



**NEWCASTLE DISEASE  
RESPONSE PLAN**  
***THE RED BOOK***

**FAD PReP**

**Foreign Animal Disease  
Preparedness & Response Plan**



**United States  
Department of  
Agriculture**

United States Department of Agriculture • Animal and Plant Health Inspection Service • Veterinary Services

FEBRUARY 2014



## FAD PReP

Foreign Animal Disease  
Preparedness and Response Plan

February 11, 2014

USDA APHIS, Veterinary Services

National Preparedness and Incident Coordination Center (NPIC)

This version of the *USDA APHIS Newcastle Disease (ND) Response Plan: The Red Book (February 2014)* has been updated according to comments received on a prior version and revisions to the current Foreign Animal Disease Preparedness and Response Plan (FAD PReP) materials that are referenced within. The following list summarizes the important changes that were made in 2014.

- Updates to reflect the 2013 OIE Terrestrial Animal Health Code.
- Revisions to ensure consistency with other response plans and strategic documents.
- Updates to ND case definition.
- Changes in nomenclature per the updated Code of Federal Regulations.
- Corrections and clarifications made in response to comments throughout the plan, including those comments received on the *Exotic ND Response Plan: The Red Book (draft August 2013)* version that was circulated.

We realize that preparing for and responding to an ND outbreak will be a complex effort, requiring collaboration for multiple stakeholders. As such, we will accept comments on the *ND Response Plan* for incorporation into future versions. Please email these comments to [FAD.PReP.Comments@aphis.usda.gov](mailto:FAD.PReP.Comments@aphis.usda.gov) with the subject line of “ND Response Plan.”

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*The Foreign Animal Disease Preparedness and Response Plan (FAD PReP) mission is to raise awareness, define expectations, and improve capabilities for FAD preparedness and response.*

For more information, please go to:

<http://www.aphis.usda.gov/fadprep>

<http://inside.aphis.usda.gov/vs/em/fadprep.shtml> (APHIS employees)

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# Executive Summary

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This *Newcastle Disease (ND) Response Plan: The Red Book (2014)* incorporates comments received on the *Exotic ND Response Plan: The Red Book (draft 2013)*. This 2014 plan was also updated to be consistent with other Foreign Animal Disease Preparedness and Response Plan (FAD PReP) materials. This plan has changed significantly from the *END Red Book (1992)*. The objectives of this plan are to identify (1) the capabilities needed to respond to an ND outbreak and (2) the critical activities that are involved in responding to that outbreak, and time-frames for these activities. These critical activities are the responsibility of Incident Command in an outbreak situation.

This plan protects public health and the environment, promotes agricultural security, secures the food supply, and guards animal health by providing strategic guidance on responding to an ND outbreak. Developed by the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), the plan gives direction to emergency responders at the local, State, Tribal, and Federal levels to facilitate ND control and eradication efforts in poultry in the United States. This plan complements, not replaces, existing regional, State, Tribal, local, and industry plans.

As defined by the Code of Federal Regulations, ND is caused by an avian paramyxovirus serotype-1 that meets specific criteria for virulence. This virus is also called virulent ND virus (vNDV). For the purposes of this plan, ND—formerly known as exotic Newcastle disease or END—is defined as an infection of poultry with vNDV. ND is readily transmitted through sick and infected birds; the 2002–2003 outbreak in the United States was estimated to cause \$5 billion in industry losses.

ND is a zoonotic disease, though not one that poses a significant threat to public health. Infections in humans are usually characterized by conjunctivitis, though mild, self-limiting influenza-like symptoms have been reported. Individuals most at risk for ND are those exposed to large quantities of the virus through direct contact with infected poultry, like laboratory workers and vaccination crews. No known infections have occurred from handling or consuming poultry products. In the event of an ND outbreak, animal health officials will collaborate with public health officials. In addition to the potential public health threat, there may also be a significant social and psychological impact on flock owners.

*The goals of an ND response are to (1) detect, control, and contain ND in poultry as quickly as possible; (2) eradicate ND using strategies that seek to protect public health and the environment, and stabilize animal agriculture, the food supply, and the economy; and (3) provide science- and risk-based approaches and systems to facilitate continuity of business for non-infected poultry and non-contaminated poultry products.*

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*Achieving these three goals will allow individual poultry facilities, States, Tribes, regions, and industries to resume normal production as quickly as possible. They will also allow the United States to regain ND-free status without the response effort causing more disruption and damage than the disease outbreak itself.*

During an ND outbreak response effort, many activities—such as epidemiology, surveillance, biosecurity, quarantine and movement control, and depopulation—must occur in a deliberate, coordinated fashion. In addition to providing strategic direction on these various activities, this plan explains the underlying Incident Command System structure, applying the National Response Framework (NRF) and National Incident Management System (NIMS) principles and systems to control and eradicate an outbreak of ND in the domestic poultry population.

*The United States' primary control and eradication strategy for ND in domestic poultry is "stamping-out," as prescribed by the World Organization for Animal Health (OIE), in order to regain ND-free status.* However, if the spread of ND outpaces the resources for stamping-out, or if other factors direct the response away from a stamping-out policy alone, emergency vaccination strategies may be considered.

Incorporating current scientific knowledge and policy guidance about ND, the *ND Response Plan* does the following:

- ◆ Identifies the audience for and purpose of the document.
- ◆ Provides technical information on ND and the impact an ND outbreak could have in the United States.
- ◆ Explains the integration of the NRF, NIMS, and other FAD PReP documents.
- ◆ Describes USDA preparedness and response activities, both domestic and international, including collaboration with public health agencies and the APHIS Incident Management Structure.
- ◆ Presents 23 specific response critical activities and tools, such as surveillance, diagnostics, cleaning and disinfection, health and safety, personal protective equipment, and depopulation.
- ◆ Details OIE standards for ND surveillance, virus inactivation, and disease freedom.
- ◆ Supplies information on proof-of-freedom procedures and restocking after an ND outbreak.

This response plan is carefully integrated with other FAD PReP documents, including the ND Standard Operating Procedures and National Animal Health Emergency Management System Guidelines. Together, these documents provide a comprehensive preparedness and response framework for an ND outbreak.

Further information on FAD PReP is available at <http://www.aphis.usda.gov/fadprep> and for APHIS employees at <http://inside.aphis.usda.gov/vs/em/fadprep.shtml>.

This plan is a dynamic document that will be updated and revised based on future knowledge and further stakeholder input. Your comments and recommendations on this document are invited. Send them to the following e-mail address: [FAD.PReP.Comments@aphis.usda.gov](mailto:FAD.PReP.Comments@aphis.usda.gov).

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# Preface

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The Foreign Animal Disease Preparedness and Response Plan (FAD PReP)—*Newcastle Disease (ND) Response Plan: The Red Book (2014)* provides strategic guidance for responding to an animal health emergency caused by ND in the United States. This *ND Response Plan (2014)* replaces previous ND summary response plans. Information in this plan may require further discussion and development with stakeholders.

This *ND Response Plan* is under ongoing review. This document was last updated in **February 2014**. Please send questions or comments to:

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While best efforts have been used in developing and preparing the *ND Response Plan*, the U.S. Government, U.S. Department of Agriculture (USDA) and the Animal and Plant Health Inspection Service and other parties, such as employees and contractors contributing to this document, neither warrant nor assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information or procedure disclosed. The primary purpose of this *ND Response Plan* is to provide strategic guidance to those government officials responding to an ND outbreak. It is only posted for public access as a reference.

The *ND Response Plan* may refer to links to various other Federal and State agencies and private organizations. These links are maintained solely for the user's information and convenience. If you link to such site, please be aware that you are then subject to the policies of that site. In addition, please note that the U.S. Department of Agriculture does not control and cannot guarantee the relevance, timeliness, or accuracy of these outside materials. Further, the inclusion of links or pointers to particular items in hypertext is not intended to reflect their importance, nor is it intended to constitute approval or endorsement of any views expressed, or products or services offered, on these outside web sites, or the organizations sponsoring the web sites.

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# Chapter 1

## Introduction and ND Information

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### 1.1 INTRODUCTION TO RESPONSE PLAN

This *Newcastle Disease (ND) Response Plan: The Red Book (2014)* incorporates comments received on the *Exotic ND Response Plan: The Red Book (draft 2013)* and updates to current Foreign Animal Disease Preparedness and Response Plan (FAD PReP) materials. This plan has been updated significantly from the *Exotic ND Red Book (1992)*. The objectives of this plan are to identify the (1) capabilities needed to respond to an ND outbreak and (2) critical activities that are involved in responding to that outbreak and associated time-frames. These critical activities are the responsibility of Incident Command (IC) in an outbreak situation.

To achieve these objectives, this plan provides current information on ND and its relevance to the United States, and presents the organizational strategy for an effective response to a detection of ND in poultry. In addition, it offers guidance on stamping-out, the primary ND outbreak response strategy. This plan also contains updated guidance on 23 critical response activities and tools, such as disposal, appraisal and compensation, and quarantine and movement control. As indicated by links throughout the document, this plan is integrated and coordinated with other FAD PReP documents such as standard operating procedures (SOPs), National Animal Health Emergency Management System (NAHEMS) Guidelines, and existing Animal and Plant Health Inspection Service (APHIS) Guidance. ([Appendix A](#) provides a list of documents related to ND outbreak response and an overview of FAD PReP.)

In the United States, historically, ND has been called exotic Newcastle disease, or END. The Code of Federal Regulations was recently updated, and END is now referred to as ND.

This plan does not replace existing regional, State, Tribal, local, or industry preparedness and response plans relating to ND. Regional, State, Tribal, local, and industry plans should be aimed at more specific issues in ND response. In particular, States should develop response plans focused on the specific characteristics of the State and its poultry industry.

Newcastle disease viruses (NDV) can infect over 250 bird species. There are three different pathotypes of NDV, lentogenic, mesogenic, and velogenic. These pathotypes are categorized by their level of virulence: lentogenic viruses are low virulence (loNDV); mesogenic and velogenic viruses are virulent (vNDV). In the United States only the occurrence of vNDV is referred to as ND. In unvaccinated

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chickens, vNDV may cause morbidity close to 100 percent. Mortality is typically between 70–100 percent; surviving birds may have permanent neurological damage. ND is a high priority for the U.S. Department of Agriculture (USDA) APHIS.

ND is endemic in many parts of the world, including Asia, Africa, Central and South America, and parts of Mexico, but has not been detected in U.S. poultry populations since 2003. ND is easily transmitted, through direct contact with infected birds or indirect contact with contaminated feed, water, and fomites.

Humans can be infected with vNDV, but it is not considered a significant threat to public health. Typically, the virus causes conjunctivitis which resolves rapidly. Mild, self-limiting influenza-like symptoms have also been reported. From past outbreaks, it appears that laboratory workers and vaccination crews are at the highest risk for infection. The USDA will coordinate with public health agencies to ensure the public's health is protected in an ND outbreak in domestic poultry.

## 1.2 PURPOSE OF DOCUMENT

This plan provides strategic guidance for USDA APHIS and responders at all levels in the event of an ND outbreak, specifically in poultry. It also provides current policy information and a strategic framework for the control and eradication of ND, should an outbreak occur in the United States.

## 1.3 AUDIENCE

This document is intended for animal health emergency responders at all levels of government, as well as industry partners. It provides strategic guidance and offers additional resources for more tactical information for responders and other individuals who will act during an ND outbreak in poultry.

## 1.4 DEFINITIONS

For the purposes of this plan, please use the following:

- ◆ Avian paramyxovirus serotype 1 (APMV-1) is the etiologic agent of Newcastle disease (ND) in birds.
- ◆ APMV-1 viruses that cause ND are either virulent (vNDV) or low virulence (loNDV).
- ◆ In the Code of Federal Regulations (CFR), Newcastle Disease (ND) refers to an infection of poultry with vNDV.
- ◆ NDV refers to the virus in general, for example, when discussing environmental persistence.

## 1.5 ND INFORMATION

These sections provide an overview of ND and cover the following subjects:

- ◆ Etiology
- ◆ History and global distribution
- ◆ Impact of an ND outbreak
- ◆ Ecology
- ◆ Diagnosis
- ◆ Immunity.

The USDA ND website also contains valuable information:

[http://www.aphis.usda.gov/animal\\_health/birdbiosecurity/end/](http://www.aphis.usda.gov/animal_health/birdbiosecurity/end/). Further information on ND can be found in the ND Overview of Etiology and Ecology SOP. [Chapter 5](#) of this plan includes a current case definition for ND.

### 1.5.1 Etiology

#### 1.5.1.1 OVERVIEW

ND is an infection of birds caused by vNDV, an avian paramyxovirus serotype-1 (APMV-1). This virus is a single stranded ribonucleic acid (RNA) virus, in the family Paramyxoviridae and genus *Avulavirus*. Nine serotypes of avian paramyxovirus have been identified. There is one serotype of APMV-1 and six phylogenetic lineages.

There are three major pathotypes based on virulence: lentogenic (low virulence viruses), mesogenic and velogenic (virulent viruses). The velogenic viruses are further classified as either neurotropic or viscerotropic.

#### 1.5.1.2 WORLD ORGANIZATION FOR ANIMAL HEALTH DEFINITION OF NEWCASTLE DISEASE

The World Organization for Animal Health (OIE) (2013) defines Newcastle disease for international trade as “an infection of poultry caused by a virus (NDV) of avian paramyxovirus serotype 1 (APMV-1) that meets one of the following criteria for virulence:”<sup>1</sup>

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<sup>1</sup> OIE. 2013. Article 10.9.1, Chapter 10.9: Newcastle Disease. *OIE Terrestrial Animal Health Code*. <http://www.oie.int>.



- 
- a. The virus has an intracerebral pathogenicity index (ICPI) in day-old chicks (*Gallus gallus*) of 0.7 or greater; or
  - b. Multiple basic amino acids have been demonstrated in the virus (either directly or by deduction) at the C-terminus of the F2 protein and phenylalanine at residue 117, which is the N-terminus of the F1 protein. The term ‘multiple basic amino acids’ refers to at least three arginine or lysine residues between residues 113 and 116. Failure to demonstrate the characteristic pattern of amino acid residues as described above would require characterization of the isolated virus by an ICPI test.

Only infection and disease attributable to vNDV in poultry is reportable to the OIE.

### 1.5.1.3 U.S. CODE OF FEDERAL REGULATIONS DEFINITIONS OF ND<sup>2</sup>

In 9 CFR 82.1, ND is defined as

Newcastle disease is an acute, rapidly spreading, and usually fatal viral infection of poultry caused by an avian paramyxovirus serotype 1 that meets one of the following criteria for virulence: The virus has an intracerebral pathogenicity index (ICPI) in day-old chicks (*Gallus gallus*) of 0.7 or greater; or multiple basic amino acids have been demonstrated in the virus (either directly or by deduction) at the C-terminus of the F2 protein and phenylalanine at residue 117, which is the N-terminus of the F1 protein. The term “multiple basic amino acids” refers to at least three arginine or lysine residues between residues 113 and 116. In this definition, amino acid residues are numbered from the N-terminus of the amino acid sequence deduced from the nucleotide sequence of the F0 gene; 113-116 corresponds to residues -4 to -1 from the cleavage site. Failure to demonstrate the characteristic pattern of amino acid residues as described above may require characterization of the isolated virus by an ICPI test. A failure to detect a cleavage site that is consistent with virulent strains does not confirm the absence of a virulent virus.

Infections with vNDV in poultry are referred to as ND in the United States.

## 1.5.2 History and Global Distribution

ND was first identified in England in 1927. It is highly infectious, and often transmitted through the smuggling of pet birds who may be disease carriers. Velogenic strains are considered exotic to the United States. The first major outbreak of ND in the United States was identified in the early 1970s; this

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<sup>2</sup> Please see the appropriate CFR sections for further information, such as CFR definitions of poultry.

outbreak was epidemiologically linked to the transmission of ND from infected parrots to commercial poultry.<sup>3</sup>

Virulent NDV remains endemic in many parts of the world, including Asia, the Middle East, and Africa. In 2011–2012, vNDV outbreaks were reported in Australia, Czech Republic, Israel, Mexico, Nicaragua, Peru, Romania, Sweden, and Switzerland.<sup>4</sup> The last ND outbreaks in the United States included the States of California (2002–2003), Nevada (2003), Arizona (2003), and Texas (2003). Virulent NDV is endemic in wild cormorants in the United States and Canada, but commercial poultry are currently free of velogenic isolates.<sup>5</sup> LoNDV is endemic in poultry.

### 1.5.3 International Trade

The United States does not import live poultry from countries or regions currently experiencing ND outbreaks in commercial or traditionally raised flocks. However, USDA APHIS may recognize ND-free regions (also called zones) for trade in countries affected by ND that demonstrate adequate veterinary infrastructure and authority, quarantine and movement controls, other disease control measures, and surveillance activities for ND. Countries and regions that are recognized, per 9 CFR 94.6, by the United States as *free* of ND are listed on the [APHIS website](#).

### 1.5.4 Impact of an ND Outbreak

#### 1.5.4.1 ECONOMIC

In 1971, the ND outbreak in the United States resulted in the destruction of 12 million birds at a cost of \$56 million to eradicate the virus in 3 years. The 2002–2003 epidemic in the western United States resulted in industry losses estimated at \$5 billion, and a direct cost of \$160 million to control the outbreak. Three million birds were culled. An ND outbreak in the United States today could exceed these economic costs and also result in significant disruptions to the U.S. food supply.

#### 1.5.4.2 ZONOTIC POTENTIAL AND PUBLIC HEALTH IMPLICATIONS

Virulent NDV can cause infection in humans. This infection is mild and self-limiting. It usually causes conjunctivitis, but can also result in mild influenza-like symptoms. Direct contact with infected birds is the most common transmission pathway; it is not transmitted through the consumption of poultry products.

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<sup>3</sup> Walker, J.W., Heron, B.R., Mixson, M.A. 1972 “Exotic Newcastle Disease Eradication Program in the United States.” *Avian Diseases* 17(3), 486–503.

<sup>4</sup> OIE. 2013. World Animal Health Information Database. [www.oie.int](http://www.oie.int).

<sup>5</sup> Center for Food Security and Public Health. 2008. “Newcastle Disease.” [http://www.cfsph.iastate.edu/Factsheets/pdfs/newcastle\\_disease.pdf](http://www.cfsph.iastate.edu/Factsheets/pdfs/newcastle_disease.pdf).

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Responders—particularly poultry workers and vaccination crews—should be protected from the virus through appropriate health and safety measures and personal protective equipment (PPE). Immunosuppressed individuals should take extra precautions, as vNDV can cause more severe opportunistic infections. An outbreak of ND in birds does not pose a serious public health threat to humans.

## 1.5.5 Ecology

More than 250 avian species can be infected with NDV. The most severely affected avian species are typically Galliformes, an order that includes

- ◆ chickens,
- ◆ guinea fowl,
- ◆ peafowl,
- ◆ pheasant, and
- ◆ quail.

Turkeys can be infected, but usually present less severe clinical signs than chickens. A species adapted strain is also frequently found in pigeons (Columbidae). Psittacine birds (such as parrots) can be carriers of the disease and not show clinical signs. In addition, waterfowl (Anseriformes) often carry the virus without clinical signs, though illness has been observed in ducks. Penguins (Sphenisciformes) are also highly susceptible.<sup>6</sup>

### 1.5.5.1 RESERVOIRS AND CARRIERS

Wild birds and waterfowl can be reservoirs for NDV. Upon transmission to domestic poultry, these strains may mutate into more virulent viruses.<sup>7</sup> In addition, some psittacine species may shed virus for extended periods of time (several months to a year), but may not show clinical signs.

### 1.5.5.2 INTRODUCTION AND TRANSMISSION OF ND IN DOMESTIC POULTRY

Contact with reservoir birds, like migratory waterfowl, or subclinically infected birds (which may not show clinical signs) is a common mode of introduction of NDV into a domestic poultry population. Secretions of affected birds—including

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<sup>6</sup> Center for Food Security and Public Health. 2008. “Newcastle Disease.” [http://www.cfsph.iastate.edu/Factsheets/pdfs/newcastle\\_disease.pdf](http://www.cfsph.iastate.edu/Factsheets/pdfs/newcastle_disease.pdf).

<sup>7</sup> OIE. 2009. Technical Disease Card: Newcastle Disease. <http://www.oie.int>.

fecal and respiratory secretions—are highly infectious. Vertical transmission of virulent strains is unlikely, because the embryo typically dies.<sup>8</sup>

Short distance aerosolized transmission has been documented.<sup>9,10</sup> In particular, care should be taken to ensure litter, feathers, and other materials are not airborne during cleaning and disinfection. Transmission of NDV occurs readily through fomites, including food, water, egg packing materials, vehicles, footwear, and clothing.

### 1.5.5.3 PERSISTENCE IN ENVIRONMENT AND ANIMAL PRODUCTS

NDV can be easily inactivated, but it remains viable for long periods of time particularly at ambient temperatures and in the presence of feces. The results of one study suggest that the virus may survive in lake water for approximately 2 weeks. NDV is inactivated by heating to 56°C for 3 hours or 60°C for 30 minutes.<sup>11</sup> NDV is also inactivated by acidic pH ( $\leq 2$ ). Ether, formalin, and disinfectants like Virkon® S all inactivate NDV.

