

Workshop Summary

Prioritizing Zoonotic Diseases for Multisectoral One Health Collaboration in Nigeria

Lagos, Nigeria



Food and Agriculture
Organization of the
United Nations



World Health
Organization
Nigeria



Photo 1. African Elephant (*Loxodonta*) in wildlife park in Jos, Nigeria.

DISCLAIMER

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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Photo 2. Osun-Osogbo Sacred Grove—exterior of the temple of the Fertility Goddess, Osogbo, Nigeria.

PARTICIPATING ORGANIZATIONS

- Federal Ministry of Agriculture & Rural Development (FMARD)
- Federal Ministry of Environment (FMEEnv)
- Federal Ministry of Health (FMOH)
- National Veterinary Research Institute (NVRI)
- Nigeria Agricultural Quarantine Service (NAQS)
- Nigeria Centre for Disease Control and Prevention (NCDC)
- Ahmadu Bello University (ABU)
- African Field Epidemiology Network (AFENET)
- Breakthrough Action - Nigeria (BA-N)
- CORE Group Partners Project
- University of Abuja (UniAbuja)
- University College Hospital (UCH)
- University of Ibadan (UI)
- University of Ilorin (Unilorin)
- UK Health Security Agency (UKHSA)
- U.S. Centers for Disease Control and Prevention (CDC)
- Food and Agriculture Organization of the United Nations (FAO)
- World Health Organization (WHO)



Photo 3. Zebu Cattle at Old Oyo National Park in Nigeria.

EXECUTIVE SUMMARY



Figure 1. Participants from the One Health Zoonotic Disease Prioritization Workshop in Nigeria.

The specific workshop goals were to use a multisectoral, One Health approach to:

- Prioritize zoonotic diseases of greatest concern for Nigeria, and
- Develop next steps and action plans to address the priority zoonotic diseases in collaboration with One Health partners.

During the workshop, participants developed a list of zoonotic diseases for prioritization for Nigeria, defined the criteria for prioritization, and determined questions and weights relevant to each criterion. A total of six zoonotic diseases were identified as a priority by participants using a mixed methods prioritization process, the One Health Zoonotic Disease Prioritization (OHZDP) process, developed by the U.S. Centers for Disease Control and Prevention (CDC) (Appendix A).

After the participants selected the priority zoonotic diseases (Table 1), they developed next steps and action plans to address the priority zoonotic diseases in collaboration with One Health partners.

The priority zoonotic diseases for One Health collaboration for Nigeria are:

- Monkeypox
- Yellow fever
- Lassa fever
- Highly pathogenic avian influenza
- Rabies
- Bovine tuberculosis

This report summarizes the OHZDP process used to prioritize zoonotic diseases of greatest concern for Nigeria, as well as next steps and action plans to jointly address these zoonotic diseases using a multisectoral, One Health approach including human, animal, and environmental health ministries and other relevant sectors.

Table 1. Description of priority zoonotic diseases selected by voting members in Nigeria using a multisectoral process in the OHZDP workshop conducted in July 2022.

