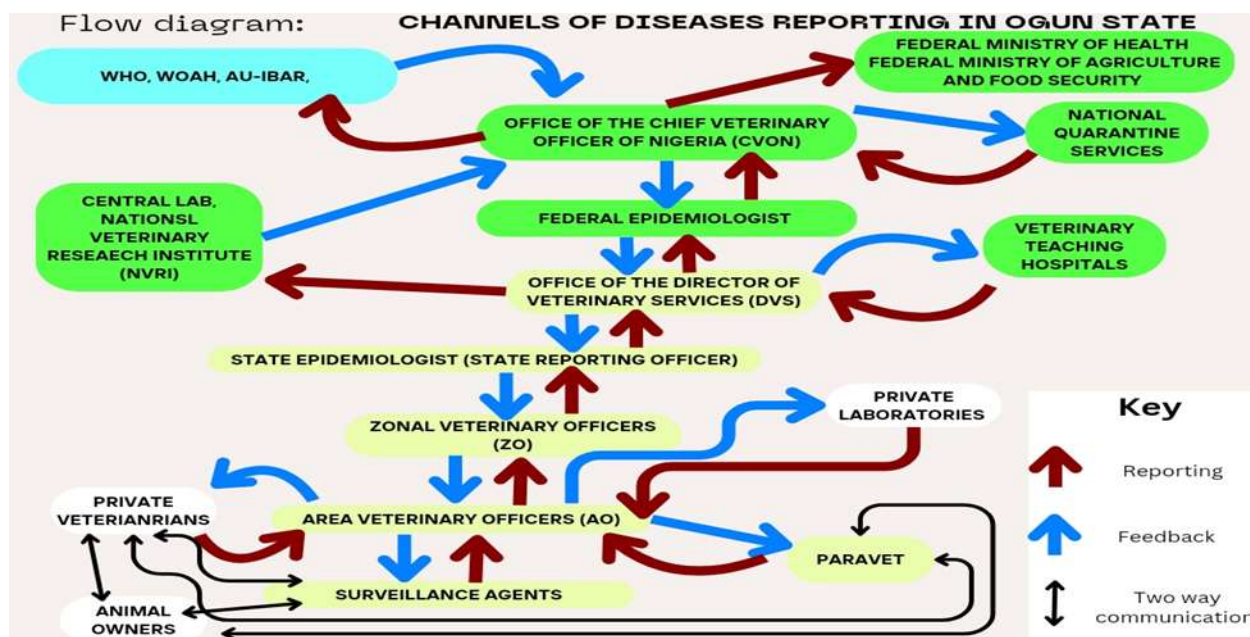


Figure 1: A flow diagram showing the movement of animal disease report data and feedback from one stakeholder to another

NATIONAL ANIMAL DISEASES INFORMATION AND SURVEILLANCE (NADIS) / EPIDEMIOLOGY UNIT
FEDERAL DEPARTMENT OF LIVESTOCK
FEDERAL MINISTRY OF AGRICULTURE AND WATER RESOURCES ABUJA-NIGERIA

MONTHLY DISEASE REPORT FORM

Reporting Unit: State Local Govt. AVO Form No.

Reporting Period: Month Year

Reporting Officer: Name Position/Designation Tel No. Signature

Date Report: Prepared (dd/mm/yyyy) Received by DVS (dd/mm/yyyy) Received at NADIS ZCO or Field Office (dd/mm/yyyy)

Is there outbreak to report: YES ☐ NO ☐ If reporting only vaccination, start at the column labelled "w"

For each outbreak, please enter the following parameters in columns labeled from (a) to (n)
 Please provide details for each species on different lines for multi-species disease

A. Outbreak

Disease (a serotype)	New or Follow up	Date				Name of affected Village	Latitude (in DD)	Longitude (in DD)	Species Affected	Age Group	Sex	Production System	Control Measures
		Occurred	Report to vet	Investigated	Final diagnosis (if available)								
a	b	c	d	e	f	g	h	i	j	k	l	m	n

Outbreak (contd)

Basis for Diagnosis	Susceptible	Number of Animals					Outbreak accepted? (Y or N)
		Cases	Deaths	Slaughter	Recovered	Destroyed	
o	p	q	r	s	t	u	v