NDV may be present in eggs and egg products. For virus inactivation, the OIE recommends that whole eggs are heated to a temperature of 59°C for 674 seconds. Liquid egg will need to be heated for 301 seconds at this temperature. In meat, NDV can be inactivated by heating to a 70°C core temperature for 3.6 seconds. The OIE provides additional guidance based on various temperatures in the OIE *Terrestrial Animal Health Code (2013)*.<sup>12</sup>

### 1.5.6 Diagnosis in Avian Species

The incubation period for ND is typically 5–6 days but can range from 2–15 days. In some species, the OIE suggests incubation periods may be over 20 days.<sup>13</sup> For the purposes of the OIE *Terrestrial Animal Health Code (2013)* the incubation period for ND is 21 days.<sup>14</sup>

<sup>8</sup> Chen, J.P. and Wang, C.H. 2002. “Clinical Epidemiologic and Experimental Evidence for the Transmission of Newcastle Disease Virus through Eggs.” *Avian Diseases*. 46(2), 461–465.

<sup>9</sup> Alexander, D.J. 2000. “Newcastle disease and other avian paramyxoviruses.” *Rev sci tech Off Int Epiz*. 19(2): 443–462.

<sup>10</sup> Hugh-Jones, M., W.H. Allan, F.A. Dark, and G.J. Harper. “The evidence for the airborne spread of Newcastle disease.” *J Hyg, Camb*. 71, 325–339.

<sup>11</sup> OIE. 2009. Technical Disease Card: Newcastle Disease. <http://www.oie.int>.

<sup>12</sup> OIE. 2013. Article 10.9.20, Chapter 10.9: Newcastle Disease. *OIE Terrestrial Animal Health Code*. <http://www.oie.int>.

<sup>13</sup> OIE. 2009. Technical Disease Card: Newcastle Disease. <http://www.oie.int>.

<sup>14</sup> OIE. 2013. Article 10.9.1, Chapter 10.9: Newcastle Disease. *OIE Terrestrial Animal Health Code*. <http://www.oie.int>.

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### 1.5.6.1 CLINICAL SIGNS<sup>15</sup>

Clinical signs vary widely depending on the strain of the virus, host species, age of the host, co-infection, and other factors. The typical clinical signs for loNDV (lentogenic pathotypes) and vNDV (mesogenic and velogenic pathotypes) are listed below.

#### 1.5.6.1.1 Low Virulence Strains (Lentogenic)

Strains of loNDV typically result in little mortality. Common clinical signs include the following:

- ◆ Coughing,
- ◆ Gasping,
- ◆ Sneezing, and
- ◆ Rales.

#### 1.5.6.1.2 Virulent Strains (Mesogenic and Velogenic)

Mesogenic strains of NDV typically result in low mortality, but can cause acute respiratory and neurologic signs.

Velogenic strains cause severe disease, particularly in chickens. Velogenic strains are divided into viscerotropic forms and neurotropic forms. The viscerotropic form typically causes hemorrhagic lesions while the neurotropic form usually causes respiratory and neurological signs. However, these signs can often be observed simultaneously, and vary depending on the strain and species of bird.<sup>16</sup> In general, clinical signs common with velogenic NDV include the following:

- ◆ Lethargy,
- ◆ Inappetence,
- ◆ Ruffled feathers,
- ◆ Edema,
- ◆ Greenish or watery diarrhea,
- ◆ Dyspnoea,
- ◆ Inflammation of the head and neck,
- ◆ Cyanotic discoloration,

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<sup>15</sup> OIE. 2009. Technical Disease Card: Newcastle Disease. <http://www.oie.int>.

<sup>16</sup> Spickler, A.R., and J.A. Roth. 2008. "Newcastle disease." In *Emerging and exotic diseases of animals*. Ames, IA: Iowa State University.

- ◆ Death.

As the disease progresses, neurologic signs may become more apparent, including tremors, tonic/clonic spasms, wing/leg paralysis, and torticollis. Egg production is likely to drop suddenly, and eggs become misshapen or abnormally colored. In unvaccinated chickens, morbidity and mortality can reach 100 percent.

### 1.5.6.2 GROSS LESIONS

Only velogenic strains will result in significant gross lesions. Lesions can be variable within neurotropic and viscerotropic forms. In general, velogenic gross lesions may include the following:

- ◆ Swelling of the periorbital area or head,
- ◆ Edema of the interstitial or peritracheal neck tissue,
- ◆ Petechiae and small ecchymoses on the mucosa of the proventriculus,
- ◆ Necrosis, ulcerations, or hemorrhages of respiratory, digestive, or lymphoid tissue, and
- ◆ Enlarged spleen.

### 1.5.6.3 DIFFERENTIAL DIAGNOSES

Virulent NDV can resemble highly pathogenic avian influenza (caused by *influenzavirus A*), laryngotracheitis (caused by infectious laryngotracheitis virus), psittacosis (caused by *Chlamydophila psittaci*), mycoplasmosis (caused by *mycoplasma gallisepticum*), and fowl cholera (caused by *Pasturella* spp.).

## 1.5.7 Vaccines and Induced Immunity

Vaccination has long been used in the United States as a control measure for loNDV.<sup>17</sup> Many commercial poultry operations, including broiler breeders, layers, and turkeys use low virulence live and/or inactivated vaccines (lentogenic vaccines) to protect poultry from clinical ND. Importantly, while these low virulence live and inactivated vaccines *do* protect against clinical ND, they *do not* protect against infection, virus replication, and virus shedding.<sup>18,19</sup>

<sup>17</sup> Hitchner, S.B. 2004. "History of Biological Control of Poultry Diseases in the U.S.A." *Avian Diseases*. 48(1), 1–8.

<sup>18</sup> Senne, D.A., D.J. King, and D.R. Kapczynski. 2004. "Control of Newcastle disease by vaccination." *Developments in Biologicals* 119, 165–170.

<sup>19</sup> Miller, P.J., D.J. King, C.L. Afonso, D.L. Suarez. 2007. "Antigenic differences among Newcastle disease virus strains of different genotypes used in vaccine formulation affect viral shedding after a virulent challenge." *Vaccine*. 25, 7238–7246.

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Live virus vaccines have been shown to result in less virus shedding when compared to inactivated vaccines.<sup>20</sup> Poultry also shed less virus when vaccinated with a vaccine more genotypically similar to the challenge virus.<sup>21</sup> In addition to shedding NDV, another concern about ND vaccination is that the induced immunity of either type of vaccine is relatively short-lived, and vaccination must be repeated over the life-span of the birds.

In addition to these lentogenic vaccines, mesogenic strains of vaccine are available. However, these strains are not used as live vaccines in many countries, including the United States, because mesogenic and velogenic NDV infections have been eradicated in poultry.

Additional vaccines are under development with the objectives of preventing not only clinical disease, but also infection (and prevention of transmission). In addition, new technologies are working towards a vaccine that could provide sufficient immunity in one dose, can be delivered through mass vaccination techniques, provide better cross-protection, and allow for the diagnostic differentiation between infected and vaccinated poultry.

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<sup>20</sup> Kapczynski, D.R. and D.J. King. 2005. "Protection of chickens against overt clinical disease and determination of viral shedding following vaccination with commercially available Newcastle disease virus vaccines upon challenge with highly virulent virus from the California 2002 exotic Newcastle disease outbreak." *Vaccine*. 23, 3424–3433.

<sup>21</sup> Miller, P.J., C. Estevez, Q. Yu, D. Suarez, and D.J. King. 2008. "Comparison of Viral Shedding Following Vaccination with Inactivated and Live Newcastle Disease Vaccines Formulated with Wild-Type and Recombinant Viruses." *Avian Diseases*. 53, 39–49.

# Chapter 2

## Framework for ND Preparedness and Response

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### 2.1 NATIONAL RESPONSE FRAMEWORK, NATIONAL INCIDENT MANAGEMENT SYSTEM, AND NATIONAL ANIMAL HEALTH EMERGENCY MANAGEMENT SYSTEM INTEGRATION

Successful emergency preparedness for and response to ND requires integration between the National Response Framework (NRF), National Incident Management System (NIMS), and NAHEMS. This ND-specific plan fits into this hierarchy to provide more detailed information and specific direction on response requirements in the event of an ND outbreak in the United States.

#### 2.1.1 National Response Framework

The NRF is a guide to how the Nation conducts all-hazards response. It describes specific authorities and establishes a comprehensive approach for responding to domestic incidents that range from serious but purely local events to large-scale terrorist attacks or catastrophic natural disasters. It builds on NIMS, which provides a consistent template for managing incidents. The NRF is available from <http://www.fema.gov/emergency/nrf/>.

#### 2.1.2 National Incident Management System

NIMS, a companion document to the NRF, provides a systematic, nationwide, proactive approach guiding departments and agencies at all levels of government, the private sector, and non-governmental organizations. Its goal is to help these organizations work seamlessly to prepare for, prevent, respond to, recover from, and mitigate the effects of incidents, regardless of cause, size, location, or complexity, to reduce the loss of life, liberty, property, and harm to the environment. NIMS provides a core set of concepts, principles, procedures, organizational processes, terminology, and standard requirements. NIMS information is available at <http://www.fema.gov/emergency/nims/>.

NIMS consists of five key components:

1. A set of preparedness concepts and principles for all hazards;



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2. Essential principles for a common operating picture and interoperability of communications and information management;
  3. Standardized resource management procedures that enable coordination among different jurisdictions or organizations;
  4. Scalability, for use in all incidents (ranging from day to day to large scale); and
  5. A dynamic system that promotes ongoing management and maintenance.

### 2.1.3 National Animal Health Emergency Management System

APHIS and its stakeholders established NAHEMS to provide a functional framework for responding to foreign animal disease (FAD) incidents through NAHEMS Guidelines, disease response plans (such as this ND-specific plan), SOPs, and other associated documents. The purpose of the NAHEMS Guidelines is to ensure a successful response commensurate with the severity of the outbreak. Federal, State, and local agencies; Tribal nations; and other groups involved in animal health emergency management activities should integrate the information provided in NAHEMS Guidelines into their preparedness plans.

NAHEMS Guidelines (and other FAD PReP documents) offer

- ◆ competent veterinary guidance on cleaning and disinfection, disposal, mass depopulation, and other activities;
- ◆ information on disease control and eradication strategies and principles;
- ◆ guidance on health, safety, and PPE issues;
- ◆ biosecurity information and site-specific management strategies; and
- ◆ training and educational resources.

In particular, NAHEMS Guidelines provide a foundation for coordinated national, regional, State, Tribal, and local activities in an emergency situation. These guidelines serve as a practical guide and complement non-Federal preparedness activities.

These NAHEMS documents can be found at <http://inside.aphis.usda.gov/vs/em/fadprep.shtml> for APHIS employees, and here for the public: <http://www.aphis.usda.gov/fadprep>.

## 2.1.4 Coordination and Collaboration

This *ND Response Plan* is coordinated with the other FAD PReP documents, which follow NRF and NIMS. This document provides strategic guidance for responding to an ND outbreak. Other FAD PReP documents provide information on general veterinary activities and include industry or facility manuals for industry stakeholders as well as SOPs for planners and responders.

Together, these documents provide strategic and tactical details for Federal, State, Tribal, and local officials that are useful for ND preparedness and response.

Building on existing planning and response relationships, raising awareness on critical issues, and collaborating to address significant problems are key goals of FAD PReP efforts. Exercises and real events can improve ND preparedness and response planning and collaboration.

## 2.2 FEDERAL ROLES, RESPONSIBILITIES, AND PLANNING ASSUMPTIONS

### 2.2.1 Overview

Understanding the roles and responsibilities of Federal departments or agencies involved in responding to a domestic incident of an FAD promotes an effective, coordinated emergency response. The section that follows describes the roles, responsibilities, and authority of USDA in an ND response. The functions described are consistent with the roles and responsibilities outlined in the NRF.

Federal response to the detection of an FAD such as ND is based on the response structure of NIMS as outlined in the NRF. The NRF defines Federal departmental responsibilities for sector-specific responses. During the course of an ND outbreak response, the USDA may request Federal-to-Federal support (FFS) from other Federal departments and agencies. FFS refers to the circumstance in which a Federal department or agency requests Federal resource support under the NRF that is not addressed by the Stafford Act or another mechanism.

### 2.2.2 USDA Roles and Responsibilities Overview

As the primary Federal agency for incident management during an FAD event of domestic poultry, like an ND outbreak, USDA coordinates Incident Management Teams (IMTs), manages incident response, manages public messages, and takes measures to control and eradicate ND. Measures used to control and eradicate ND include quarantine and movement control, epidemiologic investigation, appraisal and compensation, depopulation (euthanasia) of affected poultry, carcass disposal, cleaning and disinfection, active surveillance for additional cases, diagnostics, and, potentially, emergency vaccination.

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The USDA performs the coordination role in Emergency Support Function (ESF) #11—Agriculture and Natural Resources—under the NRF. Under ESF #11, APHIS is responsible for detecting “animal disease anomalies” and providing “technical assistance as requested on pet/animal and agricultural issues.” As stated in ESF #11, USDA “responds to animal and agricultural health emergencies under USDA statutory authority.”

USDA (not including the additional ESF responsibilities carried by the U.S. Forest Service, which is part of USDA) also plays supporting roles in the following ESFs:

- ◆ ESF #1—Transportation
- ◆ ESF #2—Communications
- ◆ ESF #3—Public Works and Engineering
- ◆ ESF #5—Information and Planning
- ◆ ESF #6—Mass Care, Emergency Assistance, Temporary Housing, and Human Services
- ◆ ESF #7—Logistics
- ◆ ESF #8—Public Health and Medical Services
- ◆ ESF #9—Search and Rescue
- ◆ ESF #10—Oil and Hazardous Materials
- ◆ ESF #12—Energy
- ◆ ESF #15—External Affairs.

During the course of a ND outbreak response, USDA may request support as necessary from other Federal agencies. If the President declares an emergency or major disaster, or if the Secretary of Agriculture requests the Department of Homeland Security (DHS) lead coordination, the Secretary of Homeland Security and DHS assume the lead for coordinating Federal resources. USDA maintains the lead of overall incident management.

For more information on the roles of other Federal agencies, such as the Departments of Health and Human Services (HHS) and the Interior (DOI), in the event of a ND outbreak, see the *APHIS Foreign Animal Disease Framework: Roles and Coordination* (FAD PReP Manual 1-0) and *APHIS Foreign Animal Disease Framework: Response Strategies* (FAD PReP Manual 2-0). [[Appendix B](#) of this plan contains an organizational chart showing the coordination between

DHS/Federal Emergency Management Agency (FEMA) and USDA in the event of a major ND outbreak.]

## 2.3 AUTHORITY

The Animal Health Protection Act (AHPA), 7 *U.S. Code* 8301 et seq., authorizes the Secretary of Agriculture to restrict the importation, entry, or further movement in the United States or order the destruction or removal of animals and related conveyances and facilities to prevent the introduction or dissemination of livestock pests or diseases. It authorizes related activities with respect to exportation, interstate movement, cooperative agreements, enforcement and penalties, seizure, quarantine, and disease and pest eradication. The act also authorizes the Secretary to establish a veterinary accreditation program and enter into reimbursable fee agreements for pre-clearance abroad of animals or articles for movement into the United States.

Section 421 of the Homeland Security Act, 6 *U.S. Code* 231 transfers to the Secretary of Homeland Security certain agricultural import and entry inspection functions under the AHPA, including the authority to enforce the prohibitions or restrictions imposed by USDA.

The Secretary of Agriculture has the authority to cooperate with other Federal agencies, States, or political subdivisions of States, national or local governments of foreign governments, domestic or international organizations or associations, Tribal nations, and other persons to prevent, detect, control, or eradicate ND. If measures taken by a State or Indian Tribe to control or eradicate a pest or disease of livestock are inadequate, the AHPA authorizes the Secretary, after notice to and review and consultation with certain State or Tribal officials, to declare that an extraordinary emergency exists because of the presence in the United States of a pest or disease of livestock that threatens the livestock of the United States (7 *U.S. Code* 8306).

For further information on USDA APHIS authorities, see the *APHIS Foreign Animal Disease Framework: Roles and Coordination* (FAD PReP Manual 1-0) at <http://www.aphis.usda.gov/fadprep>.

# Chapter 3

## USDA ND Preparedness and Response

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### 3.1 USDA

USDA APHIS is the Federal agency with primary responsibility and authority for animal disease control and will interface with Federal, State, Tribal, and local partners in ND eradication and control efforts. If the President declares an emergency or major disaster, or if the Secretary of Agriculture requests that DHS lead coordination, the Secretary of Homeland Security and DHS leads the coordination of FFS and Federal resources for the incident while USDA maintains the lead of overall incident management.

USDA is the primary Federal liaison to the U.S. animal industry. In addition, it operates the National Veterinary Services Laboratories (NVSL), including NVSL-Ames.

The following sections detail USDA activities to prepare for an ND outbreak.

#### 3.1.1 Preparedness Exercises

Preparedness and response exercises help ensure our Nation is able to respond quickly and effectively to an FAD outbreak. They are an ideal, no-fault learning environment to discuss, practice, and implement plans, procedures, and processes in advance of an actual event. APHIS exercises are conducted in accordance with Homeland Security Exercise and Evaluation Program guidance.

Multiple preparedness exercises have been conducted to simulate an FAD outbreak and response effort in the United States. These exercises allow responders to discuss and practice activities relating to highly contagious animal diseases, such as movement control, and to consider the social and economic implications of an FAD outbreak. They help prepare the United States and responders for the difficult decisions that will be made regarding animal depopulation and business continuity.

The National Veterinary Stockpile (NVS) has also conducted multiple exercises to assess and test its ability to deliver supplies and services and State and Tribal ability to receive and stage these items in the event of an FAD outbreak. These exercises have incorporated multiple States and Tribes, the poultry industry, and academia to simulate a response effort.

Multi-state exercises have enhanced coordination and collaboration between States and between States and the Federal government. Valuable logistics lessons

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were learned and important recommendations have resulted from the evaluation of these exercises.

### 3.1.2 Domestic Activities

USDA has a variety of ongoing preparedness and response activities with respect to ND. Domestically, the USDA prevents the introduction of ND and also performs FAD investigations for suspected cases. The following list details a selection of ongoing USDA activities:

- ◆ *Smuggling Interdiction and Trade Compliance (SITC)*. SITC conducts risk management and anti-smuggling activities to prevent unlawful entry and distribution of prohibited agricultural commodities. It looks at domestic markets likely to have illegal, imported avian products to establish baseline estimates on how much product is bypassing ports of entry.
- ◆ *National Import and Export Services*. All live birds and hatching eggs, except from Canada, are quarantined for at least 30 days in a USDA-approved quarantine facility. In addition to the requirements of importing healthy eggs, there are further restrictions for hatching eggs from countries not free of ND.
- ◆ *Emergency veterinary assistance*. USDA works to assist States in training and maintaining State Incident Management Teams and veterinary reserve corps, such as the National Animal Health Emergency Response Corps (NAHERC), ([Section 3.5](#)). State groups will serve as early response teams for an ND event and can educate groups on the signs, symptoms, and reporting procedures.

### 3.1.3 International Activities

In addition to the domestic activities discussed above, the USDA also has ongoing international activities to bolster ND preparedness planning and response capabilities:

- ◆ *Emergency veterinary assistance*. USDA APHIS works to provide technical assistance and expertise, at a country's request, in the event of an animal health emergency.
- ◆ *International coordination*. USDA APHIS collaborates with interagency and international partners to mitigate, prevent, and control animal health threats outside the United States through the sharing of information and development of infrastructure.

### 3.1.4 International Trade

USDA, in collaboration with the Department of State and the United States Trade Representative, will promptly address foreign governments that impose unjustifiable U.S. poultry and product trade restrictions because of an ND case.

USDA overseas embassy offices also have guidance on how to rapidly report trade disruptions to Washington, DC, headquarters and how to help foreign officials respond to such events. Multiple USDA agencies, led by the Foreign Agricultural Service, will coordinate a response to any such trade disruption and communicate with industry in the United States. USDA APHIS would also quickly fulfill any official requests for additional scientific information, including case surveillance, movement control measures, and laboratory diagnostics.

These efforts focus on cases where bans are inconsistent with OIE standards, or with any U.S. ND bilateral protocols. OIE member countries, like the United States, are to “immediately” notify the OIE of any confirmed ND case in poultry, defined in the OIE *Terrestrial Animal Health Code (2013)* as “all domesticated birds, including backyard poultry, used for the production of meat or eggs for consumption, for the production of other commercial products, for restocking supplies of game, or for breeding these categories of birds, as well as fighting cocks used for any purpose.”

Countries recognized as ND-free by the United States are listed on the [APHIS website](#).

### 3.1.5 Compartmentalization

Another tool that may mitigate the economic consequences of a disease outbreak is compartmentalization. Compartmentalization defines subpopulations of distinct health status by management and husbandry practices, as related to biosecurity. Compartmentalization is best implemented, as suggested by the OIE in the *Terrestrial Animal Health Code (2013)*, by trading partners through the establishment of parameters and agreement on necessary measures *before a disease outbreak*.

Implementation of compartmentalization will rely on producers, industry, and State and Federal animal health authorities. The importing country must be satisfied that its animal health status is appropriately protected by the biosecurity measures undertaken by the exporting country.

Currently, no compartmentalization plans have been fully accepted or implemented in the United States.

Chapters 4.3 and 4.4 of the OIE *Terrestrial Animal Health Code (2013)* explain the concept and the application of compartmentalization.