Zoonotic Disease	Agent	Human Disease Burden	Animal Disease Burden	Diagnostics, Treatment & Prevention
Monkeypox	Monkeypox virus	A total of 277 confirmed cases were reported from January 2022 to August 2022 in Nigeria. ⁸	Monkeypox is prevalent in monkeys in Nigeria. ¹	Vaccines are not regularly available in-country; however, they are accessible when there is need. Treatment for people is supportive care.
Yellow Fever	Yellow fever virus	Yellow fever is endemic in Nigeria. Data show that from 2017 to 2018, 163 confirmed cases in 46 Local Government Areas (LGAs) in 17 states have been reported. ⁹	Paucity of in-country data. Studies have however reported a prevalence of 7–64% in monkeys studied in close settings. ^{5,7}	Yellow fever vaccines are available. Treatment for people is supportive care.
Lassa Fever	Lassa fever virus	WHO has reported that Lassa fever is endemic in Nigeria, with a cumulative case fatality rate of 19% reported between 2017 to 2020. ¹⁰	Lassa fever virus prevalence in natal multimammate mouse (<i>M. natalensis</i>) has been determined in Brissa, Dalafilani, Sonkonio, and Yarawalia, ranging from 15% to 23% of animals infected in 2013–2015. ²	Vaccines are undergoing clinical trials. Treatment for people is available and effective in Nigeria.
Highly Pathogenic Avian Influenza	Influenza A viruses	According to WHO, there has been 1 confirmed case of HPAI (H5N1) in a human reported in 2007. ¹¹	There is 23% prevalence in chickens and captive birds in Nigeria. ³	No vaccines are available for use in people.
Rabies	Rabies virus	Studies show that prevalence of rabies antigen detection ranges from 3% and 28% with more cases in the southwest and southeast. ¹²	From 1978 to 2020, the prevalence of rabies among dogs ranged between 2% and 50% throughout the various regions of Nigeria. Rabies is most frequently found in dogs but can also be found in wildlife including bats, mongoose and ferret badgers. ¹²	An effective animal vaccine exists. Pre- and post-exposure vaccines are available in Nigeria for people. Diagnosis for people involves various tests on saliva and cerebrospinal fluid, but low capacity for these tests exists.
Bovine Tuberculosis	<i>M. bovis</i>	There is a lack of in-country data.	The annual prevalence of <i>M. bovis</i> in cattle in Nigeria was 1% in 2015. Research indicates that the prevalence fluctuates with the rainy and dry seasons. ⁴ In 2017, prevalence of <i>M. bovis</i> in cattle in Nigeria was 26% by lateral flow and ZN techniques. ¹³	There is no effective vaccine or treatment for animals. Treatment for <i>M. bovis</i> in humans is the same as treatment for <i>M. tuberculosis</i> , which requires an antibiotic regimen. The BCG vaccine is available for children 5 years and younger in Nigeria.



Photo 4. Woman selling citrus fruits in a market in Nigeria.

INTRODUCTION

Zoonotic diseases are diseases that are spread naturally between animals and humans. Most known human infectious diseases and about three-quarters of newly emerging infections originate from animals. Zoonotic diseases that occur in large numbers can impact society in three main ways. Specifically, they:

- Threaten the health of animals resulting in illness, loss of productivity, and death
- Threaten the livelihood of the population dependent on livestock as a major source of income
- Threaten the health of people, with ability to cause many illness and death, which is associated with significant social and economic losses



To best address zoonotic disease threats, a multisectoral, One Health approach is needed. One Health is a collaborative, multisectoral, and transdisciplinary approach—working at the local, regional, national, and global levels—with the goal of achieving optimal health outcomes recognizing the interconnection between people, animals, plants, and their shared environment.

In 2017, Nigeria conducted its first zoonotic disease prioritization using a modified OHZDP tool. Nigeria prioritized rabies, avian influenza, Ebola virus disease, swine influenza, and anthrax.¹⁴

To reassess previous priorities, address zoonotic disease challenges in Nigeria, and further incorporate additional One Health sectors and partners, Nigeria conducted a One Health Zoonotic Disease Re-prioritization workshop from July 20–22, 2022, at the Dover Hotel in Lagos, facilitated and supported by the U.S. Centers for Disease Control and Prevention (CDC), the Food and Agriculture Organization of the United Nations (FAO), and the World Health Organization (WHO). The purpose of the OHZDP workshop for Nigeria was to prioritize zoonotic diseases of greatest concern using a multisectoral, One Health approach with equal input from representatives of Ministries, Department, and Agencies (MDAs) in human, animal (livestock and wildlife), and environmental health sectors and other relevant partners.

The specific workshop goals were to use a multisectoral, One Health approach to

- Prioritize zoonotic diseases of greatest concern for Nigeria; and
- Develop next steps and action plans to address the priority zoonotic diseases in collaboration with One Health partners.

To build in-country capacity to conduct future OHZDP workshops, 12 local partners were trained by U.S. CDC on the OHZDP process from the following relevant One Health sectors and partners:

- Nigeria Centre for Disease Control (NCDC)
- Federal Ministry of Agriculture & Rural Development (FMARD)
- Federal Ministry of Environment (FME_{nv})
- African Field Epidemiology Network (AFENET)
- World Health Organization (WHO)
- Food and Agriculture Organization of the United Nations (FAO)
- UK Health Security Agency (UKHSA)

WORKSHOP METHODS

The OHZDP process uses a mixed methods approach developed by CDC's One Health Office. The methods have been described in detail (Appendix A).¹⁴ Workshop organizers began to prepare and plan for this workshop months in advance. During the workshop, participants first reviewed the initial zoonotic disease list to focus on for prioritization. A zoonotic disease was selected if it was known to be spread between humans and animals of concern for Nigeria. Zoonotic diseases on human or animal reportable disease lists were included on the initial list. A list of 36 zoonotic diseases, shown in Table 2 of Appendix C, was considered during the workshop.