B. Vaccination

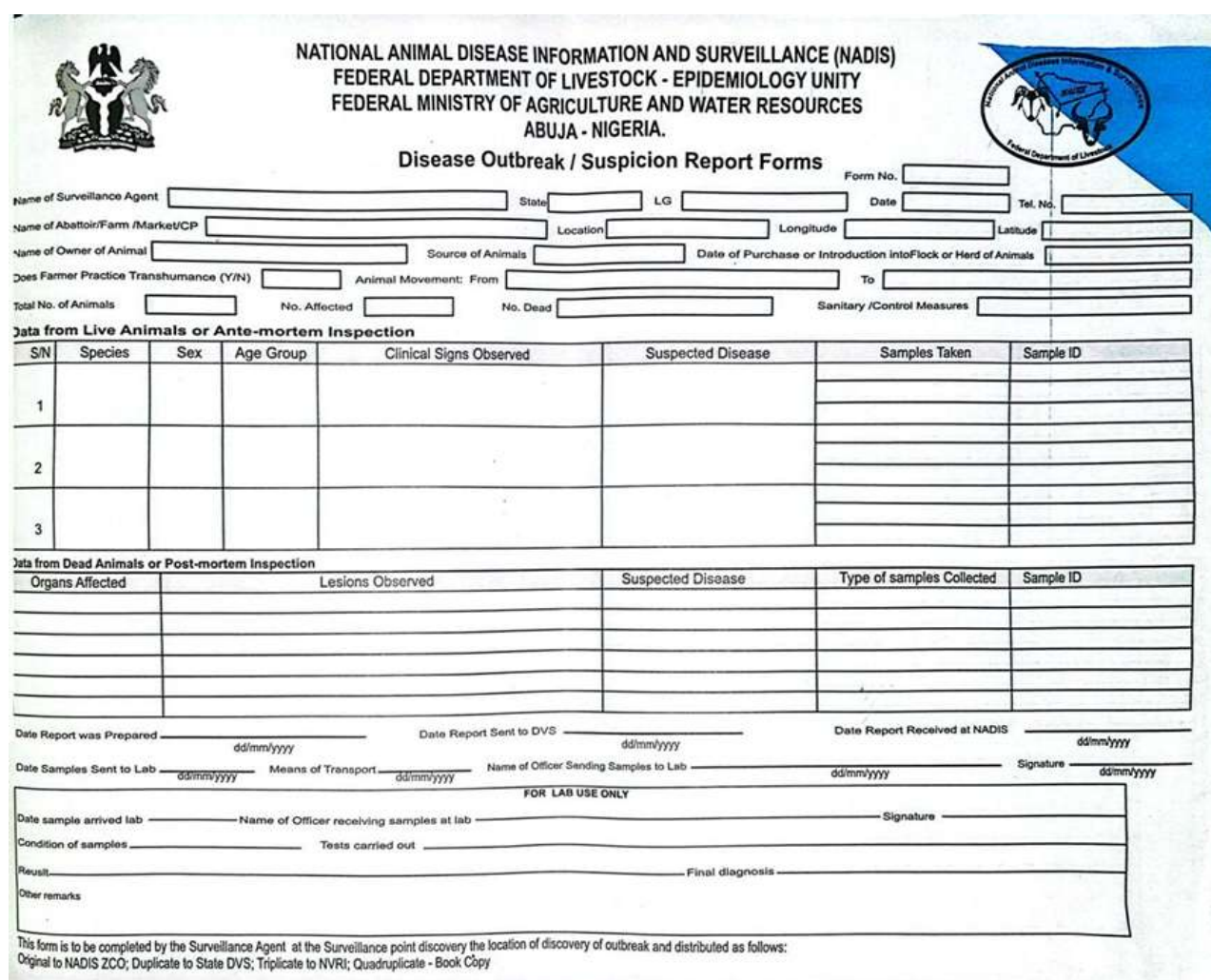
Disease	Number Control Vaccination	Number Prophylaxis Vaccination	Sources of Vaccine	Batch Number	Expiry Date
w	x	y	z	aa	ab

This Form is to be completed by Area Veterinary Officer at the Local Government level at the end of each month and distributed as follows.
 Original to NADIS Federal Epidemiology Office; Duplicate to State DVS, Triplicate - Book Copy

(Printed by the Ogun State Ministry of Agriculture)

Figure 2: NADIS report form for Monthly disease reporting

Figure 3: NADIS report form for monthly abattoir reporting



NATIONAL ANIMAL DISEASE INFORMATION AND SURVEILLANCE (NADIS)
FEDERAL DEPARTMENT OF LIVESTOCK - EPIDEMIOLOGY UNITY
FEDERAL MINISTRY OF AGRICULTURE AND WATER RESOURCES
ABUJA - NIGERIA.