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## 3.2 USDA ORGANIZATIONAL STRATEGY

In the event of an ND outbreak, effective and efficient management of the situation and clear communication pathways are critical. A synchronized management and organizational structure helps to support the control and eradication actions. Accordingly, APHIS has adopted NIMS and Incident Command System (ICS) organizational structures to manage the response to an ND outbreak. The ICS is designed to enable efficient and effective domestic incident management by integrating facilities, equipment, personnel, procedures, and communications operating within a common organizational structure. The next section discusses the APHIS incident management organizational structure.

## 3.3 APHIS INCIDENT MANAGEMENT STRUCTURE

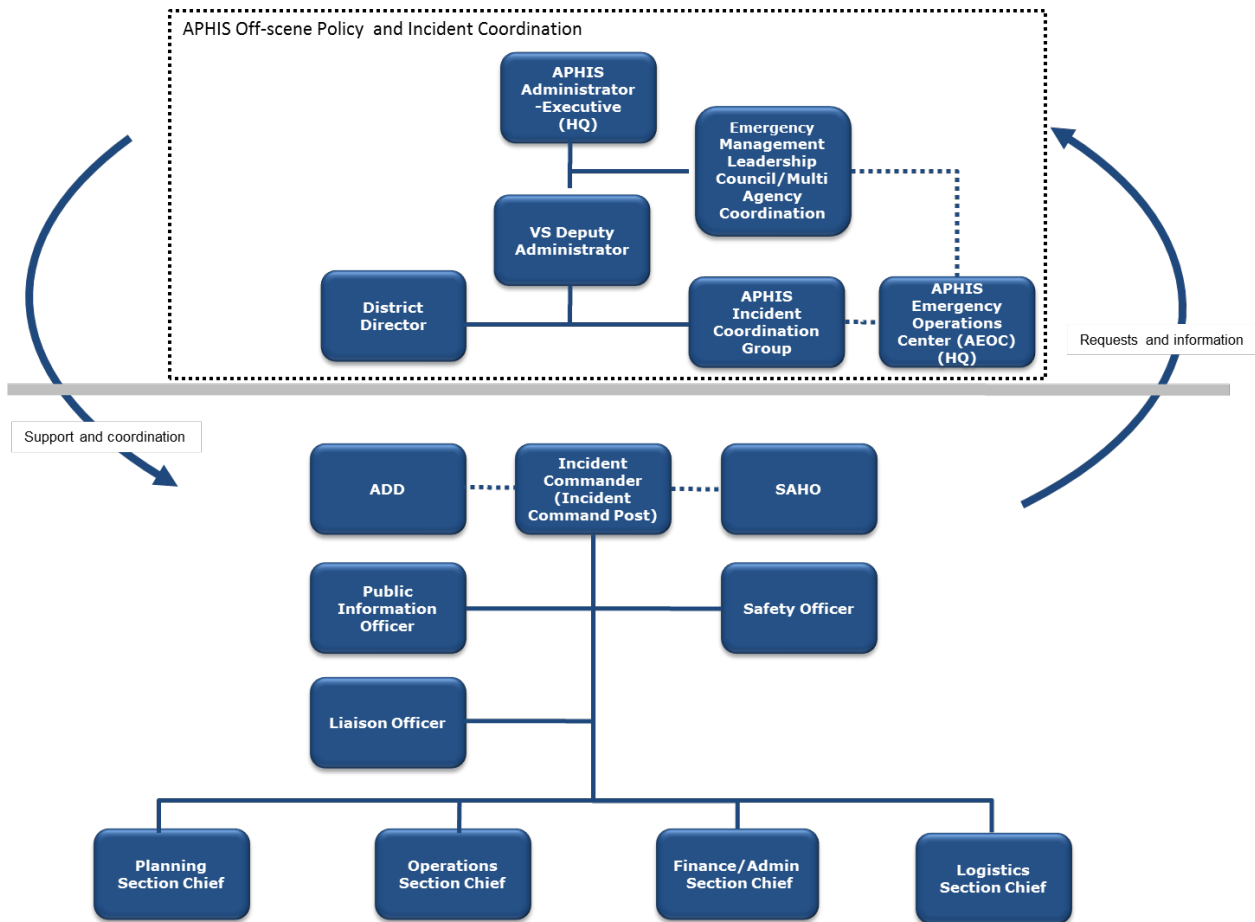
The APHIS Administrator is the Federal executive responsible for implementing APHIS policy during an ND outbreak. The APHIS Administrator will delegate much of the actual multiagency coordination (MAC) functions to the Veterinary Services (VS) Deputy Administrator, who is the Chief Veterinary Officer (CVO) of the United States, and the APHIS Emergency Management Leadership Council (EMLC).

The VS Deputy Administrator and the EMLC will establish an APHIS Incident Coordination Group (ICG) to oversee the staff functions associated with the incident at the APHIS headquarters level. The APHIS ICG will work closely with the personnel in charge of establishing operations for the incident response at the Area Command (AC) or Incident Command Post (ICP) in the field and coordinate with the APHIS MAC Group.

Figure 3-1 displays the APHIS FAD incident management organizational structure, starting with the APHIS Administrator.



Figure 3-1. APHIS Multiagency Coordination Structures and APHIS Emergency Operations Center: Relationship to Incident Management Team (Assuming Single Incident)



Note: ADD = Assistant District Director; SAHO = State Animal Health Official.

The following sections describe the MAC Group and APHIS ICG, as well as the APHIS organization for single and multiple incidents. ([Appendix B](#) contains further information and organizational diagrams describing APHIS's Incident Management Structure.) Also, see the *APHIS Foreign Animal Disease Framework: Roles and Coordination* (FAD PReP Manual 1-0) and the *Incident Coordination Group Plan*.

### 3.3.1 Multiagency Coordination Group

The *APHIS Emergency Mobilization Guide* defines coordination for major ND responses at the APHIS level. In the event of an ND outbreak, the EMLC typically serves as the APHIS MAC Group, unless the members decide to transfer responsibility for a specific incident (please see [Appendix B](#) for a list of EMLC members). The APHIS MAC Group structure is adaptable and easily expands and contracts to provide flexibility. The MAC Group—formed if the ND response

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needs more support—establishes supportive relationships among the agencies preparing for and responding to an ND outbreak.

The APHIS MAC Group offers guidance on the most efficient way to allocate resources during an ND outbreak. General functions of the group include

- ◆ incident prioritization,
- ◆ resource allocation and acquisition, and
- ◆ identification and resolution of issues common to all parties.

If additional support is needed, particularly in the event there are significant threats or consequences to public health and welfare, the natural environment, or the economy, the USDA may also stand up other MAC Groups, which may be composed of representatives from other programs and agencies.

### 3.3.2 APHIS Incident Coordination Group

The APHIS ICG is responsible for acquiring resources, formulating policy options, and assisting in implementing response and recovery strategies for an ND outbreak. For additional information, see the *Incident Coordination Group Plan*. APHIS ICG responsibilities in an ND outbreak include

- ◆ providing guidance to ensure responder and public health and safety,
- ◆ supporting ICP(s) and AC(s),
- ◆ assisting in coordinating resources and integrating response organizations into the ICS, and
- ◆ providing information to the Joint Information Center (JIC) for use in media and stakeholder briefings.

### 3.3.3 Organization for a Single Incident

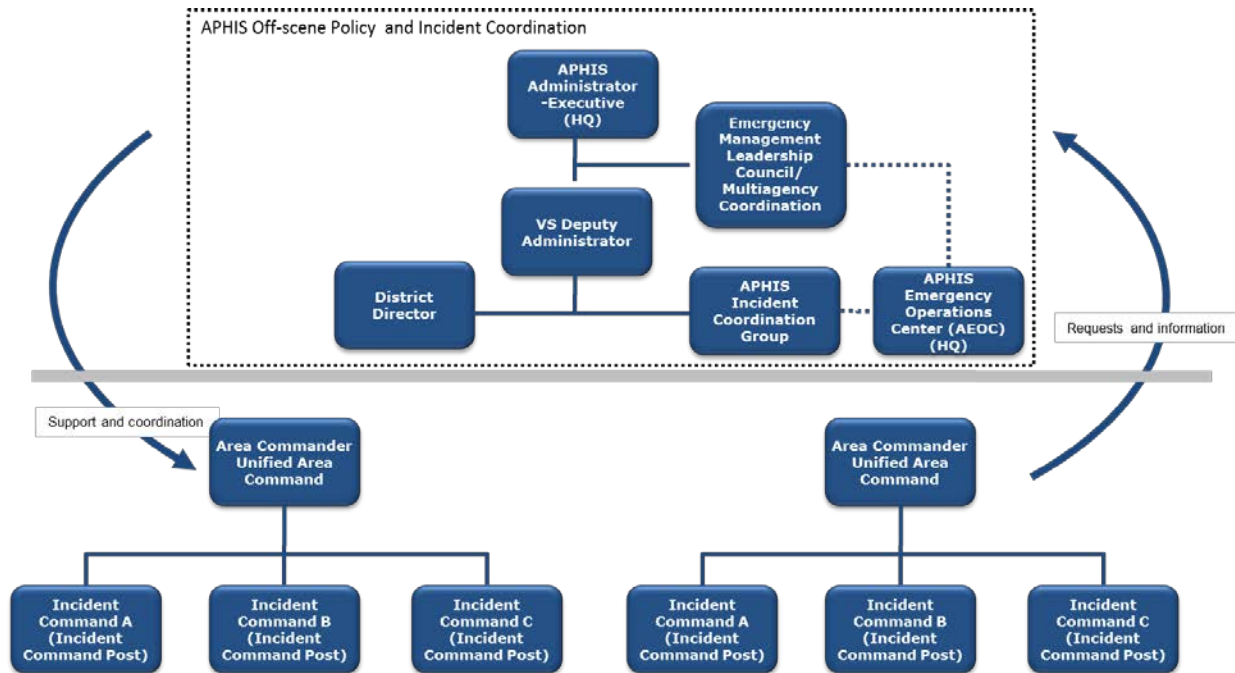
In the event of a single ND incident, the State Animal Health Official (SAHO), or designee, and Assistant District Director (ADD) [formerly the Area Veterinarian in Charge], or designee, will initially serve as the Co-Incident Commanders for the Unified IC. The ADD and SAHO may be relieved by a VS Incident Management Team if there is a delegation of authority.

### 3.3.4 Organization for Multiple Incidents

When more than one ND incident happens simultaneously, more than one ICP may be established. An AC may also be established. The VS District Director will establish a Unified AC, and the Area Commander will be responsible for

managing the multiple incidents. The ADD and SAHO for each incident (or the Incident Management Team) will report to the AC. Figure 3-2 shows the organization for multiple incidents.

Figure 3-2. APHIS Multiagency Coordination Structures and APHIS Emergency Operations Center: Relationship to Multiple Incident Management Team Structures (Assuming Multiple Incidents and Unified Area Command)



If the emergency response becomes too complex for a single APHIS MAC Group to handle efficiently—for example, a large multistate ND incident with numerous response activities—cooperation with other agencies or committees will be implemented. As stated previously, this is referred to as MAC. Other MAC Groups would likely be stood up. These groups, comprised of representatives from across USDA sub-agencies or other government agencies, would make decisions regarding the prioritizing of incidents and the sharing and use of critical resources. However, these groups are not part of the on-scene IC.

### 3.3.5 Guidance on Incident Management and Organizational Strategy

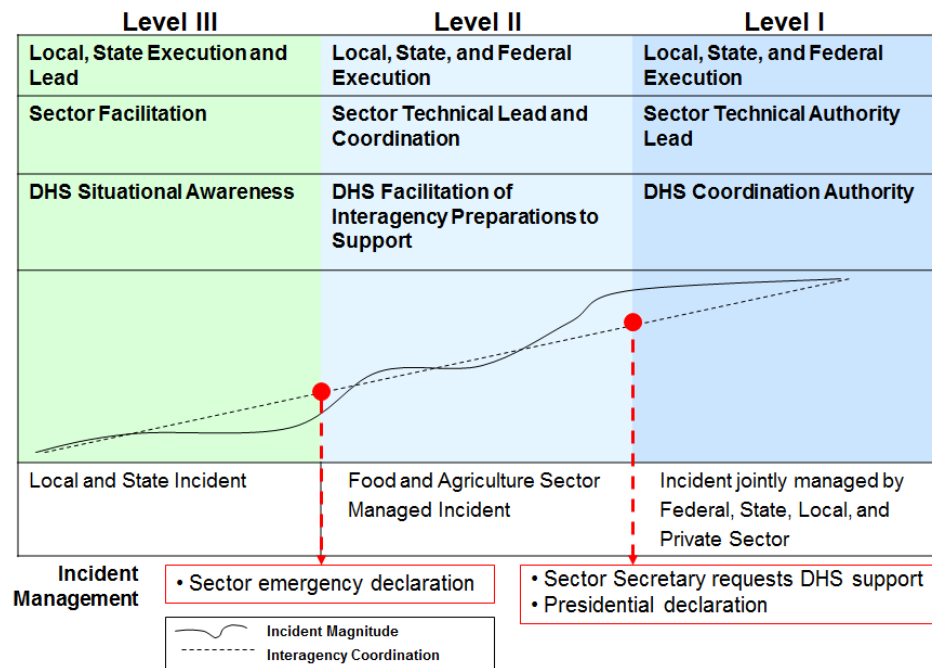
See [Appendix B](#) for further information on incident management and organizational structure.

## 3.4 APHIS INCIDENT MANAGEMENT LEVELS

APHIS uses a three-level system of emergency response types. The levels range from Level III, which has the lowest significance, to Level I, which is an event of

national significance. The levels are used both within APHIS and externally to communicate the resource requirements for an event or incident. Figure 3-3 illustrates these three incident management levels. In Figure 3-3, sector refers to the agriculture sector and USDA. Additional information can be found in the *APHIS Emergency Mobilization Guide* and in the *APHIS Foreign Animal Disease Framework: Roles and Coordination* (FAD PRoP Manual 1-0).

Figure 3-3. Incident Management Levels



These levels are as follows:

- ◆ *Level III.* A response to an event or incident the scope or severity of which the lead program unit is evaluating or that requires a limited response. In either case, enough resources (Federal, State, or local personnel) are available in the area or State to staff the evaluation or initial response effort. An equine piroplasmiasis outbreak would be a Level III incident.
- ◆ *Level II.* A response to an event or incident that requires resources beyond an area or State's resource capacity but which is within the lead program unit's ability to provide resources to support the response. Requests for additional resources outside the lead program unit are not necessary for a Level II response. However, volunteers will be considered for assignment from outside the unit if they wish to be considered for the assignment, have supervisory approval, and are qualified for the position requested. Typically, a highly pathogenic avian influenza outbreak in domestic poultry would be a Level II event.

- ◆ *Level I.* A response that requires resources or expertise beyond the lead program unit's capacity to respond. In many cases, these emergencies will be of national significance. If the lead program unit lacks the qualified resources to meet the response needs, it will make a request through the EMLC to the APHIS Administrator to declare a total mobilization. If qualified volunteers are insufficient, direct assignments will be made. A multistate foot-and-mouth disease outbreak would be a Level I event.

## 3.5 NATIONAL ANIMAL HEALTH EMERGENCY RESPONSE CORPS (NAHERC)

In addition to the activities just discussed, NAHERC assists and augments Federal and State response to domestic and international animal disease outbreaks, threats, or natural disasters. NAHERC is composed of veterinarians and veterinary technicians who volunteer to become temporary Federal employees in the event of a national animal health emergency. For further information on NAHERC and NAHERC deployment, see the *NAHEMS Guidelines: NAHERC Deployment Guide*.

## 3.6 DIAGNOSTIC RESOURCES AND LABORATORY SUPPORT

USDA also has critical diagnostic resources and laboratory support that will be leveraged in an ND outbreak.

### 3.6.1 National Veterinary Services Laboratories

The NVSL is the official reference laboratory for FAD diagnostic testing and study in the United States. The NVSL performs animal disease testing in support of USDA-APHIS programs designed to protect the health of the Nation's poultry and livestock. The NVSL provides *all* confirmatory testing for ND on all specimens found presumptively positive at a National Animal Health Laboratory Network (NAHLN) laboratory or other USDA-approved laboratory. The NVSL has two locations for FAD diagnostic testing: Ames, IA (NVSL-Ames), and the Foreign Animal Disease Diagnostic Laboratory (FADDL), Plum Island, NY (NVSL-FADDL). NVSL-Ames provides confirmatory testing for ND.

### 3.6.2 National Animal Health Laboratory Network

As of the date of publication, the NAHLN consists of more than 60 laboratories and coordinates the veterinary diagnostic laboratory capacity of State animal health laboratories and their extensive infrastructure, including facilities, equipment, and professional expertise. Of these laboratories, over 50—including

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NVSL-Ames—are currently approved to conduct ND testing diagnostics ([Appendix C](#)).

The NAHLN provides a means for early detection of ND, rapid response through surge capacity to test outbreak samples, and recovery by the capability to test large numbers of samples to show freedom from ND. The confirmation of an ND outbreak will be made at NVSL-Ames. After positive confirmation of ND, subsequent samples from premises inside the established Control Area (CA) *may* be sent to laboratories that are part of NAHLN. Please see [Section 5.4.1](#) for more information.

### 3.6.3 Center for Veterinary Biologics

APHIS's Center for Veterinary Biologics is responsible for licensing new products, including new diagnostic test kits and vaccines for ND. This work—centered on enforcement of the Virus Serum Toxin Act—ensures that pure, safe, potent, and effective veterinary biologics are available for the diagnosis, prevention, and treatment of animal diseases.

# Chapter 4

## ND Outbreak Response Goals and Strategy

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This chapter covers a wide range of information about how USDA APHIS, States, Tribal Nations, localities, and stakeholders would respond to an ND outbreak in poultry in the United States. In particular, this chapter

- ◆ identifies USDA APHIS goals for responding to an ND outbreak;
- ◆ identifies critical activities and tools required to achieve the response goals;
- ◆ provides the primary USDA APHIS response strategy for ND in poultry;
- ◆ introduces factors influencing the scope of regulatory intervention; and
- ◆ reviews the international standards from the OIE for ND.

### 4.1 RESPONSE GOALS

*The goals of an ND response are to (1) detect, control, and contain ND in domestic poultry as quickly as possible; (2) eradicate ND using strategies that seek to protect public health and the environment, and to stabilize animal agriculture, the food supply, and the economy; and (3) provide science- and risk-based approaches and systems to facilitate continuity of business for non-infected animals and non-contaminated animal products.*

Achieving these three goals will allow individual poultry facilities, States, Tribes, regions, and industries to resume normal production as rapidly as possible. They will also allow the United States to regain ND-free status without the response effort causing more disruption and damage than the disease outbreak itself.

The United States protects its poultry from ND through a number of preventive measures, including ND surveillance, import restrictions, and education programs. In the event of an ND outbreak, USDA and the affected States will work with the poultry industry to control and eradicate the disease as expeditiously as possible. In an ND outbreak, the USDA will also coordinate with the Centers for Disease Control and Prevention (CDC) and other public health authorities, including at the State, Tribal, and local level, as needed.

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## 4.2 PRINCIPLES, CRITICAL ACTIVITIES, AND TOOLS FOR AN ND RESPONSE

### 4.2.1 Critical Activities

In order to achieve the goals of an ND response, critical activities and tools must be implemented to execute the response strategy. Box 4-1 lists these critical activities and tools. A science- and risk-based approach that protects public health, animal health, and the environment and stabilizes animal agriculture, the food supply, and the economy will be employed at all times. Please see [Chapter 5](#) for more information on these activities and tools (i.e., movement control, disposal, and epidemiological investigation and tracing).

*Box 4-1. Critical Activities and Tools for an ND Response*

**Critical Activities and Tools for Containment, Control, and Eradication**

- Public awareness campaign
- Swift imposition of effective quarantine and movement controls
- Rapid diagnosis and reporting
- Epidemiological investigation and tracing
- Increased surveillance
- Continuity of business measures for non-infected premises and non-contaminated animal products
- Biosecurity measures
- Mass depopulation and euthanasia, potentially including preemptive culling
- Effective and appropriate disposal procedures
- Cleaning and disinfection measures
- Emergency vaccination (as the response strategy indicates)

### 4.2.2 Epidemiological Principles

Three basic epidemiological principles form the foundation to contain, control, and eradicate ND in the U.S. domestic poultry population:

1. *Prevent contact between ND virus and susceptible poultry.*
  - a. This is accomplished through quarantine of infected poultry and movement controls in the Infected Zone(s) and Buffer Zone(s) [Control Areas (CA)], along with biosecurity procedures to protect non-infected poultry.



- b. Certain circumstances may warrant accelerating the depopulation or slaughter of poultry at risk for exposure to ND to decrease the population density of susceptible poultry.
  - c. There is a serious but lesser transmission risk posed by other people, material, conveyances, and animals that may have been in contact with ND and serve as mechanical vectors. Contact between poultry and these items should be prevented, and transmission risk mitigated, through biosecurity and cleaning and disinfection measures.
2. *Stop the production of ND virus by infected or exposed poultry.* This is accomplished by slaughter or mass depopulation (and disposal) of infected and potentially infected poultry.
  3. *Increase the disease resistance of susceptible poultry to the ND virus.* This is accomplished by strategic emergency vaccination.

### 4.2.3 Coordinated Public Awareness Campaign

One of the most important critical activities is a public awareness campaign. Box 4-2 details the importance of a coordinated public awareness campaign to an effective response strategy.