During the workshop, participants developed five criteria for ranking the 36 zoonotic diseases. Once the five criteria were developed, one categorical question was developed for each criterion through group discussion. The questions were developed to best measure each criterion. All questions had ordinal, binomial, or multinomial answers. The ordinal nature is necessary for the scoring process and each answer choice was given a score, which was determined by the participants. Voting members then individually ranked their preferences for the relative importance of each criterion. Each individual voting member's ranking was then inputted into the OHZDP Tool by a facilitator and a group weight for each criterion was calculated. Facilitators and participants answered each question for each zoonotic disease using data that were identified through an extensive literature search, as well as information from WHO, the World Organisation for Animal Health (WOAH), ProMED, and other relevant sources. Data on disease transmission, severity, pandemic and epidemic potential, economic impact, prevention and control, and environmental impact were collected for each zoonotic disease. If information for a particular zoonotic disease was not available for Nigeria, data from the region or globally were used. If no data were available, subject matter expertise was used. Literature and data were collected with zoonotic disease-specific information on transmission, severity, pandemic and epidemic potential, economic impact, prevention and control, and environmental impact for the country, region,

and globally. These references were compiled and shared with all workshop participants.

After scoring all zoonotic diseases, decision tree analysis was used to determine the ranked zoonotic disease list. Each weighted criterion was applied across each question's answers for each zoonotic disease. The scores for all five questions for each zoonotic disease were summed. The largest raw score was then normalized giving that zoonotic disease a normalized score of 1. See Appendix C for a complete listing of raw and normalized scores for all zoonotic diseases that were considered for prioritization.

The zoonotic diseases with their raw and normalized scores were presented to the participants for discussion. Workshop participants then used the ranked OHZDP list to discuss and decide on a final priority list of six zoonotic diseases (Table 1). After the participants decided on the priority zoonotic diseases, they developed next steps and action plans to address the priority zoonotic diseases.

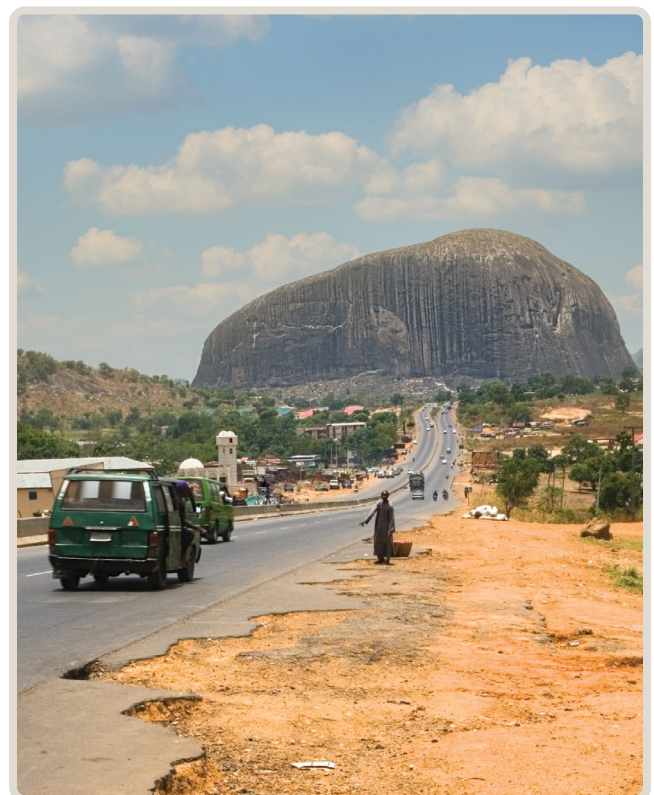


Photo 5. The road to Zuma Rock .



Photo 6. Sunset over Lagos Island .

CRITERIA AND QUESTIONS DEVELOPED

The criteria for ranking zoonotic diseases selected by the voting members in Nigeria are listed in order of importance below. A description of how the questions assessed the criteria are listed below. For the full question and answer choices, see Appendix D.