Disease Outbreak / Suspicion Report Forms

Form No. _____

Name of Surveillance Agent _____ State _____ LG _____ Date _____ Tel. No. _____

Name of Abattoir/Farm/Market/CP _____ Location _____ Longitude _____ Latitude _____

Name of Owner of Animal _____ Source of Animals _____ Date of Purchase or Introduction into Flock or Herd of Animals _____

Does Farmer Practice Transhumance (Y/N) _____ Animal Movement: From _____ To _____

Total No. of Animals _____ No. Affected _____ No. Dead _____ Sanitary /Control Measures _____

Data from Live Animals or Ante-mortem Inspection

S/N	Species	Sex	Age Group	Clinical Signs Observed	Suspected Disease	Samples Taken	Sample ID
1							
2							
3							

Data from Dead Animals or Post-mortem Inspection

Organs Affected	Lesions Observed	Suspected Disease	Type of samples Collected	Sample ID

Date Report was Prepared _____ dd/mm/yyyy Date Report Sent to DVS _____ dd/mm/yyyy Date Report Received at NADIS _____ dd/mm/yyyy

Date Samples Sent to Lab _____ dd/mm/yyyy Means of Transport _____ dd/mm/yyyy Name of Officer Sending Samples to Lab _____ dd/mm/yyyy Signature _____ dd/mm/yyyy

FOR LAB USE ONLY

Date sample arrived lab _____ Name of Officer receiving samples at lab _____ Signature _____

Condition of samples _____ Tests carried out _____

Result _____ Final diagnosis _____

Other remarks _____

This form is to be completed by the Surveillance Agent at the Surveillance point discovery the location of discovery of outbreak and distributed as follows:
 Original to NADIS ZCO; Duplicate to State DVS; Triplicate to NVRI; Quadruplicate - Book Copy

Figure 4: NADIS report form for Disease outbreak/Suspicious diseases reporting

Challenges in the disease reporting system currently being used in Ogun State

These challenges range from operational to policy challenges. These challenges result in underreporting or, in the worst-case scenarios, a complete lack of reporting of these reportable diseases, hindering the implementation of appropriate public health measures (Grainer, 2020). Some of the challenges encountered include a lack of knowledge on reporting channels in which community residents either do not know who to report cases of animal diseases to or do not know how to contact the appropriate authorities to report to (i.e. the surveillance officers and veterinarians) (Akangbou and Amanawa, 2020). Due to this, observed cases go unreported. This is particularly common in rural areas (Elelu *et al.*, 2019). The method of communication which involves the use of paper further worsens the

situation as this results in delays in relaying information and getting feedback from higher authorities, sometimes the response never gets to the farmers on time discouraging them from reporting in the future. Prolonged waiting time without getting feedback keeps them uncertain about what to do, resulting in a loss of confidence in the system's efficiency (Akangbou and Amanawa, 2024). The reliance on paper documentation, which must be compiled and submitted to higher stakeholders, significantly delays the reporting process (FMARD, 2023). This delay often results in outbreaks or a worsening of disease conditions by the time reports are acted upon (Babalobi *et al.*, 2011). The NADIS application designed to streamline this process is currently nonfunctional further complicating the situation.

A lack of adequate financial, human, and knowledge resources prevents surveillance officers and veterinary doctors from acquiring essential tools and protective equipment. Transportation systems are also deficient, as there are not enough reliable vehicles to access remote areas where reports originate.

Additionally, the shortage of skilled manpower limits the ability of surveillance agents to cover all the locations from which reports are received, and even when they can reach those locations, shortage and in some cases complete unavailability of appropriate diagnostic tools and devices create a limitation to the involved stakeholders (Ogunleye *et al.*, 2023). Many staff members also lack sufficient understanding of the severity of reportable diseases (Akangbou, 2024). This, coupled with a lackadaisical attitude, often delays forwarding reports of such diseases to higher authorities (Adekanye *et al.*, 2020). Farmers whose animals are affected by reportable diseases receive no compensation. As a result, they are reluctant to report outbreaks and instead resort to the urgent sale of their remaining animals once they observe symptoms or fatalities. Given the country's economic situation, these farmers often find willing buyers eager to purchase the animals at very low prices (Nigeria Centre for Disease Control and Prevention, 2023). This practice worsens the problem, as sick animals are sold to unsuspecting consumers, further spreading the risk of disease, coupled with inadequate reporting and lack of support from veterinary staff to the farmers (Adekanye *et al.*, 2020).

There is a significant lack of reliable data on reportable diseases due to poor data quality and insufficient record-keeping, making it difficult to track patterns or develop strategic plans for the future. This issue stems largely from the reliance on paper-based documentation, which complicates proper analysis and long-term planning as seen in the case of rabies control in the different states of the country (Wera *et al.*, 2013). The poor implementation and enforcement of the Act leave veterinary officers without sufficient legal backing to perform their duties effectively (Mateo, 2024; Meseko *et al.*, 2021). Many farmers and farm owners resist allowing surveillance activities, even when reports have been made about diseased animals in their care (Mateo, 2024).