*Box 4-2. Coordinated Public Awareness Campaign*

#### **Coordinated Public Awareness Campaign**

In all ND outbreaks, a public awareness campaign must be effectively coordinated. This will support the response strategy by

- engaging and leveraging Federal, State, Tribal, local, and stakeholder relationships to provide unified public messages for local, national, and international audiences;
- addressing the issues and concerns relating to food safety, public health, and animal welfare;
- addressing issues and concerns related to interstate commerce, continuity of business, and international trade; and
- widely disseminating key communication messages to consumers and producers.

### 4.2.4 Timeline in any ND Response for First 72 Hours

In the first 72 hours after the detection of ND in the United States, specific actions will occur. As seen in Figure 4-1, these critical tasks are fundamental to the rapid control and containment of ND.

Figure 4-1. Critical Activities in the First 72 Hours of U.S. ND Response



## 4.3 RESPONSE STRATEGY FOR CONTROL AND ERADICATION OF ND IN POULTRY

The United States' primary control and eradication strategy for ND in poultry is stamping-out. If the spread of ND outpaces the resources for stamping-out, or if other factors direct the response away from a stamping-out strategy alone, emergency vaccination strategies may be considered.

Currently it is not possible to delineate *a priori* the specific factors that might signal the need to deviate from an exclusive stamping-out strategy. A decision to use emergency vaccination will be based on the prevailing epidemiological circumstances during the outbreak. Please see [Chapter 5, Section 5.16](#) for information on emergency vaccination. Other response critical activities and tools are also employed, such as health and safety, biosecurity, surveillance, disposal, and movement control (see [Chapter 5](#)). This chapter provides general strategic guidance for a response to the detection of ND in poultry.

### 4.3.1 Defining Stamping-Out as a Response Strategy for Poultry

Stamping-out is the depopulation of clinically affected and in-contact susceptible poultry. Box 4-3 lists the key elements of stamping-out (disposal issues are covered in [Section 5.14](#) in Chapter 5). The OIE definition of stamping-out is provided in [Section 4.5.1](#).

Box 4-3. Strategy of Stamping-Out ND

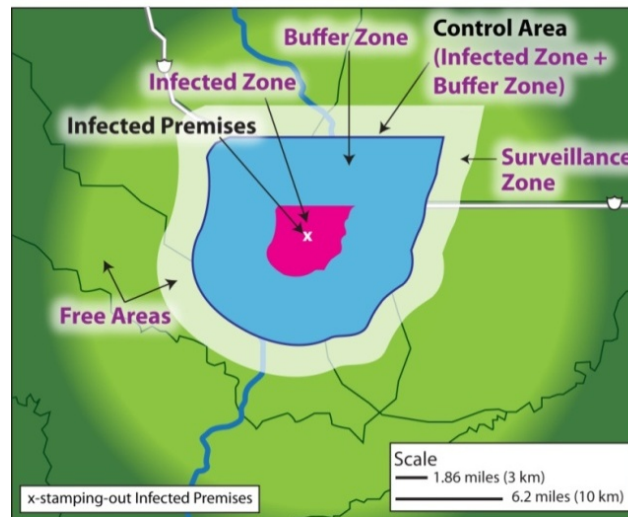
**Stamping-Out: Critical Goals**

- Within 24 hours of (or as soon as possible after) a premises being classified as an Infected Premises (IP), infected poultry will be depopulated in the quickest, safest, and most humane way possible. In many cases, poultry on Contact Premises (CP) may also be depopulated as soon as possible.
- Where resources are limited, premises will be prioritized so that those with the highest potential for active ND spread are ‘stamped-out’ first.
- Based on the epidemiology of the outbreak, prioritizing the poultry to depopulate first may be necessary.
- Public concerns about stamping-out require a well-planned and proactive public relations and liaison campaign. Stakeholders, the public, and the international community must be involved.

### 4.3.2 Zones and Areas in Relation to Stamping-Out

Figure 4-2 shows an example of a stamping-out strategy, where IP are depopulated. See [Section 5.5 in Chapter 5](#) for more information on zones, areas, and premises for ND outbreak response.

Figure 4-2. Example of Zones and Areas in Relation to Stamping-Out (Infected Premises would be Depopulated)



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### 4.3.3 Assessing a Possible Outbreak

During the investigation of a premises suspected of having ND, animal health responders use clinical signs, history, and professional judgment to determine the likelihood that ND exists on the premises. This assessment includes

- ◆ a history of clinical and epidemiological findings,
- ◆ results of physical examinations,
- ◆ necropsy findings,
- ◆ specimen collection and submission to an approved laboratory,
- ◆ reporting, and
- ◆ initiating appropriate control measures.

Incident management includes quarantine and movement control, tracing, activation of response plans, and communication of these actions to all stakeholders, the public, and the international community. Cooperative Federal, State, Tribal, local, and industry response measures are carried out with extreme urgency using the broadest geographic scope appropriate.

If ND has not been or cannot be detected on a premises, but epidemiological evidence indicates that the disease has spread beyond the initial premises, the premises should be treated as presumptive positive premises and control measures implemented.

### 4.3.4 Authorization for Response and Associated Activities

ND may be listed as a disease reportable to animal health or public health officials depending on the laws and policy of the State or Tribal nation. In some States, all FADs or animal diseases of consequence are listed for reporting to a State authority, which would include ND. Detection of ND may result in emergency intervention by State, Tribal, Federal, or local authorities.

When the criteria for a presumptive ND case have been met (see [Chapter 5](#) for case definitions), the APHIS Administrator or VS Deputy Administrator (CVO of the United States) can authorize APHIS personnel—in conjunction with State, Tribal, and IC personnel—to initiate depopulation, cleaning, and disinfection procedures of the index case and investigation of CP. Personnel may also depopulate poultry on any CP meeting the criteria for a presumptive case. APHIS and SAHOs will assess the need to initiate depopulation of poultry and cleaning and disinfection procedures on other poultry flocks in a radius up to 3 kilometers around the index case.

When ND is detected, SAHOs and Tribal officials issue a quarantine or hold order for the IP. A Federal quarantine may be issued when requested by SAHOs or as directed by the Secretary of Agriculture. The Incident Commander works with the Operations Section and Situation Unit in the Planning Section to determine zone, area, and premises designations during an ND outbreak.

### 4.3.5 Management of Incident

The outbreak response effort should be implemented through an ICS with an appropriate span of control and delegation of authority. Responses will be as local as possible. Good communication within the chain of command is imperative.

An Incident Commander should be identified and an ICP established. In-State resources (whether State, Federal, Tribal, local, or privately owned) should be used to manage a local response. Out-of-State resources may be used to support the State impacted by the outbreak. The USDA will notify and coordinate with public health agencies in response to ND in poultry.

## 4.4 FACTORS INFLUENCING RESPONSE

The previous sections identified the primary response strategy for an ND outbreak. Detection of ND will result in emergency intervention by State, Tribal, Federal, and local authorities; the scope of regulatory intervention will depend on the following factors:

- ◆ *Consequences of the ND outbreak.* The consequences of the ND outbreak, and the impact of the response, in terms of disruptions to national security, food security, animal health, public health, environment, economy, interstate commerce, international trade, and regulatory issues.
- ◆ *Acceptance.* Acceptance of response policy (social and political) by different communities, from local to international.
- ◆ *Scale of outbreak.* The number of poultry infected, species infected, number of premises infected, and susceptible poultry population density for infected areas or high risk areas.
- ◆ *Rate of outbreak spread.* The rate of spread of infection in terms of number of premises, types of premises, number of susceptible poultry, types of poultry; this is the rate at which each IP “reproduces” or results in other IP.
- ◆ *Veterinary countermeasures available.* The availability and efficacy of veterinary countermeasures, such as ND vaccines.

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- ◆ *Resources available to implement response strategies.* The capabilities and resources available to eradicate ND in poultry and to control and eradicate ND in potential wildlife reservoirs.

## 4.5 INTERNATIONAL STANDARDS FOR ND

### 4.5.1 World Organization for Animal Health Standards for ND Response

In terms of general international standards, for countries that have competent veterinary authorities, the initial response eradication policy for ND outbreaks that can be confined to a Containment Zone is a stamping-out policy in domestic poultry. Stamping-out, as defined in the OIE *Terrestrial Animal Health Code (2013)* means

carrying out under the authority of the Veterinary Authority, on confirmation of a disease, the killing of the animals which are affected and those suspected of being affected in the herd and, where appropriate, those in other herds which have been exposed to infection by direct animal to animal contact, or by indirect contact of a kind likely to cause the transmission of the causal pathogen. All susceptible animals, vaccinated or unvaccinated, on an infected premises should be killed and their carcasses destroyed by burning or burial, or by any other method which will eliminate the spread of infection through the carcasses or products of the animals killed.

This policy should be accompanied by the cleansing and disinfection procedures defined in the Terrestrial Code.

The term modified stamping-out policy should be used in communications to the OIE whenever the above animal health measures are not implemented in full and details of the modifications should be given.

The OIE recognizes that if outbreaks cannot be confined to a Containment Zone (equivalent to a CA), response strategies other than just stamping-out may be necessary.

### 4.5.2 Recognition of Disease-Free Status

As a member of the OIE, the United States has agreed to abide by standards drafted and approved by member countries. The OIE does not grant official recognition for ND-freedom, but OIE members can self-declare their entire territory or a zone within their territory free from certain OIE-listed diseases, such as ND in poultry.

In cases of self-declaration, delegates are advised to consult the OIE *Terrestrial Animal Health Code* for specific requirements for self-declaration of freedom from ND. By providing the relevant epidemiological evidence, the OIE member can prove to a potential importing country that the entire country or zone under discussion meets the provisions of the specific disease chapter. Any submitted self-declaration should contain evidence demonstrating that the requirements for the disease status have been met in accordance with OIE standards. This self-declaration must be signed by the official OIE delegate of the OIE member concerned. As stated in Article 10.9.1 of the OIE *Terrestrial Animal Health Code* (2013), for the purposes of international trade, ND is defined “as an infection of poultry,” and bans on international trade in poultry commodities should not be imposed for detection of NDV in wild birds.

### 4.5.3 Criteria Needed for ND-Free Status

The OIE has one category for country recognition for ND<sup>1</sup>: an ND free country, zone, or compartment. This determination is described in Article 10.9.2 of the OIE *Terrestrial Animal Health Code* (2013). The criteria for an ND-free country, zone, or compartment are as follows (Article 10.9.3):

A country, zone, or compartment may be considered free from ND when it has been shown that NDV infection in poultry has not been present in the country, zone or compartment for the past 12 months, based on surveillance in accordance with Articles 10.9.22. to 10.9.26.

If infection has occurred in poultry in a previously free country, zone, or compartment, ND free status can be regained three months after a stamping-out policy (including disinfection of all affected establishments) is applied, providing that surveillance in accordance with Articles 10.9.22. to 10.9.26. has been carried out during that three-month period.

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<sup>1</sup> In the OIE *Terrestrial Animal Health Code*, ND is defined as vNDV.

# Chapter 5

## Specific ND Response Critical Activities and Tools

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FAD PReP documents identify critical activities and tools to be employed in the event of an ND outbreak. These critical activities and response tools will assist in controlling, containing, and eradicating ND while facilitating continuity of business in an outbreak. This chapter describes key parts of these critical activities and tools.

Documents referenced in this chapter can be found, for APHIS employees, at <http://inside.aphis.usda.gov/vs/em/fadprep.shtml>, or for others, at <http://www.aphis.usda.gov/fadprep>.

### 5.1 ETIOLOGY AND ECOLOGY

Information on the etiology and ecology of ND promotes a common understanding of the disease agent among responders and other stakeholders (see [Chapter 1](#) for ND information). The ND Overview of Etiology and Ecology SOP contains additional information.

### 5.2 LABORATORY DEFINITIONS AND CASE DEFINITIONS

Laboratory and case definitions provide a common point of reference for all responders. Case definitions and laboratory criteria are developed according to the Case Definition Development Process SOP (see [Section 5.2.3](#)).

#### 5.2.1 Laboratory Definitions

The following sections are the APHIS, VS, Science, Technology, and Analysis Services, Center for Epidemiology and Animal Health (CEAH) draft definitions for vNDV from January 2014. For further information on the diagnostic tests conducted by NVSL-Ames in the event of an ND outbreak, please see [Section 5.4](#).

##### 5.2.1.1 LABORATORY CRITERIA

*OIE Manual of Standards for Diagnostic Tests and Vaccines for Terrestrial Animals* (2013), Chapter 2.3.14 (updated 2012).



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1. *Agent isolation and identification:* Samples of choice are tracheal, oropharyngeal, or cloacal swabs (or feces) from live birds. From dead birds, tissues (lung, spleen, trachea, intestine, and brain) as well as pools of organs and feces, are appropriate specimens. Tests include the isolation or culture of the virus in embryonated chicken eggs (appropriate cell culture may be used per the OIE Manual of Diagnostic Tests), and real-time reverse transcriptase polymerase (rRT-PCR) for detection of the virus or the viral genome. Viral isolates can be identified by the hemagglutination (HA), hemagglutination inhibition (HI), and real-time reverse transcriptase polymerase chain reaction (rRT-PCR) tests. APMV-1 viruses, especially those with moderate to high titers, may cross-react in the HI tests with other APMV viruses, most specifically APMV-3 and APMV-2.
  2. *Pathogenicity assessment:* The intracerebral pathogenicity index (ICPI) in 24–40-hour-old chicks from specific pathogen free (SPF) eggs is the definitive assessment for virulence per OIE. The OIE allows for confirmation of virus virulence by amino acid sequence analysis of the fusion protein cleavage site, but molecular methods are not sufficient evidence for lack of virulence.
  3. *Serological tests:* Use clotted blood or serum for enzyme-linked immunosorbent assay (ELISA) or HI. Antibodies are detectable 6 to 10 days after infection.

## 5.2.2 Case Definitions

The following sections include APHIS-VS CEAH draft definitions for vNDV from January 2014.

### 5.2.2.1 CASE DEFINITION

1. *Suspect case:* Domesticated bird or flock having clinical signs consistent with virulent Newcastle disease virus.
2. *Presumptive positive case:* A suspect case (as in 1.) that has either:
  - a. Positive screening test (rRT-PCR) for Newcastle disease virus (APMV-1); **OR**
  - b. Epidemiological information indicating exposure to virulent Newcastle disease virus.
3. *Confirmed positive case:* Domesticated bird or flock from which:

- a. Newcastle disease virus (APMV-1) has been isolated and identified at the National Veterinary Services Laboratories (NVSL) or laboratory designated by the Secretary of Agriculture; **AND**
- b. The Newcastle disease virus (APMV-1) has an ICPI in day-old chicks (*Gallus gallus*) of 0.7 or greater; **OR**
- c. Presumptive positive (as in 2.) and presence of multiple basic amino acids in the virus (either directly or by deduction) at the C-terminus of the F2 protein and phenylalanine at residue 117, which is the N-terminus of the F1 protein. The term ‘multiple-basic amino acids’ refers to at least three arginine or lysine residues between residues 113 and 116.
  - i. Failure to demonstrate the characteristic pattern of amino acid residues as described above would require virus isolation and further characterization by an ICPI test.

### 5.2.3 Case Definition Development Process

The Case Definition Development Process SOP describes the general process for developing and approving animal disease case definitions for use in animal health surveillance and reporting. Case definitions are developed by CEAH, in cooperation with other VS units. CEAH coordinates review with SAHOs, subject matter experts, and other stakeholders. Case definitions are approved by the VS Deputy Administrator (the U.S. CVO) and VS Leadership Team. Case definitions enhance the usefulness of animal disease data by providing uniform criteria for reporting purposes.

In an ND outbreak, case definitions may be revised within 24 hours of the first presumptive positive or confirmed positive case (index case). The case definitions will be reviewed throughout the outbreak and modified on the basis of additional information or the changing needs of the eradication effort.

## 5.3 SURVEILLANCE

Surveillance is a critical activity during an outbreak of ND. The following are goals in an ND outbreak:

- ◆ To implement surveillance plans within 48 hours of the confirmation of an outbreak.
- ◆ To implement a surveillance plan that will (1) define the present extent of ND and (2) detect unknown IP quickly.
- ◆ To have the surveillance plan consider the susceptible wild bird population in the area, to coordinate with APHIS, U.S. Department of the Interior,

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State wildlife agencies, and State agriculture departments to perform appropriate ND surveillance in these populations.

- ◆ To provide complete surveillance data summaries and analysis at intervals as specified by IC.
- ◆ To develop effective surveillance plans that can achieve desired outcomes by leveraging available resources, satisfying jurisdictional requirements, and implementing continuity of business measures.

At the APHIS level, CEAH is responsible for surveillance design and Surveillance, Preparedness, and Response Services (SPRS) is responsible for surveillance implementation. Box 5-1 lists the key objectives of surveillance activities during and immediately after an ND outbreak.

*Box 5-1. Surveillance Objectives in an ND Outbreak*

**Surveillance Objectives**

- Detect ND IP during an outbreak.
- Determine the size and extent of an ND outbreak.
- Supply information to evaluate outbreak control activities.
- Provide information for poultry and product movement within the CA.
- Provide information for poultry and product movement out of the CA.
- Prove disease freedom (DF) and regain disease-free status after eradication of the outbreak.

## 5.3.1 Surveillance Planning for ND Outbreak

### 5.3.1.1 GENERAL CONSIDERATIONS

A surveillance plan will indicate the frequency, number, and distribution of poultry and premises to be sampled. This requires tradeoffs be made among six surveillance parameters or tools, listed below. These tradeoffs are made employing initial information collected about the outbreak, and best estimates. During an outbreak, surveillance plans will change as new information becomes available. ([Appendix D](#) contains more detailed surveillance information.) The six surveillance parameters are:

1. *Design (threshold) prevalence.* The goal is to determine the lowest feasible prevalence that can be used to detect infected birds on premises. The chosen proportion of animals or premises infected that if exceeded will indicate the disease has been detected for a given confidence level and population size (1 percent vs. 5 percent vs. 15 percent).

2. *Confidence level.* The selected level (90 percent confident vs. 95 percent confident) that the disease can be detected for the chosen design threshold, given the population size.
3. *Types of tests.* Test choices—clinical inspection, polymerase chain reaction (PCR) testing, serology testing, etc.—and the test cutoff values can influence the design prevalence choice. Each test has a sensitivity and specificity that varies with the cutoff values.
4. *Sampling frequency.* Previous negative test results can augment information gained from negative test results if the time period between sampling is short—ideally daily, but definitely less than the incubation period. The value of the previous negative test results decreases as the interval between sampling increases (daily vs. every other day).
5. *Risk-based sampling.* Selecting populations with a higher proportion of infected animals (1 percent vs. 10 percent) reduces the number of samples needed for a given confidence level and population size.
6. *Sampling scheme.* Within the selected population (risk-based or total population) a random, convenience, or other scheme may be used, and the choice will influence the number of animals and premises sampled.

#### 5.3.1.2 SURVEILLANCE OBJECTIVES BY TIME PERIOD

There are three key segments of surveillance activity in an outbreak. These segments have distinct goals to aid in the control, containment, and eradication of ND in poultry. For more information on the zone, area, and premises designations referred to in this section, please refer to [Section 5.5](#) in this chapter.

1. *The initial 72 hours post-ND outbreak declaration.* The objective is to detect existing infected flocks and premises as quickly as possible. During this period, there are three goals of the IC:
  - a. Create the initial Buffer Zone (BZ) designation and the boundary of the CA.
  - b. Create a list of premises with susceptible flocks in the CA.
  - c. Determine the boundary of the Surveillance Zone (SZ) and start developing a surveillance plan to be used in the SZ.
2. *The control and eradication period (from initial 72-hour period until last case is detected and eradicated).* Four key surveillance objectives need to be accomplished simultaneously in this period.
  - a. Detect IP, new and existing, so that control measures can be put in place.

- 
- b. Provide evidence that premises are free of ND, thereby permitting poultry and poultry product movements in the CA.
  - c. Evaluate the outbreak management control activities.
  - d. Provide evidence that the Free Area (FA) is free of disease, thereby enabling unrestricted poultry and poultry product movement.
3. *Post eradication.* The objective is to prove that the CA and FA are free of disease (using OIE recommendations and requirements on surveillance).
    - a. Prove DF on depopulated premises.
    - b. Prove DF on At-Risk Premises (ARP) in the CA by random sampling or targeted sampling (choosing populations based on risk) on selected premises and selected flocks.
    - c. Prove DF in the FA, following OIE guidelines, using multiple methods including serological slaughter sampling and passive surveillance by veterinarians and the public.

### 5.3.2 Surveillance Sampling

The goal of surveillance sampling is to detect ND in poultry as soon as possible. Once an ND outbreak response has been authorized, surveillance sampling schemes will be finalized to sample and monitor premises for business continuity purposes and to survey premises that do not require daily poultry or product movement.

Surveillance sampling, using appropriate disease detection sampling schemes, will begin immediately after outbreak response has been authorized. The sampling unit and sample shown in Box 5-2 should be used in all surveillance schemes for the Infected Zone (IZ), BZ, and SZ, for both commercial and backyard premises.

## Box 5-2. Sampling Unit and Sample Measures for ND Surveillance

**Sampling Unit and Sample Measures for ND Surveillance**

- **Sampling Unit:** Flock or house.
- **Sample:** A pooled sample that combines swabs taken from five dead or euthanized sick birds out of the house's (flock's) daily dead or ill birds.