Rank	Criteria	Weight	Questions
1	Severity of Disease	0.35	What is the case fatality rate of the disease?
2	Epidemic Potential	0.26	Does the disease have a demonstrable potential for spread in: 1. Sustained Human to Human 2. Sustained Animal to Animal
3	Socio-economic Impact	0.17	Does the disease affect international travel or trade, or livelihood, lifestyle, or livestock production?
4	Capacity to Prevent and Control	0.16	Do we have a treatment or vaccine available in Nigeria for humans or animals?
5	Environmental Impact	0.07	Does the management of the disease (detection, control, or prevention) cause an impact of the environment?

PRIORITY ZONOTIC DISEASE LIST FOR NIGERIA

The six priority zoonotic diseases (Table 1) for One Health collaboration for Nigeria are:

1. **Monkeypox**
2. **Yellow fever**
3. **Lassa fever**
4. **Highly Pathogenic Avian Influenza**
5. **Rabies**
6. **Bovine Tuberculosis**

Of the six priority zoonotic diseases for Nigeria, five (yellow fever, Lassa fever, avian influenza, rabies, and bovine tuberculosis) were also prioritized in the regional OHZDP workshop conducted for the Economic Community of West African States.^{15,16}

NEXT STEPS AND ACTION PLANS

One Health Coordination

Goal: Enhanced government and stakeholder commitment for a sustainable and institutionalized One Health platform at all levels of government

Next Steps	Indicators to measure when the next steps are achieved	Sector(s) Responsible
1.1: Advocacy visits to policymakers on One Health to increase political buy-in	Number of advocacy visits/reports	One Health Technical Committee and One Health Coordinating Unit
1.2: Engage legislative and finance stakeholders to allocate funding for One Health	Availability of funds	
1.3: Develop a coordination governance manual to establish linkages between the subnational and national levels to strengthen One Health operationalization framework	Manual developed and produced	
1.4: Engage the line ministries across the tiers of government through the National Council on Health, Agriculture and Environment, as well as the Nigeria Governor's Forum (NGF)	Reports of engagement meetings	
1.5: Conduct other stakeholder mapping and engagement	Number of stakeholders identified	
1.6: Establish resource mobilization and accountability framework structure to strengthen One Health	Framework developed and produced	
Timeframe for Progress Check	18 months, by Dec, 2023	

Laboratory Capacity

Goal: Effective detection of zoonotic diseases through the One Health approach across both national and subnational levels

Next Steps	Indicators to measure when the next steps are achieved	Sector(s) Responsible
2.1: Mapping and capacity assessment of relevant laboratories at national and subnational levels	Laboratory mapping and need assessment reports published and disseminated	Tripartite
2.2: Laboratory capacity building at national and subnational levels	Number of laboratories renovated (national spread) Number of laboratory personnel trained Number of equipment procured	
2.3: Upgrading and accreditation of laboratories within the national One Health network	Number of laboratories attaining/ maintaining accreditation	
2.4: Ensure consistent supply of critical laboratory input (chemical, reagent, diagnostic kits, etc.)	Number of laboratories attaining/ maintaining accreditation	
Timeframe for Progress Check	18 months, by Dec, 2023	

Surveillance Capacity

Goal: Prevent and control prioritized zoonotic diseases through prompt detection and reporting

Next Steps	Indicators to measure when the next steps are achieved	Sector(s) Responsible
3.1. Establish or strengthen a One Health Surveillance Technical Working Group (TWG) across the prioritized zoonotic diseases	Availability of a functional TWG	All Sectors
3.2. Review and leverage on the existing surveillance work plan for all the prioritized zoonotic diseases	Availability of work plan	
3.3. Strengthen Early Warning and Alert System (EWAS) across all prioritized zoonotic diseases	Availability of trained EWAS focal points across the sectors at all levels; timeliness of reporting	
3.4. Strengthen the National One Health Risk Surveillance and Information Sharing (NOHSIS)	Monthly NOHSIS report Disease outbreak report shared via the platform	
3.5 Conduct Joint Risk Assessments for the priority zoonotic diseases	Completion of the joint risk assessments	
Timeframe for Progress Check		3 months–1 year

Outbreak Response

Goal: To promptly respond to outbreak of prioritized diseases, to contain and prevent spread