Another challenge faced is inadequate public sensitization regarding the importance of disease outbreak reporting and appropriate responses (Sharan *et al.*, 2023). In rural areas, financial constraints further reduce cooperation, as residents are often reluctant to engage with veterinary officers. In some instances, reported cases are inconclusive. By the time veterinary officers reach the location, the affected animal may have already been killed, burned, or declared missing, making it nearly impossible to gather concrete data.

This leads to incomplete records and hampers the ability to track and address disease outbreaks effectively (Ogunleye *et al.*, 2023). Insufficient equipment and tools hinder veterinary officers and surveillance teams from performing their duties effectively (Cadmus, 2023), and tools such as smartphones, and reliable and fast internet connections that are limited make reporting of data slow and inefficient (Ogwuche, *et al.*, 2021).

Way Forward

As a result of these challenges and the breeches accompanying them, many times these zoonotic diseases would have infected humans before being made known to the public, annulling the purpose of the One Health approach and the Animal Disease Control Act of 2022. This is aside from the many public health dangers and economic adverse effects due to poor animal disease surveillance. Therefore, it is important to involve stakeholders particularly professionals to have a clearer knowledge of these implications and take action to make it right. Here are some actionable plans that can be taken to improve the current condition of disease reporting:

1. **Digital Solutions for Fast Reporting:**

Adopting digital solutions instead of paper forms would significantly speed up report submissions, and feedback response and enable nationwide disease data tracking. Platforms like the Surveillance Outbreak Response Management and Analysis System (SORMAS), initially developed during the 2014 Ebola outbreak and later expanded to cover other zoonotic diseases, provide a model for such initiatives (Kehinde *et al.*, 2009). Similarly, platforms should be created to allow individuals in the community to anonymously report disease occurrences.

2. Training and Employment of Skilled Personnel:

There is a pressing need to train and employ more personnel with expertise in disease surveillance and reporting to ensure comprehensive coverage and effective intervention.

3. Public Sensitization and Community Engagement:

Continuous public awareness campaigns are crucial to encourage disease reporting (Meseko *et al.*, 2021). Platforms similar to the Program for Monitoring Emerging Diseases (ProMED), which allows subscribers to report preliminary and unofficial disease cases, could be adopted (Woodall and Calishe, 2001). ProMED's approach involves posting these reports and, when necessary, sending investigation forms to veterinary professionals in their area of concern.

4. Adequate Compensation for Farmers:

Providing financial compensation to farmers who report disease outbreaks on their farms to encourage transparency and timely reporting, especially during outbreaks.

5. Increased Funding:

Improved funding is essential to provide biosecurity materials, personal protective equipment (PPE), point-of-care rapid test kits, consumables, and surveillance tools. Inadequate funding currently hampers proper interventions, including transportation to remote areas for disease control. Investments in resources like helicopters for transporting samples to laboratory centres could greatly enhance response times.

6. Improved Diagnostic Facilities:

Investing in advanced diagnostic facilities is essential to ensure that generated data is accurate, sensitive, reliable, and valid (Meseko *et al.*, 2021). The occurrence of COVID-19 allowed for the use of more sophisticated laboratory devices and it improved the diagnostic capacity for easier diagnosis of the virus (Meseko *et al.*, 2024). In like manner, investing in such tools and resources would help in early and fast diagnosis of other zoonotic diseases.

7. Policy Enactment and Stakeholder Clarity:

Clear policies should be enacted to define the roles and responsibilities of all stakeholders involved in disease reporting and responses.

8. State-Level National Veterinary Research Institute (NVRI) Branches:

Establishing NVRI branches in every state would significantly reduce the time required to obtain laboratory results. This is particularly critical in cases of zoonotic diseases, where delays can result in significant human exposure.

9. Enhanced Information Dissemination:

Efficient dissemination of information about available resources and interventions is critical to ensure that stakeholders, including farmers and veterinary professionals, are well-informed (Said *et al.*, 2023).

Conclusion:

Animal disease reporting plays a role in preventing zoonotic disease outbreaks and requires collective efforts from individuals, professionals, and national and international bodies. In Ogun State and Nigeria at large, it is imperative to address the gaps in disease reporting promptly. Incorporating modern solutions and strategic planning will enhance reporting systems, promote public health, and safeguard against future outbreaks.

Statements and Declarations

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Conflict of Interest Statement

The authors declare no competing interests

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