These sampling measures are defined as:

- **Dead Birds:** The dead or euthanized sick birds found each day in every house (flock) on a premises.
- **50-Dead-Bird Group:** Consists of 50 or fewer dead birds (and each multiple of 50 or fewer dead birds) from each house on the premises each day.
- **5-Bird Pool:** Combines samples taken from five dead or euthanized sick birds out of the house's (flock's) daily dead birds into one sample. In all cases where a 5-bird pool is mentioned, an 11-bird pool (samples taken from eleven dead or euthanized sick birds) may be collected instead (an additional option for sampling).
- **Detection Probability:** The sampling scheme will detect at least 1 infected bird in each 50-dead-bird group (at the 95 percent confidence level) if there are 20 or more infected birds (40 percent prevalence) in the target population of daily dead birds, where the rRT-PCR test sensitivity of the 5-bird pool is 86.5 percent.

### 5.3.3 Surveillance Schemes Based on Zone

The outbreak surveillance plan will have specific outbreak surveillance schemes for each zone (such as the IZ, BZ, and SZ). For example, a surveillance plan for the sampling frequency for commercial CP, Suspect Premises (SP), and Monitored Premises (MP) in the IZ would be to collect a 5-bird pool or 11-bird pool sample 2 times per week for 28 days. This may need to be adapted for ND viruses that demonstrate shorter incubation periods. Feasible sampling frequencies are provided in [Appendix D](#).

In the SZ, the number of premises to be sampled is based on detecting at least one IP where the prevalence rate of IP equals or exceeds 5 percent, at the 95 percent confidence level. ([Appendix D](#) contains complete information on sampling schemes for the IZ, BZ, and SZ for both commercial and backyard premises.)

For proof of DF, following OIE recommendations, surveillance starts 21 days after depopulation of the last IP and is in effect for 3 months. The OIE recommends intensifying surveillance schemes in conjunction with surveillance of the CA. In a U.S. ND outbreak, this might be conducted by

- ◆ active investigation of flocks with suspicious clinical signs,

- 
- ◆ increasing slaughter sero-surveillance, and
  - ◆ increasing the use of sentinel flocks.

Surveillance will be conducted in both the CA and FA. Investigation of suspect disease cases will augment the surveillance scheme. (Chapter 6 and Appendix D contain additional information on proof of DF.)

The ND Surveillance SOP provides additional information on the protocol for a response surveillance team responding to ND IP, the distinction between commercial and backyard premises surveillance and equipment checklists.

The Outbreak Surveillance Toolbox, available to people with access to the Inside APHIS webpage (<http://inside.aphis.usda.gov/vs/ceah/nsu/toolbox/>).

## 5.4 DIAGNOSTICS

Effective and appropriate sample collection, diagnostic testing, surge capacity, and reporting are critical in an effective ND response. These activities will require additional resources in the event of an ND outbreak. In particular, sample collection will require additional personnel. Surge capacity may also be required for diagnostic laboratory testing. Surveillance plan requirements must be fully integrated with current diagnostic sample collection, sample testing, surge capacity, and reporting capabilities.

During a suspected or actual ND outbreak, the key goals of response are to (1) meet the surge requirements for diagnostic testing at specific intervals, starting at time zero and at 24-hour intervals as the response escalates and (2) report all diagnostic test results to appropriate personnel and information management systems within 12 of hours of diagnostic test completion.

The *FAD Investigation Manual* (FAD PReP Manual 4-0) offers detailed information on diagnostic sample collection, diagnostic testing, surge capacity, and reporting. This document provides additional guidance on who is responsible for diagnostic testing, sample collection and processing, and analyzing diagnostic test results. Appendix E references VS Guidance Document 12001 which contains more information on submitting diagnostic samples. The procedures outlined in this document should be followed regarding the submission of diagnostic samples for an FAD investigation. For packaging and labeling submissions, please see the [APHIS webpage](#) (path to link: APHIS→Animal Health→Lab Information Services→Diagnostic Testing).

### 5.4.1 Sample Collection and Diagnostic Testing

Trained personnel and field collection kits are required to effectively collect samples from poultry.

Confirmation of an ND outbreak will be made by NVSL-Ames; confirmation of ND on any premises not currently in an ND CA will be made by NVSL-Ames. After NVSL confirmation of ND on a premises (index case), subsequent samples from premises within an ND CA may be sent to USDA-approved laboratories which are part of the NAHLN ([Appendix C](#)).

IC will provide specific instructions regarding the direction and collection of samples, which is likely to change as the outbreak evolves. In all cases, (1) NVSL will confirm the index case, (2) presumptive positive samples (on a rRT-PCR) from outside an established CA will be tested and confirmed by NVSL, and (3) NVSL will receive samples routinely from *inside* the CA to monitor in ND virus.

#### 5.4.1.1 DIAGNOSTIC SAMPLE FLOW FOR ND

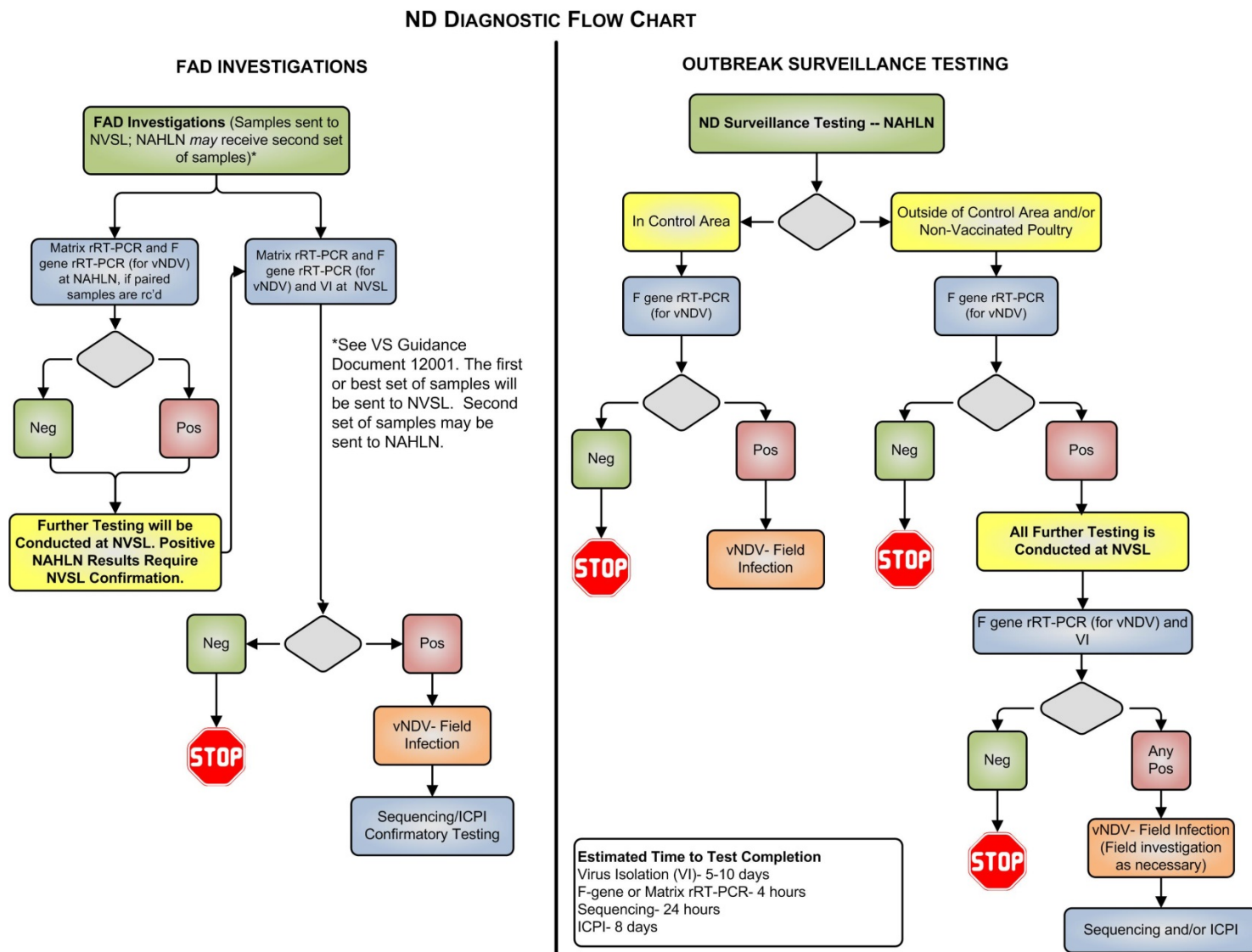
Figure 5-1 illustrates the typical diagnostic flow of sample testing for an FAD investigation of potential ND. Table 5-1 provides the corresponding legend.

Table 5-1. Legend for Figure 5-1

Abbreviation	Definition
ICPI	Intracerebral pathogenicity index (day-old chicks)
rRT-PCR	Real-time reverse polymerase chain reaction
VI	Virus Isolation



Figure 5-1. Diagnostic Flow for FAD Investigations for ND



## 5.4.2 Surge Capacity

Surge capacity may be needed in an ND outbreak. Additional resources, such as personnel and materials, will be needed for sample collection. Additional capacity may also be required for laboratory sample testing. Surge capacity can facilitate a rapid response and continuity of business for non-infected premises. In the event that the State NAHLN laboratory and NVSL-Ames are overwhelmed by the diagnostic testing requirements, NAHLN labs from across the country will provide surge capacity for diagnostic testing. For more information on surge capacity, please see the NAHLN Activation Guide. Individual laboratories have independent protocols on how to manage personnel if a surge is required. [Appendix C](#) contains a list of the NAHLN labs approved to conduct ND diagnostics.

## 5.4.3 Reporting

Box 5-3 clarifies reporting and notification of presumptive positive ND cases. See VS Guidance Document 12001 (regarding FAD investigations) for further information on ND investigations and notifications. This document is available here: <http://www.aphis.usda.gov/fadprep>.

### *Box 5-3. Reporting and Notification*

#### **Reporting and Notification**

- Cases considered a presumptive positive for ND at NVSL-Ames, based on the current case definition, will be reported to the affected States, other States, Tribal nations, industry, other Federal agencies, trading partners, and the OIE.
- This includes breeder and commercial poultry flocks, domestic waterfowl and upland game birds, backyard flocks, and live bird marketing system (LBMS).
- Appropriate Federal-State-Tribal-industry response and containment measures are initiated during ND investigations.

## 5.5 EPIDEMIOLOGICAL INVESTIGATION AND TRACING

### 5.5.1 Summary of Zones, Areas, and Premises Designations

A critical component of an ND response is the designation of zones, areas, and premises. The Incident Commander will work with the Operations Section and Situation Unit (in the Planning Section) to (1) determine appropriate zones, areas, and premises designations in the event of an ND outbreak and (2) reevaluate these designations as needed throughout the outbreak based on the epidemiological situation (see [Appendix B](#) for organizational charts). These zones, areas, and premises designations are used in quarantine and movement control efforts. For

details on the zones, areas, and premises, please see the *APHIS Foreign Animal Disease Framework: Response Strategies* (FAD PReP Manual 2-0).

Table 5-2 summarizes the premises designations that would be employed in an ND outbreak response. Table 5-3 summarizes the zone and area designations that would be used in an ND outbreak response. Figure 5-2 illustrates these premises, zone, and area designations.

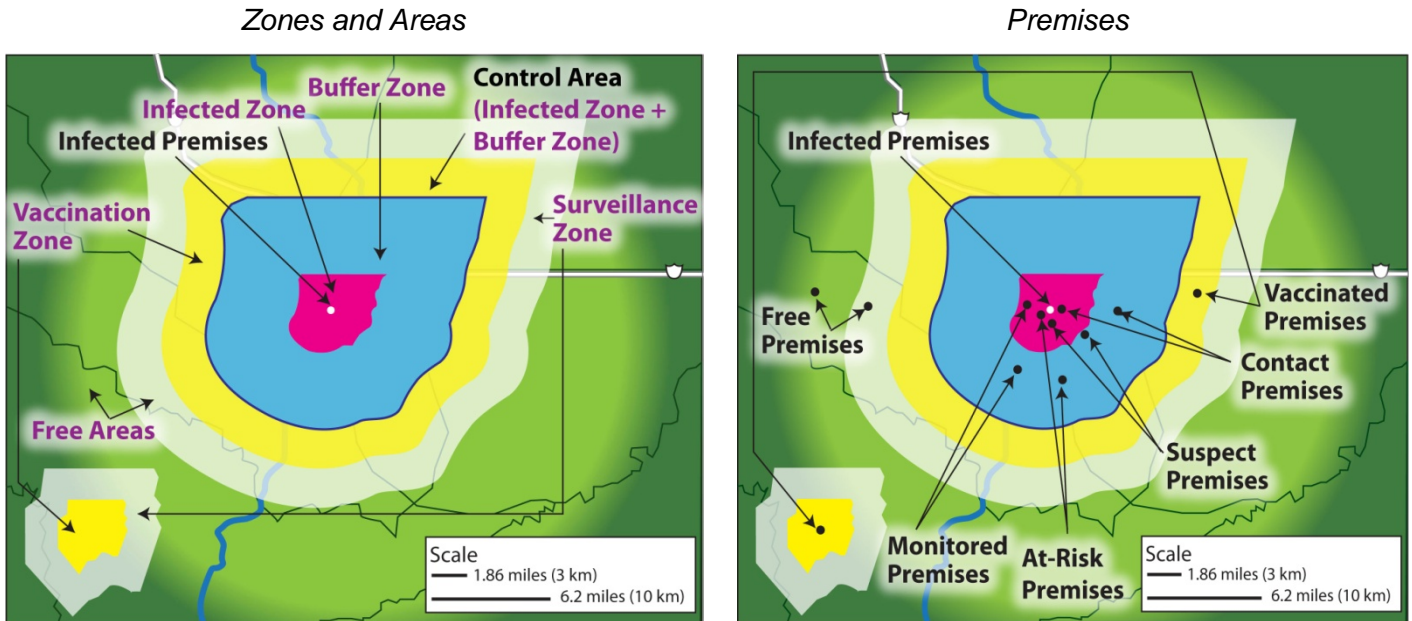
*Table 5-2. Summary of Premises Designations*

Premises	Definition	Zone
Infected Premises (IP)	Premises where a presumptive positive case or confirmed positive case exists based on laboratory results, compatible clinical signs, ND case definition, and international standards.	Infected Zone
Contact Premises (CP)	Premises with susceptible poultry that may have been exposed to ND, either directly or indirectly, including but not limited to exposure to animals, animal products, fomites, or people from Infected Premises.	Infected Zone, Buffer Zone
Suspect Premises (SP)	Premises under investigation due to the presence of susceptible poultry reported to have clinical signs compatible with ND. This is intended to be a short-term premises designation.	Infected Zone, Buffer Zone, Surveillance Zone, Vaccination Zone
At-Risk Premises (ARP)	Premises with susceptible poultry, but none of those susceptible animals have clinical signs compatible with ND. Premises objectively demonstrates that it is not an Infected Premises, Contact Premises, or Suspect Premises. At-Risk Premises seek to move susceptible poultry or products within the Control Area by permit. Only At-Risk Premises are eligible to become Monitored Premises.	Infected Zone, Buffer Zone
Monitored Premises (MP)	Premises objectively demonstrates that it is not an Infected Premises, Contact Premises, or Suspect Premises. Only At-Risk Premises are eligible to become Monitored Premises. Monitored Premises meet a set of defined criteria in seeking to move susceptible poultry or products out of the Control Area by permit.	Infected Zone, Buffer Zone
Free Premises (FP)	Premises outside of a Control Area and not a Contact or Suspect Premises.	Surveillance Zone, Free Area
Vaccinated Premises (VP)	Premises where emergency vaccination has been performed. This may be a secondary premises designation.	Containment Vaccination Zone, Protection Vaccination Zone

Table 5-3. Summary of Zone and Area Designations

Zone/Area	Definition
Infected Zone (IZ)	Zone that immediately surrounds an Infected Premises.
Buffer Zone (BZ)	Zone that immediately surrounds an Infected Zone or a Contact Premises.
Control Area (CA)	Consists of an Infected Zone and a Buffer Zone.
Surveillance Zone (SZ)	Zone outside and along the border of a Control Area.
Free Area (FA)	Area not included in any Control Area.
Vaccination Zone (VZ)	Emergency Vaccination Zone classified as either a Containment Vaccination Zone (typically inside a Control Area) or a Protection Vaccination Zone (typically outside a Control Area). This may be a secondary zone designation.

Figure 5-2. Example of Zones, Areas, and Premises in ND Outbreak Response



Note: The Vaccination Zone can be either a Protection Vaccination Zone or Containment Vaccination Zone. Stamping-out is not pictured in these figures.



### 5.5.2 Epidemiological Investigation

Epidemiological investigation and movement tracing during an outbreak are critical in controlling and eradicating ND. In an ND outbreak, the goals are to

- ◆ within 96 hours of identifying the index case, characterize the nature of the ND outbreak, identify the risk factors for transmission, and develop mitigation strategies;

- 
- ◆ within 6 hours of identifying potential IP or CP through tracing activities, assign a premises classification and a priority of investigation; and
  - ◆ within 24 hours of identifying the IP or initial CP, identify all additional CP.

These measures will aid in the control of ND and lessen the impact of the outbreak during the response effort. [Appendix F](#) contains a sample template of an epidemiological questionnaire. Please note that this questionnaire is only an example. In an outbreak, other factors may be considered; the scope of any such questionnaire should be assessed based on the epidemiological situation, and is at the discretion of IC. The Epidemiological Investigation and Tracing SOP as well as the *NAHEMS Guidelines: Surveillance, Epidemiology, and Tracing* both provide more information.

### 5.5.3 Tracing

Box 5-4 explains the fundamental importance of movement tracing in an ND response effort.

#### *Box 5-4. Importance of Movement Tracing in ND Outbreak*

##### **Tracing**

One of the single most important and urgent veterinary activities during an ND outbreak is to rapidly and diligently trace-back and trace-forward movements from an IP. This tracing will aid in the control of the spread of ND virus and limit the impact of the outbreak. Tracing should cover all movements from the premises, including susceptible poultry, non-susceptible species, animal products, vehicles, crops and grains, and people. Tracing also includes consideration of all potential modes of transmission and possible contact with wild birds.

Trace-back and trace-forward information should ideally be collected for at least 21 days prior to the appearance of clinical signs in poultry infected with ND. Additional tracing information will be collected for movements up to the time that quarantine was imposed.

Tracing information will be obtained from many sources (such as reports from field veterinarians, producers, industry, farm service providers, or the public). The Emergency Management Response System (EMRS) will be used to collect and report epidemiological data, including movement tracing information, locally and nationally.

### 5.5.4 Considerations for Size of Control Area and Minimum Sizes of Other Zones

The perimeter of the CA should be at least 10 km (~6.21 miles) beyond the perimeter of the closest IP. The size of the CA depends on the circumstances of the outbreak, including the IP transmission pathways and estimates of transmission risk, poultry movement patterns and concentrations, distribution of susceptible wildlife in proximity, natural terrain, jurisdictional boundaries, and other factors. The boundaries of the CA can be modified or redefined when tracing and other epidemiological information becomes available.

Table 5-4 provides a description of the minimum sizes of areas and zones. Table 5-5 reviews the factors used to determine the size of the CA.

*Table 5-4. Minimum Sizes of Areas and Zones*

Zone or Area	Minimum Size and Details
Infected Zone (IZ)	Perimeter should be at least 3 km (~1.86 miles) beyond perimeters of presumptive or confirmed Infected Premises. Will depend on disease agent and epidemiological circumstances. This zone may be redefined as the outbreak continues.
Buffer Zone (BZ)	Perimeter should be at least 7 km (~4.35 miles) beyond the perimeter of the Infected Zone. Width is generally not less than the minimum radius of the associated Infected Zone, but may be much larger. This zone may be redefined as the outbreak continues.
Control Area (CA)	Perimeter should be at least 10 km (~6.21 miles) beyond the perimeter of the closest Infected Premises. Please see Table 5-5 for factors that influence the size of the Control Area. This area may be redefined as the outbreak continues.
Surveillance Zone (SZ)	Width should be at least 10 km (~6.21 miles), but may be much larger.