Next Steps	Indicators to measure when the next steps are achieved	Sector(s) Responsible
4.1 Establish One Health Rapid Response Teams (OHRRT) at national and subnational levels	Availability of a functional OHRRT at national and subnational levels	All Sectors
4.2: Conduct resource mapping and needs assessment for outbreak response	Resource mapping and needs assessment conducted Resource and capacity gaps identified	
4.3: Develop and implement a One Health capacity building program for prioritized zoonotic diseases	One Health curriculum on surveillance and outbreak response developed Capacity building program/training conducted	
Timeframe for Progress Check		3 months–1 year

Preparedness Planning

Goal: Strengthen the TWG within existing One Health structure, ensuring multisectoral collaboration and communication to support preparedness and planning

Next Steps	Indicators to measure when the next steps are achieved	Sector(s) Responsible
5.1: Ensure TWGs for each of the priority zoonoses are active, multisectoral, and report to the National One Health Technical Committee	TWG meeting minimum every 2 months	NCDC/FMEnv/FMARD
5.2: TWG to review all relevant plans within their area and ensure robust One Health plans are in place	Multisectoral plans in place for all priority zoonotic diseases	NCDC/FMEnv/FMARD
5.3: Conduct simulation exercises for priority zoonotic diseases.	Emergency plans identified for priority zoonotic diseases	NCDC/FMEnv/FMARD
Timeframe for Progress Check	3 months–1 year	

Prevention and Control

Goal: Strengthen the multisectoral approach to prevent the establishment and spread of priority zoonoses

Next Steps	Indicators to measure when the next steps are achieved	Sector(s) Responsible
6.1: Review availability and accessibility of vaccines for the priority zoonoses, where relevant	National audit of storage and stockpile of vaccines Number of people/animals vaccinated annually for priority zoonoses, where relevant	NCDC/FMARD
6.2: Strengthen vector control, including in rodents, in high prevalence areas for disease for human and animals	Frequency of fumigation and decontamination in peri-urban areas of high disease prevalence Increased frequency of rodent control program in households in high prevalence areas	FMEnv
6.3: Promote increased environmental sanitation to prevent priority zoonoses	Number of environmental cleaning campaigns introduced	
Timeframe for Progress Check	December 2022	

Workforce

Goal: Develop One Health workforce

Next Steps	Indicators to measure when the next steps are achieved	Sector(s) Responsible
7.1: Conduct an integrated situational analysis (SITAN) of existing workforce gaps and issues across all tripartite sectors	SITAN meeting held SITAN report developed	All Tripartite MDAs FMEnv
7.2: Develop an integrated workforce development plan/strategy with contribution from all tripartite MDAs for expansion, diversification, financial sustainment, and retention of the existing One Health workforce	Stakeholders mapped Consultative meeting held Integrated workforce development plan developed and validated	
7.3: Increase national workforce of epidemiologists through sustainment of the intermediate and advanced FETP, ISAVET, etc.	At least 3 epidemiologists per tripartite sector per year at subnational level trained	
7.4: Conduct advocacy to employ additional One Health personnel (environment, health, and agriculture) at all national and subnational levels	At least 2 advocacy meetings held	
7.5: Bi-annual national One Health review of the workforce strategy (involving all government levels, partners, etc.)	National One Health review meeting held Communique report produced and disseminated	
Timeframe for Progress Check		December 2022

Risk Communication and Advocacy

Goal: Improve communication across sectors and the general public on One Health and the prioritized diseases

Next Steps	Indicators to measure when the next steps are achieved	Sector(s) Responsible
8.1: Increase capacity and understanding of One Health using the One Health risk communication training package. Revise the case study to include the six prioritized zoonoses. Use the training package to build capacity off One Health stakeholders.	Finalized One Health Risk Communication Training Package with the six diseases as case study Number of people trained on One Health risk communication	NCDC
8.2: Improve information sharing across One Health Coordinating Unit and leverage National Risk Communication Technical Working Group (NRCTWG) knowledge management platform, standing agenda item, WhatsApp, etc. and develop a newsletter/bulletin	Quarterly/bi-annual newsletter or bulletin on the prioritized zoonoses	All Sectors
8.3: Increase awareness and advocacy for One Health events and prioritized diseases among stakeholders and general public, leveraging world's days or other events (webinars, social media, campaigns)	Awareness campaign on prioritized zoonoses conducted	
Timeframe for Progress Check		6 months

Research

Goal: Strengthen the multisectoral approach to prevent the establishment and spread of prioritized zoonoses