*Table 5-5. Factors to Consider in Determining Control Area Size for ND*

Factors	Additional details
Jurisdictional areas	<ul style="list-style-type: none"> <li>◆ Effectiveness and efficiency of administration</li> <li>◆ Multi-jurisdictional considerations: local, State, Tribal, and multistate</li> </ul>
Physical boundaries	<ul style="list-style-type: none"> <li>◆ Areas defined by geography</li> <li>◆ Areas defined by distance between premises</li> </ul>
ND epidemiology	<ul style="list-style-type: none"> <li>◆ Reproductive rate</li> <li>◆ Incubation period</li> <li>◆ Ease of transmission</li> <li>◆ Infectious dose</li> <li>◆ Species susceptibility</li> <li>◆ Modes of transmission (fecal-oral, droplet, aerosol, vectors)</li> <li>◆ Survivability in the environment</li> <li>◆ Ease of diagnosis (for example, no pathognomonic signs; requires diagnostic laboratory testing)</li> </ul>

Table 5-5. Factors to Consider in Determining Control Area Size for ND

Factors	Additional details
Infected Premises characteristics	<ul style="list-style-type: none"> <li>◆ Number of contacts</li> <li>◆ Transmission pathways and transmission risk                             <ul style="list-style-type: none"> <li>▪ Extent of animal movement</li> <li>▪ Number of animals</li> <li>▪ Species of animals</li> <li>▪ Age of animals</li> <li>▪ Movement of traffic and personnel to and from premises (fomite spread)</li> <li>▪ Biosecurity measures in place at time of outbreak</li> </ul> </li> </ul>
Contact Premises characteristics	<ul style="list-style-type: none"> <li>◆ Number and types of premises</li> <li>◆ Susceptible animal populations and population density</li> <li>◆ Animal movements</li> <li>◆ Movement of traffic (fomites) and personnel to and from premises (fomite spread)</li> <li>◆ Biosecurity measures in place prior to outbreak</li> </ul>
Environment	<ul style="list-style-type: none"> <li>◆ Types of premises in area or region</li> <li>◆ Land use in area or region</li> <li>◆ Susceptible wildlife and population density</li> <li>◆ Wildlife as biological or mechanical vectors</li> </ul>
General area, region, or agricultural sector biosecurity	<ul style="list-style-type: none"> <li>◆ Biosecurity practices in place prior to outbreak</li> <li>◆ Biosecurity practices implemented once outbreak detected</li> </ul>
Number of backyard or transitional premises	<ul style="list-style-type: none"> <li>◆ Types of premises, animal movements, and network of animal and fomite movements</li> </ul>
Continuity of business	<ul style="list-style-type: none"> <li>◆ Continuity of business plans and processes in place or activated at beginning of outbreak (such as surveillance, negative diagnostic tests, premises biosecurity, and risk-assessments)</li> <li>◆ Permit processes, memorandums of understanding, and information management systems in place or activated at beginning of outbreak</li> </ul>

## 5.6 INFORMATION MANAGEMENT

Local, State, Tribal, and Federal information management systems need to be compatible for information and data sharing. In an ND outbreak, the response goal is to have EMRS information downloads or data entry processes performed in 24-hour or shorter intervals. Field personnel should be provided with access to mobile technology devices necessary for collecting, monitoring, and sharing information. Rapidly functional, robust, and scalable information technology infrastructure will be needed in an ND outbreak.

The Overview of Information Management SOP provides information on key VS systems, including the following:

- ◆ Animal Disease Traceability Information System

- ◆ EMRS
- ◆ LabWare Laboratory Information Management System
- ◆ Licensing, Serial Release, and Testing Information System
- ◆ Mobile Information Management
- ◆ Surveillance Collaboration Services
- ◆ Veterinary Services Process Streamlining.

It also covers the following APHIS information technology systems:

- ◆ APHIS Emergency Qualifications System
- ◆ Resource Ordering and Status System.

## 5.7 COMMUNICATION

APHIS Legislative and Public Affairs (LPA) will serve as the primary liaison with the news media in the event of an ND outbreak. Under the ICS, a JIC is established. During an ND outbreak, APHIS LPA and the USDA Office of Communications will operate from the JIC.

Effective communication during an ND outbreak should be carried out and maintained by

- ◆ establishing a network of stakeholders and systems for communication prior to an incident or outbreak;
- ◆ briefing the media, public, industry, Congress, trading partners, and others on the ND outbreak status and the actions being taken to control and eradicate the disease;
- ◆ coordinating with Federal, State, and local agencies, Tribal entities, producer groups, and Land Grant University-based Cooperative Extension Services to ensure consistent messaging regarding animal health, public health, and food safety; and
- ◆ assuring consumers that USDA is working on animal health issues, in an informed and timely manner, along with HHS, which is working on human health issues.

In addition, all communications should highlight the importance of sound biosecurity measures and steps that producers and owners can take to protect against ND infection in their own flocks.



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## 5.7.1 Objectives

All ND communications must

- ◆ furnish accurate, timely, and consistent information;
- ◆ maintain credibility and instill public confidence in the government's ability to respond to an outbreak;
- ◆ minimize public panic and fear; and
- ◆ address rumors, inaccuracies, and misperceptions as quickly as possible.

## 5.7.2 Key Messages

Six key messages will be conveyed in an ND outbreak (Box 5-5).

*Box 5-5. ND Communication Messages*

**Key Communication Messages**

For consumers:

1. ND is not a food-safety issue.
2. Properly prepared eggs and poultry are safe to eat.
3. We are responding quickly and decisively to eradicate the disease.

For producers:

1. You are the best protection your birds have.
2. Protect your flocks with good biosecurity practices.
3. Know the signs of ND, and be vigilant in reporting signs of illness.

## 5.7.3 Further Communications Guidance

The following resources provide guidance on communication and information about various stakeholder groups:

- ◆ USDA Biosecurity for the Birds (Newcastle Disease):  
[http://www.aphis.usda.gov/animal\\_health/birdbiosecurity/end/](http://www.aphis.usda.gov/animal_health/birdbiosecurity/end/)
- ◆ APHIS Animal Health website:  
<http://www.aphis.usda.gov/wps/portal/aphis/ourfocus/animalhealth>
- ◆ For information on the safe handling of poultry and poultry products, please see: <http://www.fsis.usda.gov/wps/portal/fsis/topics/food-safety-education/get-answers/food-safety-fact-sheets/poultry-preparation>.

## 5.8 HEALTH AND SAFETY AND PERSONAL PROTECTIVE EQUIPMENT

During an ND outbreak, responders are exposed to many hazards. Taking precautions to prevent adverse human health events related to emergency response efforts is important. In an ND response, personal protection and safety is particularly essential to protect individuals from ND infection. Typically, those at increased risk for ND infection are personnel in prolonged and direct contact with infected birds in an enclosed setting. Upon the confirmation of ND, public health authorities should implement appropriate public health measures, including surveillance, prevention, and case management (as required). APHIS will work closely with public health authorities in a response.

PPE is fundamental in ensuring personnel are protected from ND, as well as other hazards. Disposable or reusable outerwear may be acceptable, and all workers involved in the culling, transport, or disposal of ND virus-infected poultry must be provided with appropriate PPE. All visitors and employees, regardless of their exposure, should be provided with disposable coveralls, boots, hats, and gloves for their use before entering premises. Disposal of this PPE is required after leaving.

For further information on health, safety, and PPE, see the Health and Safety and PPE SOP. This SOP provides information on best practices to ensure the well-being and safety of all individuals involved in the response effort. Specific topics covered include the following:

- ◆ Procedures to create a site-specific health and safety plan;
- ◆ Details of hazard analysis, necessary training, and medical surveillance requirements;
- ◆ PPE, including Occupational Safety and Health Administration respirator fit testing;
- ◆ Pre-deployment information and guidance; and
- ◆ A protocol for staff field safety in an ND response.

### 5.8.1 Mental Health Concerns

The health and safety of all personnel is affected by the mental state of those involved in the ND response effort. The toll an ND outbreak may take on mental and physical health must be considered to protect the health and safety of all personnel. ND depopulation efforts can significantly affect both responders and owners of affected poultry. Quarantine and movement restrictions may also impact populations affected by such controls. Care should be taken in the event of

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an ND outbreak to consider and provide provisions for such psychological effects. HHS has developed resources specifically for emergency and disaster responders, State and local planners, health professionals, and the general public ([www.bt.cdc.gov/mentalhealth/](http://www.bt.cdc.gov/mentalhealth/)). The Mass Depopulation and Euthanasia SOP provides further information on how personnel can effectively deal with euthanasia-related stress.

## 5.8.2 Further Information on Health, Safety, and Personal Protective Equipment

In addition to the resources already listed, more information and guidance can be found in the following documents:

- ◆ *APHIS Health and Safety Manual*: Available to APHIS employees at [http://inside.aphis.usda.gov/mrpbs/publications/safety\\_health\\_wellness\\_manual/index.shtml](http://inside.aphis.usda.gov/mrpbs/publications/safety_health_wellness_manual/index.shtml)
- ◆ *NAHEMS Guidelines: Health and Safety*
- ◆ *NAHEMS Guidelines: Personal Protective Equipment*.

## 5.9 BIOSECURITY

An ND outbreak would potentially have a serious impact on the agricultural industry. Strict biosecurity measures need to be implemented to prevent or slow the spread of ND. Biosecurity procedures should be implemented within 24 hours of the identification of an index ND case. Accordingly, veterinarians, owners, and anyone else in contact with enterprises that have poultry need to observe biosecurity measures.

Proper biosecurity measures have two functions: (1) containing the virus on IP (biocontainment) and (2) preventing the introduction of the virus via movement of personnel and material to naïve poultry and premises (bioexclusion). During an ND outbreak, a careful balance must be maintained between facilitating response activities and ensuring personnel do not expose naïve animals and premises to ND.

Because some people in contact with ND virus may develop conjunctivitis or a mild “flu-like” illness, USDA will coordinate with public health agencies to minimize risks to responders and others exposed. In outbreaks with zoonotic potential, such as ND, appropriate PPE is provided to persons involved in outbreak control and eradication as an additional biosecurity measure. For more information on health, safety, and PPE, see [Section 5.8](#). Further information on biosecurity is discussed in the Biosecurity SOP which provides guidance on how to draft a site-specific biosecurity plan and

- ◆ identifies the roles and responsibilities of key personnel,

- ◆ explains biosecurity training and briefing requirements,
- ◆ addresses site security and safety,
- ◆ discusses biosecurity practices for shipping and transportation, and
- ◆ provides a biosecurity checklist.

In addition, more information and guidance on appropriate biosecurity measures in an FAD outbreak can be found in the *NAHEMS Guidelines: Biosecurity*.

### 5.9.1 Biosecurity Hazards and Mitigating Measures

Box 5-6 shows biosecurity hazards and biosecurity measures to mitigate these risks during an ND outbreak.

*Box 5-6. ND Biosecurity Hazards and Appropriate Biosecurity Measures*

<b>Biosecurity Hazards</b>	<b>Biosecurity Measures to Mitigate Risk</b>
<ul style="list-style-type: none"> <li>• Movement of poultry, other livestock, vehicles, equipment, and people.</li> <li>• Contaminated feed and water.</li> <li>• Contact with susceptible birds.</li> </ul>	<ul style="list-style-type: none"> <li>• Clean and disinfect premises, vehicles, and equipment, and dispose of materials that cannot be disinfected in an appropriate manner.</li> <li>• Account for the movement of all poultry, livestock, and equipment for accurate records.</li> <li>• Provide a location for all individuals to carry out appropriate cleaning and disinfection procedures and insist these measures be followed.</li> <li>• Ensure that housed poultry remain housed and that entry of rodents, ground water, and live birds is prevented.</li> <li>• Prevent close or direct contact between poultry and wild birds.</li> </ul>

### 5.9.2 Closed Flocks

In the event of an ND outbreak, one of the most fundamental biosecurity measures is closed flocks. Box 5-7 provides guidance on employing closed flocks as a critical biosecurity measure.

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*Box 5-7. Biosecurity Measure—Closed Flocks*

**Biosecurity: Closed Flocks**

- To the fullest extent possible, close the flock to the introduction of new poultry (with population increases occurring only from offspring).
- If closing a flock is not possible, isolate newly purchased poultry (from the healthiest possible sources) and those returning from existing flocks for 30 days or more.
- Vaccination status of introduced poultry should be known.

### 5.9.3 Waiting Period

Another important biosecurity measure is to ensure personnel are not travelling between IP and unknown or non-IP. During an ND outbreak, it is important that personnel wait the allotted time between premises visits in addition to following appropriate biosecurity and cleaning and disinfection protocols (see [Section 5.15](#)). *Actual waiting periods will be recommended by IC on the basis of the outbreak circumstances, and need for personnel.* Typical waiting times may vary between 24 and 72 hours. Regardless of wait time, personnel should not travel from an IP or SP to unknown or non-IP. However, personnel may travel *between* IP, if proper mitigating procedures are followed.

Extended avoidance periods may be unnecessary with stringent biosecurity practices and effective cleaning and disinfection protocols. However, until further information is available, veterinarians and other responders should adhere to the guidance provided by the local IC.

## 5.10 QUARANTINE AND MOVEMENT CONTROL

By restricting the movement of infected animals, animal products, and contaminated fomites, quarantine and movement control can be a powerful tool in controlling and eradicating an ND outbreak. Movement control is accomplished through a permit system that allows entities to make necessary movements without creating an unacceptable risk of disease spread. Operational staff members need to strictly adhere to movement control procedures, which are based on the best scientific information available at the time.

The Incident Commander, Disease Surveillance Branch (Operations Section), and Situation Unit (Planning Section), will coordinate to establish an IZ and a BZ within 12 hours of the identification of an index case. Controlled movement orders and 24-hour standstill notices are likely to be implemented upon detection of ND in the United States for relevant premises and zones. ([Appendix G](#) contains examples of movement control notices.) Once the CA (IZ plus BZ) is established, quarantine and movement controls will be implemented.

Each State's animal health emergency response plan should describe the implementation of quarantine and movement controls, including a permit system. USDA will impose a Federal quarantine and restrict interstate commerce from the infected States, asking the States (or adjoining countries) to provide resources to maintain and enforce the quarantine. Reimbursement formulas will be established between the States and USDA in a cooperative agreement. See *Foreign Animal Disease Framework: Roles and Coordination* (FAD PReP Manual 1-0) for further information on authorities and funding.

The following sections provide information on movement control guidelines.


### 5.10.1 Zones, Areas, and Premises Designations

The Incident Commander will work with the Disease Surveillance Branch (Operations Section) and the Situation Unit (Planning Section) to determine appropriate premises designations in the event of an ND outbreak (see [Appendix B](#) for an organizational chart). These zone, area, and premises designations will be used for quarantine and movement control efforts. Again, refer to Tables 5-2 and 5-3 and Figure 5-2 for the designations used here.

### 5.10.2 Permit Guidance to Move into a Control Area, within a Control Area, and out of a Control Area

During an ND outbreak, the following guidance in Table 5-6 (movement into a CA), Table 5-7 (movement within a CA), and Table 5-8 (movement out of a CA) will be used to issue permits in movement control efforts.

Table 5-6. Movement into Control Area from Outside Control Area to Specific Premises<sup>a</sup>

Item Moving into a Control Area to a/an... 	Infected Premises	Suspect Premises <sup>^</sup>	Contact Premises <sup>^</sup>	At-Risk Premises	Monitored Premises
Poultry <sup>b</sup>	Prohibited, except under certain circumstances as determined by the IC, such as slaughter.	Prohibited, except under certain circumstances as determined by the IC, such as slaughter.	Prohibited, except under certain circumstances as determined by the IC, such as slaughter.	Permit for movement must be approved by the IC with appropriate biosecurity measures.	Permit for movement must be approved by the IC with appropriate biosecurity measures.
Poultry products	See continuity of business plans for information on susceptible poultry products, or guidance and processes as determined by the IC. Please see <a href="#">Section 5.10.3</a> which contains OIE ND-specific guidance for inactivating ND.				
Other animals (non-susceptible) from premises <b>with</b> poultry	Prohibited unless permit approved by IC and appropriate biosecurity measures.	Prohibited unless permit approved by IC and appropriate biosecurity measures.	Prohibited unless permit approved by IC and appropriate biosecurity measures.	Allowed with appropriate biosecurity measures. IC may require a permit for movement depending on ND epidemiology and characteristics of destination premises.	Allowed with appropriate biosecurity measures. IC may require a permit for movement depending on ND epidemiology and characteristics of destination premises.
Other animals (non-susceptible) from premises <b>without</b> poultry	IC will determine movement restrictions based on ND epidemiology and characteristics of destination premises.	IC will determine movement restrictions based on ND epidemiology and characteristics of destination premises.	IC will determine movement restrictions based on ND epidemiology and characteristics of destination premises.	Allowed with appropriate biosecurity measures. IC may require a permit for movement depending on ND epidemiology and characteristics of destination premises.	Allowed with appropriate biosecurity measures. IC may require a permit for movement depending on ND epidemiology and characteristics of destination premises.
Equipment, vehicles, and other fomites from premises <b>with</b> poultry	Allowed with appropriate biosecurity measures.	Allowed with appropriate biosecurity measures.	Allowed with appropriate biosecurity measures.	Allowed with appropriate biosecurity measures.	Allowed with appropriate biosecurity measures.
Semen, embryos from poultry	Prohibited.	Prohibited.	Prohibited.	Allowed with appropriate biosecurity measures.	Allowed with appropriate biosecurity measures.

<sup>a</sup> Movement control and permit processes will change over time depending on situational awareness and operational capabilities.

<sup>b</sup> May include pet birds and other susceptible species as defined by Incident Command during the outbreak.

<sup>^</sup> Contact Premises and Suspect Premises are intended to be short-term premises designations. Ideally these Premises should be re-designated before movements occur.

Table 5-7. Movement within a Control Area<sup>a</sup>

Item Moving within a Control Area from a/an....	Infected Premises	Suspect Premises <sup>^</sup>	Contact Premises <sup>^</sup>	At-Risk Premises	Monitored Premises
Poultry <sup>b</sup>	Prohibited, except under certain circumstances as determined by the IC, such as slaughter.	Prohibited, except under certain circumstances as determined by the IC, such as slaughter.	Prohibited, except under certain circumstances as determined by the IC, such as slaughter.	Allowed to move by permit approved by the IC; surveillance, negative diagnostic tests, premises biosecurity, and risk-assessment may be required for permit.	Allowed to move by permit approved by the IC; surveillance, negative diagnostic tests, premises biosecurity, and risk-assessment may be required for permit.
Poultry products	See continuity of business plans for information on susceptible poultry products, or guidance and processes as determined by the IC. Please see <a href="#">Section 5.10.3</a> which contains OIE ND-specific guidance for inactivating ND.				
Other animals (non-susceptible) from premises <b>with</b> poultry	Prohibited unless specific permit granted by IC and appropriate biosecurity measures.	Prohibited unless specific permit granted by IC and appropriate biosecurity measures.	Prohibited unless specific permit granted by IC and appropriate biosecurity measures.	Allowed to move by permit approved by the IC; surveillance, negative diagnostic tests, premises biosecurity, and risk-assessment may be required for permit.	Allowed to move by permit approved by the IC; surveillance, negative diagnostic tests, premises biosecurity, and risk-assessment may be required for permit.
Other animals (non-susceptible) from premises <b>without</b> poultry	n/a (Infected Premises have poultry)	n/a (Suspect Premises have poultry)	n/a (Contact Premises have poultry)	n/a (At-Risk Premises have poultry)	n/a (Monitored Premises have poultry)
Equipment, vehicles, and other fomites from premises <b>with</b> poultry	Prohibited unless specific permit granted by IC and appropriate biosecurity measures.	Prohibited unless specific permit granted by IC and appropriate biosecurity measures.	Prohibited unless specific permit granted by IC and appropriate biosecurity measures.	Allowed by permit approved by IC and appropriate biosecurity measures.	Allowed by permit approved by IC and appropriate biosecurity measures.
Semen, embryos from poultry	Prohibited.	Prohibited.	Prohibited.	Allowed by permit approved by IC and appropriate biosecurity measures.	Allowed by permit approved by IC and appropriate biosecurity measures.

<sup>a</sup> Movement control and permit processes will change over time depending on situational awareness and operational capabilities.

<sup>b</sup> May include pet birds and other susceptible species as defined by Incident Command during the outbreak.

<sup>^</sup> Contact Premises and Suspect Premises are intended to be short-term premises designations. Ideally these Premises should be re-designated before movements occur.



Table 5-8. Movement from Inside a Control Area to Outside a Control Area from Specific Premises<sup>a</sup>

Item Moving out of a Control Area from a/an...	Infected Premises	Suspect Premises <sup>^</sup>	Contact Premises <sup>^</sup>	At-Risk Premises	Monitored Premises <sup>*</sup>
Poultry	Prohibited, except under certain circumstances as determined by the IC.	Prohibited, except under certain circumstances as determined by the IC.	Prohibited, except under certain circumstances as determined by the IC.	At-Risk Premises must become Monitored Premises to move susceptible poultry out of a Control Area.	Allowed to move by permit approved by IC; surveillance, negative diagnostic tests, premises biosecurity, and risk-assessment may be required for permit.
Poultry products	See continuity of business plans for information on susceptible poultry products, or guidance and processes as determined by the IC. Please see <a href="#">Section 5.10.3</a> which contains OIE ND-specific guidance for inactivating ND.				
Other animals (non-susceptible) from premises <b>with</b> poultry	Prohibited unless specific permit approved by IC and appropriate biosecurity measures and risk-assessment.	Prohibited unless specific permit approved by IC and appropriate biosecurity measures and risk-assessment.	Prohibited unless specific permit approved by IC and appropriate biosecurity measures and risk-assessment.	Allowed to move by permit approved by IC; surveillance and negative diagnostic tests for susceptible poultry on premises, premises biosecurity, and risk-assessment may be required for permit.	Allowed to move by permit approved by IC; surveillance and negative diagnostic tests for susceptible poultry on premises, premises biosecurity, and risk-assessment may be required for permit.
Other animals (non-susceptible) from premises <b>without</b> poultry	n/a (Infected Premises have poultry)	n/a (Suspect Premises have poultry)	n/a (Contact Premises have poultry)	n/a (At-Risk Premises have poultry)	n/a (Monitored Premises have poultry)
Equipment, vehicles, and other fomites from premises <b>with</b> poultry	Prohibited unless permit approved by IC and appropriate biosecurity measures.	Prohibited unless permit approved by IC and appropriate biosecurity measures.	Prohibited unless permit approved by IC and appropriate biosecurity measures.	Allowed by permit approved by IC and appropriate biosecurity measures.	Allowed by permit approved by IC and appropriate biosecurity measures.
Semen, embryos from poultry	Prohibited.	Prohibited.	Prohibited.	At-Risk Premises must become Monitored Premises to move semen, embryos from susceptible poultry out of a Control Area.	Monitored Premises only allowed by permit approved by IC and appropriate biosecurity measures.

<sup>a</sup> Movement control and permit processes will change over time depending on situational awareness and operational capabilities.