Next Steps	Indicators to measure when the next steps are achieved	Sector(s) Responsible
9.1: Mapping of ongoing research activities and gaps across the One Health sectors	Availability of harmonized list of research activities and gaps	National One Health Coordinating Unit
9.2: Identify funding sources for One Health research	Availability of list of funding sources for One Health research	National One Health Coordinating Unit, All the One Health sectors
9.3: Advocacy for prioritization of research funding for One Health	Number of MDA, partners, and donors with budget line for One Health research	
9.4: Establish One Health research network to improve research output in One Health	One Health research published	
Timeframe for Progress Check		6 months (December 2022)



Photo 7. Woman and her chicken.

APPENDIX A: Overview of the One Health Zoonotic Disease Prioritization Process

U.S. Centers for Disease Control and Prevention: Overview of the One Health Zoonotic Disease Prioritization Workshop <https://www.cdc.gov/one-health/php/prioritization/>



APPENDIX B: One Health Zoonotic Disease Prioritization Workshop Participants for Nigeria

Voting Members

Name	Organization	Title/Position
Nasir Ahmed	Nigeria Centre for Disease Control (NCDC)	Assistant Director One Health
Chinenye Emelife	Nigeria Centre for Disease Control (NCDC)	Epidemiologist
Damilola Kolade	Nigeria Centre for Disease Control (NCDC)	Epidemiologist
Yahya Disu	Nigeria Centre for Disease Control (NCDC)	Assistant Director Risk Communication
Chinyere Akujobi	Federal Ministry of Agriculture & Rural Development (FMARD)	Deputy Director/Vet. Public Health
Shuaibu Muhammad Osu	Federal Ministry of Agriculture & Rural Development (FMARD)	Senior Vet. Officer Public health
Dupe Hambolu	Federal Ministry of Agriculture & Rural Development (FMARD)	Assistant Director/Vet. Public Health
Abagidi Faith	Federal Ministry of Environment (FMEnv)	Senior Scientific Officer
Aghogho Getsere	Federal Ministry of Environment (FMEnv)	Chief Environmental Health Officer
Okpala Chika Catherine	Federal Ministry of Environment (FMEnv)	Chief Environmental Health Officer
Dickson Akoh Silas	Federal Ministry of Environment (FMEnv)	SSO Senior Scientific Officer
Sunday Makama	National Veterinary Research Institute (NVRI)	Assistant Director

Advisors/Observers

Name	Organization	Title/Position
Fatimah Mohammed Yusuf	Federal Ministry of Health (FMOH), PHS	Deputy Director
Dorcas Mernyi	Federal Ministry of Health (FMOH), OH	Assistant Director
Achichi Grace. O	Nigeria Agricultural Quarantine Service (NAQS)	Deputy Director
Ubor Gloria	National Environmental Standards and Regulations Enforcement Agency (NESREA)	Assistant Director
Prof Adebisi Pelumi	University of Ibadan	Professor of Human Health
Dr. Oyewale Morakinyo	Envirt, University of Ibadan	Professor of Environment
Prof Osagbemi Kayode	University of Ilorin	Professor of Human Health
Prof. Agwu Amadi	Federal University of Technology	Professor of Environment
Prof. James Ameh	University of Abuja	Professor of Animal Health
Olusola Aruna	UK Health Security Agency (UKHSA)	Senior Public Health Advisor
Guy Kouame	ECTAD, Food and Agriculture Organization of the United Nations (FAO), Nigeria	ECTAD Country Team Leader
Prof Dilys Morgan	UK Health Security Agency	Senior Public Health Advisor
Patrick Igawe	CORE Group	Epidemiologist
Banji Ipadeola	U.S. Centers for Disease Control and Prevention, Nigeria country office	Senior Public Health Specialist

Name	Organization	Title/Position
Olayinka Umar-Farouk	Breakthrough Action Nigeria (BA-N)	Deputy Project Director
Patrick Nguku	AFENET/GIS	Epidemiologist
Yetunde Abioye	National One Health Coordinating Unit Secretariat	Senior Veterinary Officer

Trained In-Country Facilitators

Name	Organization	Title/Position
Oyeladun Okunromade	Nigeria Centre for Disease Control (NCDC)	Deputy Director/Surveillance
Abiodun Egwuenu	Nigeria Centre for Disease Control (NCDC)	Assitant Director/AMR Programme Manager
Damilola Kolade	Nigeria Centre for Disease Control (NCDC)	One Health/IHR officer
Samuel Anzaku	Federal Ministry of Agriculture & Rural Development (FMARD)	Deputy Director/Vet. Public Health
Mairo Kachalla	Federal Ministry of Agriculture & Rural Development (FMARD)	Assistant Director/Vet. Public Health
Akinola Kabiru O.	Federal Ministry of Environment (FMEnv)	Chief Environmental Health Officer
Collins Okenyi	Federal Ministry of Environment (FMEnv)	Scientific Officer (SSO)
Charles Akatobi	AFENET	Epidemiologist
Kikiope Oluwarore	WHO Nigeria	One Health Sherpa (Consultant)
Abraham Zirrah	ECTAD, FAO Nigeria	ECTAD National Epidemiology Advisor
Guy Kouame	ECTAD, FAO Nigeria	Country Team Lead—Nigeria

External Facilitators or Other Key Staff

Name	Organization	Title/Position
Modupe Osinubi	U.S. Centers for Disease Control and Prevention, One Health Office	Health Scientist
Hayley Belles	U.S. Centers for Disease Control and Prevention, One Health Office	Health Scientist
Grace Goryoka	U.S. Centers for Disease Control and Prevention, One Health Office	Public Health Advisor

Core Planning Team Members

Name	Organization	Title/Position
Oyeladun Okunromade	Nigeria Centre for Disease Control (NCDC)	Deputy Director/Surveillance
Nasir Ahmed	Nigeria Centre for Disease Control (NCDC)	Assistant Director/Surveillance & Epidemiology
Abiodun Egwuenu	Nigeria Centre for Disease Control (NCDC)	Assistant Director/AMR Programme Manager
Bola Lawal	Nigeria Centre for Disease Control (NCDC)	Epidemiologist
Mairo Kachalla	Veterinary Public Health	Chief Veterinary Officer
Sunday Makama	National Veterinary Research Institute (NVRI)	Assistant Director
Salome Bawa	Federal Ministry of Agriculture and Rural Development/Veterinary Public Health	Deputy Director/Assistant Chief Veterinary Officer
Abraham Zirrah	ECTAD, FAO Nigeria	ECTAD National Epidemiology Advisor

Name	Organization	Title/Position
Guy Kouame	ECTAD, FAO Nigeria	Country Team Lead—Nigeria
Ismaila Seck	ECTAD, FAO ECTAD Regional	Regional Epidemiologist
Kikiope Oluwarore	WHO Nigeria	One Health Sherpa
Tieble Traore	WHO AFRO Regional Office	Technical Officer, Emergency Preparedness
Oladipupo Banji Ipadeola	U.S. Centers for Disease Control and Prevention, Nigeria country office	Senior Public Health Specialist (Surveillance & Info Systems)
Modupe Osinubi	U.S. Centers for Disease Control and Prevention, One Health Office	Health Scientist
Hayley Belles	U.S. Centers for Disease Control and Prevention, One Health Office	Health Scientist
Grace Goryoka	U.S. Centers for Disease Control and Prevention, One Health Office	Public Health Advisor



Photo 8. Seafood market in Lagos, Nigeria

APPENDIX C: Ranked Zoonotic Disease List in Nigeria from the One Health Zoonotic Prioritization Tool