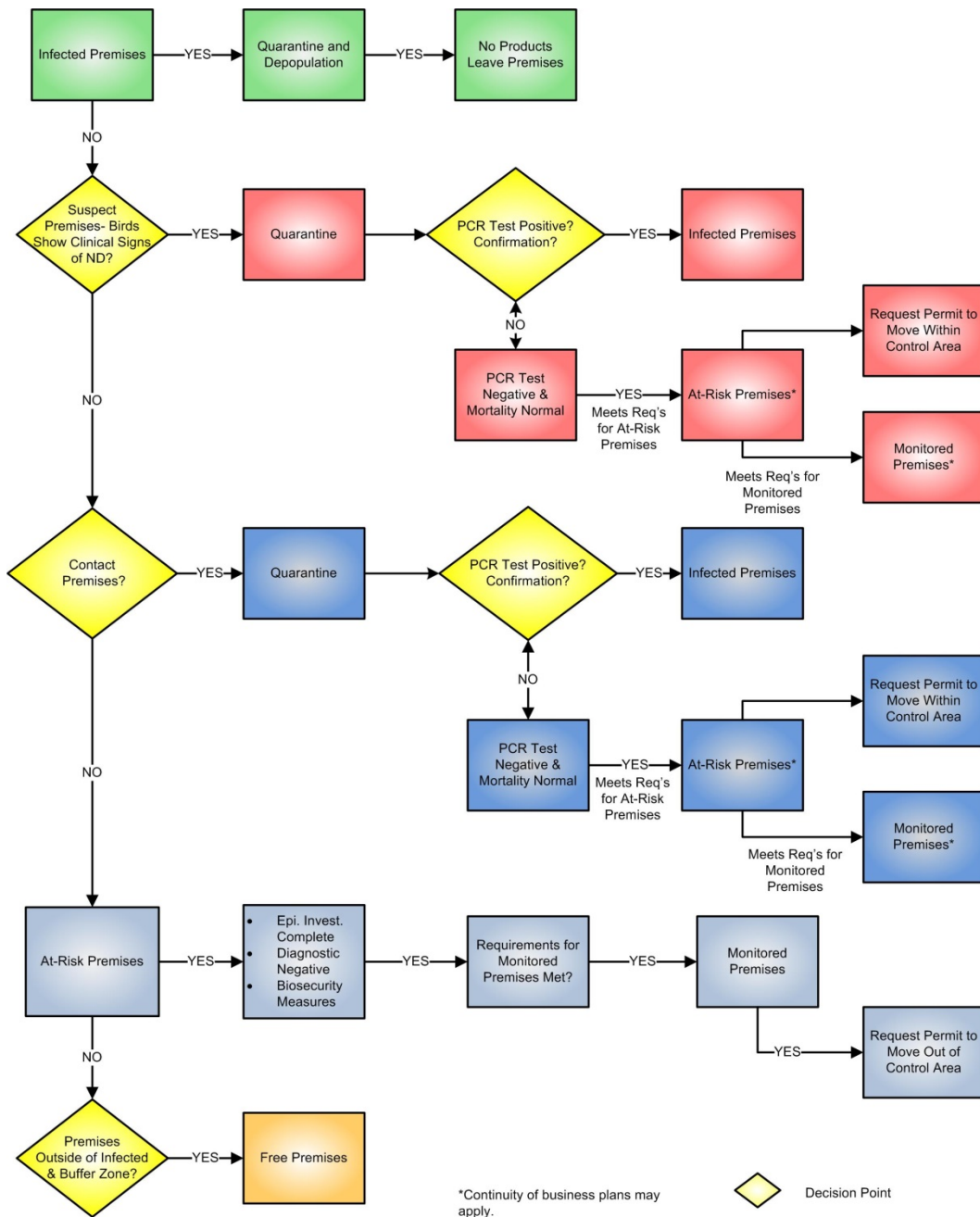
<sup>b</sup> May include pet birds and other susceptible species as defined by Incident Command during the outbreak.

<sup>^</sup> Contact Premises and Suspect Premises are intended to be short-term premises designations. Ideally these Premises should be re-designated before movements occur.

<sup>\*</sup> Continuity of business plans may apply.

For movement of susceptible poultry and poultry products out of the CA to an FA, the permit process must consider national standards, any OIE standards, and conditions for such movement such as biosecurity procedures and risk assessment recommendations. In addition, commodity-specific proactive risk assessments, continuity of business plans, movement and marketability plans, and compartmentalization plans will also be considered. Figure 5-3 illustrates movement control and permitting in relation to premises designation.

Figure 5-3. Premises Designations in Relation to Permitting and Movement Control



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### 5.10.3 Moving Commodities, Animals, and Conveyances

Any movement of commodities, animals, and conveyances brings some level of risk of ND transmission from a known IP or an unknown IP to a non-IP. The risk of moving commodities, animals, and conveyances depends on the nature of the item being moved and its ability to transmit or be contaminated with ND virus. ND virus can be transmitted via items that contain biological material, through infected birds, or via a contaminated fomite or person.

### 5.10.4 Guidance for All Premises

Because of the variation in the risk of the commodities, animals, and conveyances, it is possible that premises—particularly MP and ARP—may be permitted to move one commodity or conveyance but not another. In making the decision whether movement will be allowed, substantial consideration will be given to critical movements (for example, the movement of animal feed onto premises).

### 5.10.5 World Organization for Animal Health Treatment Guidelines for ND

The OIE *Terrestrial Animal Health Code (2013)* provides guidance for the inactivation of ND virus in eggs, egg products, and meat. The Code also provides extensive information on the importation of various poultry products, including feather meal, down, meat products, and other products of poultry origin, including those intended for animal feeding or industrial use. The procedures for inactivating ND virus in eggs, egg products, and meat are reproduced here for easy reference, and should be considered in any movement control and permitting during an outbreak.

#### 5.10.5.1 PROCEDURES FOR THE INACTIVATION OF THE NEWCASTLE DISEASE VIRUS IN EGGS AND EGG PRODUCTS (ARTICLE 10.9.20)

Table 5-9 lists times for industry standard temperatures suitable for the inactivation of ND virus present in eggs and egg products:

*Table 5-9. Inactivation of Newcastle Disease in Eggs and Egg Products*

	Temperature (°C)	Time
Whole egg	55.0	2,521 seconds
Whole egg	57.0	1,956 seconds
Whole egg	59.0	674 seconds
Liquid egg white	55.0	2,278 seconds
Liquid egg white	57.0	986 seconds
Liquid egg white	59.0	301 seconds

*Table 5-9. Inactivation of Newcastle Disease in Eggs and Egg Products*

	Temperature (°C)	Time
10% salted yolk	55.0	176 seconds
Dried egg white	57.0	50.4 hours

The listed temperatures are indicative of a range that achieves a 7-log kill. Where scientifically documented, variances from these times and temperatures may also be suitable when they achieve the inactivation of the virus.

#### 5.10.5.2 PROCEDURES FOR THE INACTIVATION OF THE ND VIRUS IN MEAT (ARTICLE 10.9.21)

Table 5-10 lists times for industry standard temperatures are suitable for the inactivation of ND virus present in meat.

The listed temperatures are indicative of a range that achieves a 7-log kill. Where scientifically documented, variances from these times and temperatures may also be suitable when they achieve the inactivation of the virus.

*Table 5-10. Inactivation of Newcastle Disease in Meat*

	Temperature (°C)	Time
Poultry meat	65.0	39.8 seconds
	70.0	3.6 seconds
	74.0	0.5 seconds
	80.0	0.03 seconds

#### 5.10.6 Surveillance Required for Poultry and Product Movement

Surveillance measures are required for non-daily movement of poultry and poultry products for premises located in the CA (IZ and BZ). These steps include visual surveillance as well as diagnostic testing for at least 2 days prior to movement. For more information on surveillance requirements for non-daily poultry and product movement, see [Appendix D](#) of this plan.

### 5.11 CONTINUITY OF BUSINESS

Continuity of business is the management of non-IP and non-contaminated animal products in the event of an ND outbreak. Continuity of business provides science- and risk-based approaches and systems as a critical activity in an ND response. This helps agriculture and food industries facilitate routine business, or a return to business, during a disease response, while the risk of disease spread and threat to

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public health is effectively managed. Continuity of business planning can help to minimize unintended consequences on producers and consumers impacted by ND. During an ND outbreak, permitting, movement control, and prioritized disruptions—all based on science- and risk-based approaches—are critical measures to ensure continuity of business during an ND outbreak. The *NAHEMS Guidelines: Continuity of Business* covers topics such as

- ◆ key roles and responsibilities in continuity of business planning,
- ◆ details of developing continuity of business plans,
- ◆ potential components required for continuity of business planning, and
- ◆ preparedness and response goals.

The *Secure Egg Supply Plan* contains additional information about continuity of business planning (available from [www.secureeggsupply.com](http://www.secureeggsupply.com)) in the event of a highly pathogenic avian influenza outbreak. Stakeholders may wish to consider similar measures for continuity of business planning during an ND response effort.

## 5.12 REGIONALIZATION FOR INTERNATIONAL TRADE (FOR A U.S. ND RESPONSE)

In the event of an ND outbreak in the United States, international trade of animals and animal products may be adversely affected for a significant period of time. This would have serious economic implications for the affected industries and the United States. Therefore it is important to identify, prior to an outbreak, potential procedures and plans that may mitigate the consequences and reestablish international trade as rapidly as possible.

As defined by the OIE, regionalization, also known as zoning, is the concept of separating subpopulations of animals in order to maintain a specific health status in one or more disease-free regions or zones. Disease-free regions can be created to facilitate continuity of business and reestablish international trade from the regions demonstrated to be disease-free. Regionalization recognizes that risk may be tied to factors that are not reflected by political boundaries of the nation or individual states, especially when the outbreak has been confined to specific areas within an individual state or group of states. Providing information to the OIE, its member countries, and our trading partners, which clearly identifies the boundaries of the disease-free areas can be used to inform our trading partners' decisions whether to receive or reject our exports. This risk-based process, based on sound science, can mitigate the adverse economic effects of an ND outbreak.

## 5.12.1 Compartmentalization

Another tool that may potentially mitigate the economic consequences of a disease outbreak is compartmentalization. Compartmentalization, which defines an animal subpopulation by management and husbandry practices related to biosecurity, could be used by the veterinary authorities to demonstrate and maintain DF in certain commercial establishments whose practices have prevented the introduction of the disease. The disease-free status of these compartments could enable trade movement of poultry and poultry products. Compartmentalization has not been fully implemented by the United States for any disease agent to date and will depend on the recognition of the status of these compartments by international trading partners. Implementation of compartmentalization will rely on producers, industry, and State and Federal animal health authorities. By working closely together to develop and strengthen relationships and implementing the agreed upon procedures preceding an FAD outbreak, compartmentalization may be a useful tool.

## 5.12.2 Further Guidance

The OIE *Terrestrial Animal Health Code (2013)* also offers guidance on regionalization and compartmentalization in Chapters 4.3 and 4.4. Currently there are no internationally accepted or fully implemented ND-free compartments in the United States.

## 5.13 MASS DEPOPULATION AND EUTHANASIA

Poultry on an IP will be depopulated as soon as possible after declaration of an ND outbreak. Poultry on CP may also be depopulated as soon as possible after the premises are classified as CP. The Mass Depopulation and Euthanasia SOP provides instructions for personnel following the declaration of an ND outbreak and the classification of IP and CP. This SOP offers information on mass depopulation and euthanasia for poultry, including evaluation of various euthanasia methods, such as

- ◆ carbon dioxide or other gas,
- ◆ water-based foam concentrate, and
- ◆ other approved methods.

The *NAHEMS Guidelines: Mass Depopulation and Euthanasia* contains additional information on euthanasia and mass depopulation.

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### 5.13.1 Best Practice Guidance

In the event of an ND outbreak, euthanasia or mass depopulation should be provided to affected poultry as safely, quickly, efficiently, and humanely as possible. In addition, the emotional and psychological impact on animal owners, caretakers, their families, and other personnel should be minimized.

Mass depopulation and euthanasia are not synonymous, and APHIS recognizes a clear distinction. Euthanasia involves transitioning an animal to death as painlessly and stress-free as possible. Mass depopulation is a method by which large numbers of animals must be destroyed quickly and efficiently with as much consideration given to the welfare of animals as practicable, given extenuating circumstances. Mass depopulation is employed in an ND response to prevent or mitigate the spread of ND through elimination of infected or potentially infected animals. Best practice guidance issued in 2007 from the American Veterinary Medical Association (AVMA) states that, “Under unusual conditions, such as disease eradication and natural disasters, euthanasia options may be limited. In these situations, the most appropriate technique that minimizes human and animal health concerns must be used.” Qualified personnel should perform mass depopulation in the event of an ND outbreak using the safest, quickest, and most humane procedures in accordance with AVMA guidance.

If personnel or materials are insufficient, the Incident Commander or other official should request emergency depopulation, disposal, and decontamination (3D) contractor support for ND depopulation efforts from the NVS.

### 5.13.2 Water-Based Foam for Poultry Depopulation

AVMA supports the use of water-based (fire suppression) foam as a method of mass depopulation for poultry under emergency conditions, if performance standards are implemented as detailed by APHIS. This method is superior in that fewer personnel are required to enter into poultry houses. However the equipment required may be expensive and large amounts of water are required, depending on the foaming system. Water-based foam has been approved for poultry depopulation of the following groups:

- ◆ Floor-reared poultry (broiler chickens and turkeys);
- ◆ Poultry infected with a potentially zoonotic disease;
- ◆ Animals experiencing an outbreak that is rapidly spreading and, in the opinion of State or Federal regulatory officials, cannot be contained by conventional or currently accepted means of depopulation; and
- ◆ Animals housed in structurally unsound buildings that would be hazardous for human entry.

The Mass Depopulation and Euthanasia SOP provides additional information on using water-based foam for poultry depopulation in an attachment.

## 5.14 DISPOSAL

Appropriate disposal of poultry carcasses and materials is a critical component of a successful ND response. NDV can survive for long periods on both organic and inorganic materials. The Disposal SOP discusses how to dispose of thousands of bird carcasses, contaminated and potentially contaminated materials, poultry products, items that cannot be properly cleaned and disinfected (such as manure, litter, and bedding), products of the response effort (such as PPE), and products of vaccination response. Disposal will occur as soon as possible after flock depopulation.

On-site burial has commonly been used as an accepted means of disposal; off-site burial may also be considered when on-site burial is not possible or if a common burial site would be more efficient. However, while burial has been a traditional method used, it may present significant issues related to potential environmental contamination. Composting and disposal by managed landfill are two methods that address the need to minimize negative environmental impact while also mitigate virus spread. Composting can be performed on-site either “in-house” or outdoors; composting materials are likely to be available. Additionally, managed landfills may be equipped to handle infectious waste properly, though their ability to take carcasses may vary. Incineration is another option, though fuel requirements and smoke discharge can be challenging.

Please see the Disposal SOP for more details on any disposal method. Other disposal methods such as digestion, rendering, and hydrolysis may be employed, as indicated by the circumstances of the outbreak and disposal requirements. Disposal methods should always be assessed and applied appropriately, given the facility location, type of housing, premises characteristics, and other situational factors.

Disposal must always occur in a biosecure way that does not allow ND virus to spread and minimizes negative environmental impact. In addition, local and State regulations *must* be observed and memorandums of understanding may need to be obtained to ensure disposal capability. IC will coordinate closely with local authorities in deciding how to dispose of carcasses and other items. Cost effectiveness and stakeholder acceptance must also be considered in disposal decisions. If movement is required for disposal, the IC must permit such movement. In the event that available personnel are insufficient for disposal requirements in an ND outbreak, the Incident Commander can request emergency 3D contractor support from the NVS.

The *NAHEMS Guidelines: Disposal* also contains further guidance on disposal activities; stakeholders should consider what disposal methods would be



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appropriate in advance of an outbreak, and plan for these requirements accordingly.

## 5.15 CLEANING AND DISINFECTION

Because of ND's high survival rate on both organic and inorganic materials, aggressive cleaning and disinfection practices are required for control and eradication. Cleaning and disinfection are to be conducted within 48 hours of the disposal of depopulated poultry. The Cleaning and Disinfection SOP provides information on

- ◆ the ND cleaning and disinfection effort,
- ◆ optimal cleaning and disinfection methods for ND,
- ◆ processes used to inactivate ND virus from organic materials,
- ◆ how to clean and disinfect equipment and premises after ND detection, and
- ◆ Environmental Protection Agency (EPA)-approved [disinfectants](#) for ND.

Water and feeding systems, ventilation, slats, nest box material, egg packing machines, egg storage areas, floor areas, the exterior of the house, and other materials and areas must be cleaned and disinfected. All disinfectants must be EPA-approved for ND; off-label use of disinfectants is illegal.

If available personnel or materials are insufficient for cleaning and disinfection in an ND outbreak, the Incident Commander can request emergency 3D contractor support from NVS.

The *NAHEMS Guidelines: Cleaning and Disinfection* contains additional information on cleaning and disinfection.

## 5.16 VACCINATION

### 5.16.1 General Vaccination Information

Vaccination using lentogenic (low virulence) vaccines is widely practiced in the U.S. poultry industry, particularly in broiler breeders, layers, and turkeys. Both inactivated and live lentogenic vaccine is commercially available. Vaccination does prevent clinical signs, and can thereby mitigate production losses from low virulence strains of APMV-1. However, poultry will still shed the virus, and typical lentogenic vaccination may not be sufficient to protect poultry from a velogenic challenge.

typical lentogenic vaccination may not be sufficient to protect poultry from a velogenic challenge.

For improved immunity, multiple doses of either the live or inactivated vaccine (or a combination thereof) are required, and must be used at frequent intervals. Frequently, a live vaccine is used first, followed by a killed vaccine. This approach has been employed in countries where vNDV is endemic to control the disease.

Inactivated vaccines are given through an injection and provide longer immunity than live vaccine. However, live vaccine is less expensive and can be given through mass application via water or aerosol. The level of protection provided is also significantly impacted by the timing of vaccination based on the duration of time that has passed after hatching. The potency of the vaccine and handling (appropriate temperatures) will also impact the level of induced immunity.

The *NAHEMS Guidelines: Vaccination for Contagious Diseases* contains more general information on vaccination as part of a FAD response.

## 5.16.2 Emergency Vaccination Strategies for Poultry

Although stamping-out is the preferred and primary strategy for controlling and eradicating ND in the event of an outbreak, emergency vaccination may be considered in specific circumstances. In this scenario, there are two distinct purposes for emergency vaccination.

### 1. *Emergency vaccination to kill*

- a. A suppressive emergency vaccination strategy.
- b. The goal is to suppress virus replication in high-risk susceptible poultry using emergency vaccination and then killing vaccinates at a date determined by IC and the VS Deputy Administrator (U.S. CVO).
- c. Targeted vaccination of high-risk susceptible poultry in an IZ, CA, or VZ. Ring or regional vaccination around an IP or an IZ is a frequently cited example of this strategy.

### 2. *Emergency vaccination to live*

- a. A protective emergency vaccination strategy.
- b. The goal is to protect susceptible poultry from infection using emergency vaccination with the deliberate intent to maintain vaccinates for the duration of their usefulness.
- c. Targeted vaccination may include layers, valuable genetic stock, or endangered birds.

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### 5.16.3 Assessment and Overview

IC and, if needed, Federal, State, and other advisors will evaluate whether to vaccinate if vaccine has been requested. The SAHO or Tribal official *and* the APHIS VS Deputy Administrator (the U.S. CVO) *must* agree on the decision to vaccinate. A decision-tree matrix may also be employed.

USDA APHIS Center for Veterinary Biologics implements the provisions of the Virus-Serum-Toxin Act to ensure that veterinary biologics used to treat animal diseases are pure, potent, and effective.

#### 5.16.3.1 DECIDING TO VACCINATE FOR ND

The decision for emergency vaccination will be based on the consideration of the following elements:

- ◆ Probability that the disease can or cannot be rapidly contained;
- ◆ Proximity of high-value genetic birds to the rapidly spreading disease focal point;
- ◆ Risk of infection of valuable, rare, or endangered nondomestic species;
- ◆ Poultry density in an area;
- ◆ Increased risk of introduction due to the presence of ND in neighboring countries;
- ◆ The extent to which disease is found in waterfowl, other wild birds, backyard flocks, or in live bird markets;
- ◆ Availability of physical and human resources;
- ◆ Sociopolitical factors (public confidence in commercial poultry products);
- ◆ Impact on international trade; and
- ◆ Economic consequences of failure to control the disease.

The safety and health of vaccination personnel must be considered in any vaccination effort, and appropriate PPE must be used.

#### 5.16.4 Strategic Vaccine Distribution

Typically, if emergency vaccination is employed for the purposes of disease control, it is strategically implemented to create a ring or “firebreak” of vaccinated poultry around the IZ, creating a CVZ. A second option is to vaccinate susceptible poultry on premises that are farthest from known IP as a priority, and

then vaccinate progressively closer to the IP. A third option is to vaccinate susceptible poultry only on premises that are closest to an IP. Vaccination may also be used (as a protection strategy) to protect valuable, rare, or endangered non-domestic species of birds, creating a PVZ.

The following are bird classes that may be vaccinated in an outbreak:

1. Valuable genetic poultry, breeding stock such as grandparent and parent breeders.
2. Long-lived poultry, such as layers.
3. High-risk situations, such as ring vaccination around ND-infected birds.
4. Rare, endangered, genetically valuable captive birds such as zoo birds.
5. Commercial turkeys.
6. Commercial ducks.
7. Broilers, meat production poultry.
8. Backyard birds.