Rank#	Disease	Etiologic Agent	Raw Score	Final Score
1	Monkeypox	Monkeypox virus	1.365	1.000
2	Anthrax	<i>Bacillus anthracis</i>	1.250	0.916
3	Yellow fever	Yellow fever virus	1.246	0.912
4	Lassa fever	Lassa Fever virus	1.246	0.912
5	Ebola hemorrhagic fever	Ebola virus	1.209	0.886
6	Highly Pathogenic Avian Influenza	Influenza A viruses	1.197	0.877
7	Rabies	Rabies Virus	1.156	0.847
8	Zika	Zika virus	1.150	0.843
9	E. coli	<i>Escherichia coli</i>	1.126	0.825
10	Staphylococcus	<i>Staphylococcus spp.</i>	1.085	0.795
11	Salmonellosis	<i>Salmonella spp.</i>	1.078	0.790
12	Covid-19	SARS-CoV-2	1.069	0.783
13	Trypanosomiasis	<i>T. brucei rhodesiense</i> ; <i>T. brucei gambiense</i> ; <i>T. cruzi</i>	1.040	0.762
14	Middle East respiratory syndrome (MERS)	Middle East respiratory syndrome coronavirus (MERS-CoV)	0.949	0.695
15	Bovine Tuberculosis	<i>Mycobacterium bovis</i>	0.946	0.693
16	Echinococcosis/Hydatidosis	<i>Echinococcus spp.</i>	0.926	0.678
17	Listeriosis	<i>Listeria monocytogenes</i>	0.926	0.678
18	Leptospirosis	<i>Leptospira spp.</i>	0.908	0.665
19	Marburg	Marburg virus	0.866	0.635
20	Crimean-Congo hemorrhagic fever	Crimean-Congo hemorrhagic fever virus	0.866	0.635
21	Chikungunya	Chikungunya virus	0.866	0.635
22	Q fever	<i>Coxiella burnetii</i>	0.834	0.611
23	Leishmaniasis	<i>Leishmania spp.</i>	0.825	0.604
24	Shigella	<i>Shigella spp.</i>	0.821	0.601
25	Brucellosis	<i>Brucella abortus</i> ; <i>Brucella melitensis</i> ; <i>Brucella suis</i>	0.818	0.599
26	Dengue fever	Dengue virus	0.816	0.598
27	Rift Valley fever	Rift Valley fever virus	0.726	0.532
28	Plague	<i>Yersinia pestis</i>	0.710	0.520
29	Scrapie/Bovine spongiform encephalopathy	Bovine spongiform encephalopathy	0.694	0.508
30	Cysticercosis	<i>T. saginatum</i> ; <i>T. solium</i>	0.666	0.488
31	Giardiasis	Giardia lamblia	0.624	0.457
32	Swine erysipelas	Erysipelothrix rhusiopathiae	0.538	0.394

Rank#	Disease	Etiologic Agent	Raw Score	Final Score
33	Psittacosis	<i>Chlamydia psittaci</i>	0.538	0.394
34	Tularemia	<i>Francisella tularensis</i>	0.538	0.394
35	Myiasis	Diptera flies	0.538	0.394
36	Trichinellosis	<i>Trichinella spiralis</i>	0.538	0.394



Photo 9. Farm Fields in Nigeria .

APPENDIX D: Criteria, Criteria Weights, and Questions Developed

1. Environmental Impact (criteria weight = 0.069)

Question: Does the management of the disease (detection, control, or prevention) cause an impact of the environment?

Assumptions: Considered incidence in Nigeria primarily

Answers:

- ☐ Yes (2)
- ☐ No (1)

2. Severity of Disease (criteria weight = 0.347)

Question: What is the case fatality rate of the disease?

Assumptions: Assessed both animal and human fatality rate and used the higher of the two rates to answer the question. If available, Nigeria country data was used, if not then global data was used.

Answers:

- ☐ Less than 1% (1)
- ☐ More than or equal to 1% and less than 5% (2)
- ☐ More than or equal to 5% and less than 10% (3)
- ☐ More than or equal to 10% and less than 50% (4)
- ☐ More than 50% (5)

3. Epidemic Potential (criteria weight = 0.263)

Question: Does the disease have a demonstratable potential for spread in:

- Sustained human to human
- Sustained animal to animal

Answers:

- ☐ Both of these (3)
- ☐ One of these (2)
- ☐ Neither (1)

4. Socio-economic Impact (criteria weight = 0.166)

Question: Does the disease affect international travel or trade, or livelihood, lifestyle or livestock production?

Answers:

- ☐ 4 or more met (5)
- ☐ 3 met (4)
- ☐ 2 met (3)
- ☐ 1 met (2)
- ☐ None (1)

5. Capacity to Prevent and Control (criteria weight = 0.156)

Question: Do we have a treatment or vaccine available in Nigeria for humans or animals?

Assumptions: Question contextualizes Nigeria assuming that this is a pre-prioritization phase (as at present)

Answer:

- ☐ Not available (3)
- ☐ One available (2)
- ☐ Both available (1)



Photo 10. Landscape of Idanre Hill

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Photo 11. Erin-Ijesha Waterfalls (also known as Olumirin waterfalls) is located in Erin-Ijesha, Osun State, Nigeria.

<http://www.cdc.gov/onehealth>