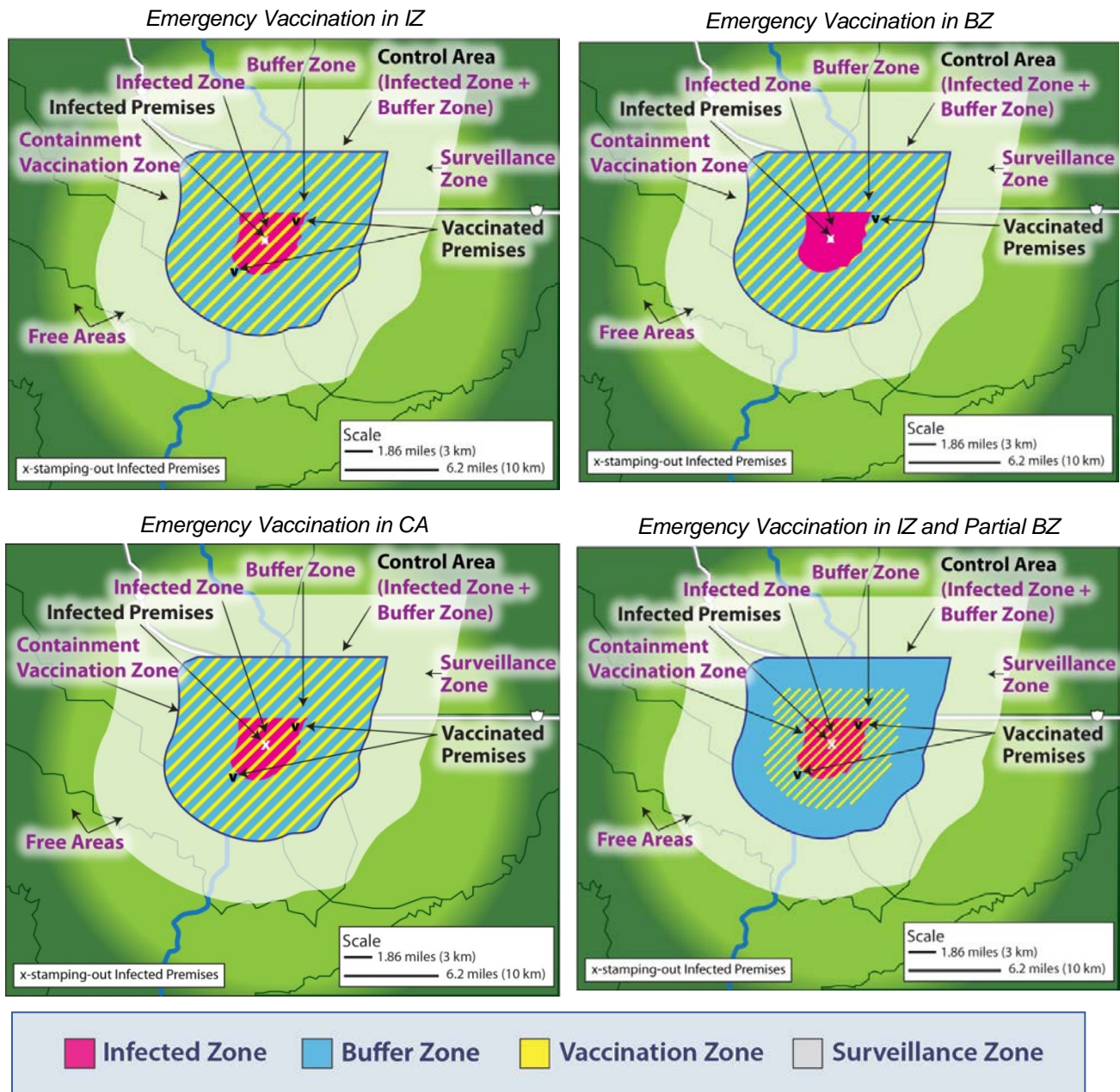
## 5.16.5 Vaccination Zone Designations

The following sections present illustrations of the VZ designations.

### 5.16.5.1 CONTAINMENT VACCINATION ZONE

The CVZ is an emergency vaccination zone typically within the CA, and may include the IZ and/or the BZ. A CVZ is typically observed with stamping-out modified with emergency vaccination to kill. Figure 5-4 shows examples of a CVZ.

Figure 5-4. Examples of Containment Vaccination Zones



### 5.16.5.2 PROTECTION VACCINATION ZONE

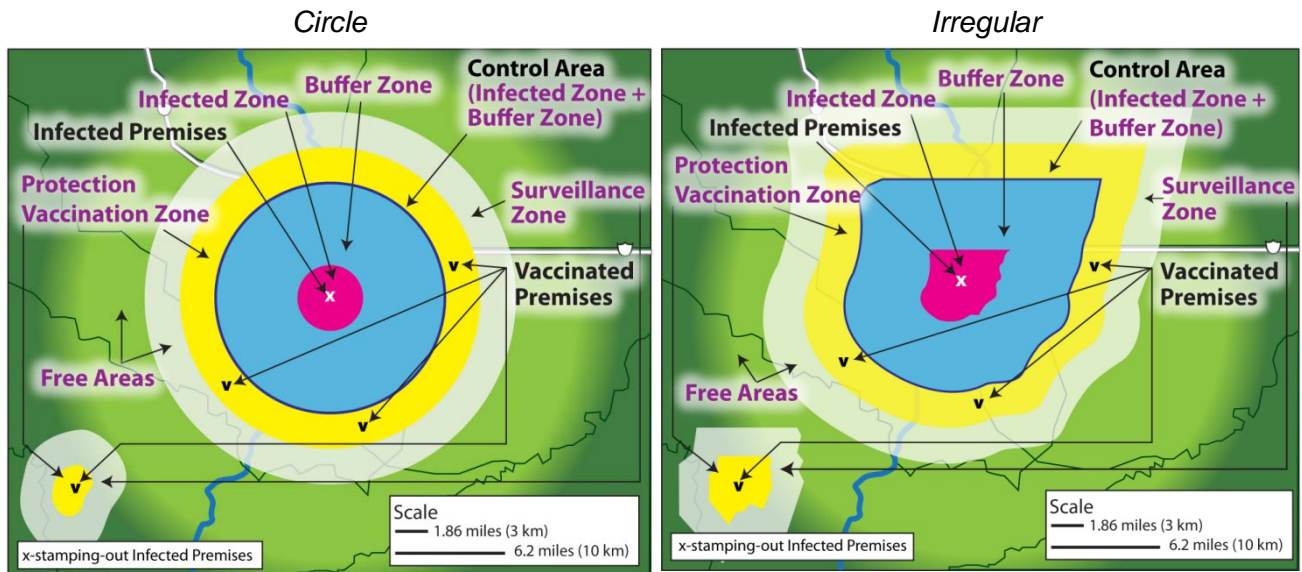
The PVZ is an emergency vaccination zone typically in the FA. It is consistent with the OIE *Terrestrial Animal Health Code (2013)* definition for a Protection Zone:

A zone established to protect the health status of animals in a free country or free zone, from those in a country or zone of a different animal health status, using measures based on the epidemiology of the disease under consideration to prevent spread of the causative pathogen

agent into a free country or free zone. These measures may include, but are not limited to, vaccination, movement control and an intensified degree of surveillance.

Typically, a PVZ would be observed with stamping-out modified with emergency vaccination to live. Figure 5-5 shows examples of a PVZ.

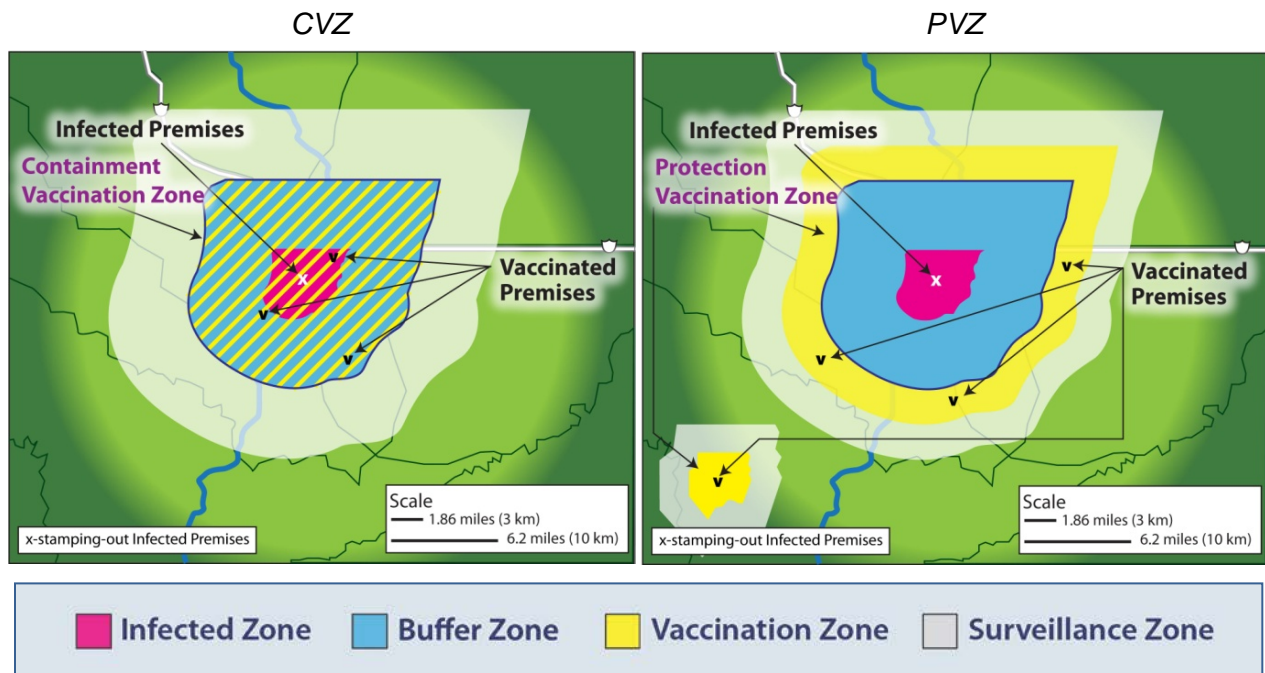
Figure 5-5. Examples of Protection Vaccination Zones



### 5.16.6 Vaccinated Premises

VP may be a secondary designation to another premises designation, and is only used if emergency vaccination is employed in an outbreak. A VP may be located in a CVZ, typically inside a CA (an IZ or BZ), or in a PVZ, typically in the FA. Figure 5-6 shows VP in a CVZ (left) and in a PVZ (right).

Figure 5-6. Examples of Vaccinated Premises



### 5.16.7 Movement Restrictions for Vaccinates

If vaccination is used in response to an outbreak, a vaccination plan will define procedures to prevent the spread of ND by vaccination teams. Emergency vaccination occurs within a CVZ or a PVZ. All vaccinates may be identified with specific and permanent (tamper-proof) identification. When vaccine is used, surveillance must continue to assess vaccination effectiveness and detect any antigenic change. Movement restrictions for vaccinates are as follows:

- ◆ VP may be subject to the movement restrictions of their primary premises designation.
- ◆ Animals receiving emergency vaccination on the VP may be subject to vaccinated animal identification and traceability.
- ◆ For movement of emergency vaccinated animals, consideration must be given to any national or international standards or conditions for such movement.

### 5.16.8 Cessation of Vaccination

ND vaccination in response to an outbreak should cease as soon as possible to allow the region or State to return quickly to a favorable trade status. The decision to cease emergency vaccination will be made by the IC, SAHO and CVO, and will consider national and international standards for movement in making this determination.

## 5.17 NATIONAL VETERINARY STOCKPILE

The Overview of the NVS SOP provides information on NVS capabilities and overviews required steps to request countermeasures from the NVS. It also provides a direct link to the NVS website, where State preparedness officials and responders can download important publications to help them understand the NVS. This website provides

- ◆ a planning guide for Federal, State, and local authorities;
- ◆ a template for a State NVS plan; and
- ◆ outreach and exercise programs.

The NVS also has contractor support for 3D activities, which can be requested through IC. The surge response capacity of 3D commercial responders is the following: a response to the site within 24 hours, 500–600 people within 72 hours, and 1,000 people within a week.

## 5.18 WILDLIFE MANAGEMENT AND VECTOR CONTROL

USDA APHIS will work in close collaboration, communication, and coordination with DOI and other Federal, State, Tribal, and local wildlife agencies that have primary jurisdictional authority and subject matter expertise for wildlife. This collaboration, communication, and coordination will occur in both the Unified Command and in MAC Groups.

*The NAHEMS Guidelines: Wildlife Management and Vector Control for an FAD Response in Domestic Livestock* discusses personnel and equipment required for wildlife management, quarantine and movement control for wildlife, wildlife risk assessment, wildlife surveillance, and related activities. Please see VS Memorandum 573.1 for additional information on VS animal health policy in relation to wildlife.

### 5.18.1 Wildlife Management

A wildlife management plan that addresses transmission of ND in wildlife will be developed as soon as possible after identification of the index case in domestic poultry to prevent the exposure of domestic poultry to wild birds. An assessment of the risk that wildlife poses for ND transmission to susceptible birds and poultry will be conducted within 7 days of confirmation of the index case.

In any ND response, wildlife surveillance and other management must be conducted by persons trained and proficient in wildlife health, capture, collection, biosecurity, and restraint.



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Importantly, ND in wild birds does not impact OIE ND-free status. As stated in the OIE *Terrestrial Animal Health Code (2013)*, in Article 10.9.1,

A Member should not impose bans on the trade in poultry commodities in response to information on the presence of any APMV-1 in birds other than poultry, including wild birds.

## 5.18.2 Vector Control

ND can be transmitted mechanically by mice, vultures, and other vectors. Appropriate biosecurity measures should be in place during an ND outbreak to ensure that mechanical vectors do not have contact with infected flocks or other infected material.

## 5.19 ANIMAL WELFARE

During an ND outbreak, humane treatment must be provided to animals given the specific circumstances of the outbreak, particularly from the time they are identified for destruction or vaccination activities until they are depopulated, euthanized, or slaughtered, as prescribed by veterinary authorities of the affected States or Tribal nations. The Overview of Animal Welfare SOP contains additional information.

## 5.20 MODELING AND ASSESSMENT TOOLS

The development of models and risk assessments are critical in a successful ND response. These tools give decision makers valuable insight. During an outbreak, one or more multidisciplinary teams (consisting of epidemiologists, disease agent experts, economists, affected commodity experts, and others) will be established to perform risk assessments as needed. An appropriate, scientific risk assessment on an issue of concern will be provided within 72 hours after a request from the Incident Commander.

The Overview of Modeling and Assessment Tools SOP provides information on modeling and risk assessment, covering the following:

- ◆ Key roles and responsibilities in modeling and risk analysis;
- ◆ Uses of epidemiological models;
- ◆ Proactive risk assessments;
- ◆ Risk assessment during and after an outbreak; and
- ◆ Examples of current models and assessment tools.

## 5.21 APPRAISAL AND COMPENSATION

Indemnity payments are to encourage disease reporting, reduce the spread of animal disease, and compensate owners on the basis of fair market value. Fair market value appraisals are provided to owners of destroyed poultry and materials. The Appraisal and Compensation SOP focuses on specifying personnel responsibilities, appraisal procedures, assessment of compensation eligibility, payment of indemnity, and required forms and reports during an ND outbreak.

The AHPA gives APHIS authority to establish and implement an indemnification program to prevent or eradicate an ND outbreak. Indemnity is a key component of APHIS's disease control programs in that the promise of fair compensation for losses helps to ensure cooperation from the owners of affected poultry. Such cooperation is important for rapid disease control and eradication. In an ND outbreak, ordering the destruction of poultry on premises that are epidemiologically linked to an IP may be necessary to ensure that the ND does not spread. The Secretary of Agriculture has the authority to pay up to 100 percent of the fair market value of the poultry, as well as for disposal, cleaning, and disinfection. However, compensation will only be paid in cases where State and Federal animal health authorities concur with the recommendations to order the destruction of poultry, whether those recommendations emerged from industry, State, or Federal authorities.

The best practices for containment and eradication of ND will in many instances require depopulation, disposal, and decontamination faster than can be achieved with slow or deliberate appraisal processes. In some circumstances, appraisals will not be required to be signed prior to destruction if APHIS and the cooperating State agree that the poultry must be destroyed immediately to mitigate the potential spread or amplification of ND virus during a response to a confirmed or presumptive ND incident. All data required to determine fair market value will be collected prior to depopulation, including a complete inventory of poultry being destroyed and any relevant value information.

For additional resources and guidance on appraisal and compensation please see [APHIS's Livestock Appraisal, Indemnity, and Compensation Website](#).

## 5.22 FINANCE

During an ND outbreak, funding may be rapidly required. For responding to specific emergency situations, VS has access to a variety of sources for funding. The two most common sources are the Commodity Credit Corporation (CCC) and the APHIS Contingency Fund (CF).

During an emergency, the Secretary is authorized to transfer funds from the CCC. The funds are provided to APHIS as no-year funds. Before APHIS can ask the Secretary to transfer funds, however, it must consider whether it can redirect

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During an emergency, the Secretary is authorized to transfer funds from the CCC. The funds are provided to APHIS as no-year funds. Before APHIS can ask the Secretary to transfer funds, however, it must consider whether it can redirect funds from a budget line item or if other funding sources are available. APHIS will consider the total estimated amount of funding needed to address the issue and whether the program has political support prior to deciding whether or not to seek a CCC transfer.

The APHIS CF takes care of unforeseen, unpredictable program activities. The following four conditions must exist to qualify for the release of agency contingency funds:

1. The outbreak must pose an economic threat.
2. Eradication technology must be feasible and cost effective.
3. No program or no effective program must currently exist.
4. The proposed program must have industry support.

The Overview of Finance SOP contains additional guidance on

- ◆ key roles and responsibilities in finance,
- ◆ emergency funding processes for FAD outbreaks, and
- ◆ triggering events for APHIS emergency funding.

## 5.23 NATIONAL RESPONSE FRAMEWORK AND NATIONAL INCIDENT MANAGEMENT SYSTEM

In any ND outbreak, the capability to rapidly scale up the size of an IC and integrate veterinary functions and countermeasures is critical for an effective response. NRF and NIMS, already discussed in this plan, allow such scalability. The Overview of NRF and NIMS SOP provides additional information on the relation of NRF and NIMS to APHIS and lists the responsibilities of Federal, State, Tribal, and local governments in an ND outbreak.

The documents referenced in this chapter can be found at <http://www.aphis.usda.gov/fadprep>.

# Chapter 6

## Recovery after an ND Outbreak

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### 6.1 PROOF-OF-FREEDOM

#### 6.1.1 Recognition of Disease-Free Status

The OIE does not grant official recognition for ND-freedom, but as a member of the OIE, the United States can self-declare a compartment, zone, or the country free from certain OIE-listed diseases such as ND. In cases of self-declaration, delegates are advised to consult the OIE *Terrestrial Animal Health Code* for specific requirements for self-declaration of freedom from ND. By providing relevant epidemiological evidence, the OIE member can provide information to demonstrate to potential importing countries that the entire country, zone, or compartment under discussion meets the provisions of the specific disease chapter. Any submitted self-declaration should contain evidence demonstrating that the requirements for the disease status have been met in accordance with OIE standards.

##### 6.1.1.1 CRITERIA NEEDED FOR ND-FREE STATUS

The OIE defines an ND free country, zone, or compartment as follows:

A country, zone, or compartment may be considered free from ND when it has been shown that NDV infection in poultry has not been present in the country, zone or compartment for the past 12 months, based on surveillance in accordance with Articles 10.9.22. and 10.9.26.

If infection has occurred in poultry in a previously free country, zone or compartment, ND free status can be regained three months after a stamping-out policy (including disinfection of all affected establishments) is applied, providing that surveillance in accordance with Articles 10.9.22 to 10.9.26 has been carried out during that three-month period.

##### 6.1.1.2 ND-FREE COMPARTMENTS

There are no ND-free compartments in the United States that have been fully implemented and internationally accepted.

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## 6.1.2 Surveillance for Recognition of Disease Freedom

Surveillance is fundamental in proving DF to regain disease-free status after an ND outbreak. According to the OIE, a country re-declaring for country, zone, or compartment freedom from ND virus should show evidence of an active surveillance program, considering the epidemiological circumstances of the outbreak to demonstrate absence from infection. This requires surveillance that incorporates virus detection and antibody tests described in the OIE *Terrestrial Animal Health Code (2013)*. Surveillance schemes could also be intensified in conjunction with CA surveillance by

- ◆ actively investigating flocks with suspicious clinical signs;
- ◆ monitoring at-risk populations and normal mortality levels;
- ◆ increasing slaughter sampling (sero-surveillance);
- ◆ considering the limited use of sentinel flocks in specific circumstances.<sup>1</sup>

[Appendix D](#) offers surveillance guidance for proof-of-freedom for IZs, BZs, and SZs for both backyard and commercial premises. In all cases the number of premises to be sampled is based on detecting at least one IP with 95 percent confidence. Article 10.9.24 and Article 10.9.25 in the OIE *Terrestrial Animal Health Code (2013)* provide information on surveillance strategies and the documentation of ND status, respectively.

### 6.1.2.1 SPECIFIC OIE SURVEILLANCE GUIDANCE FOR COUNTRIES REGAINING FREEDOM

In addition to Article 10.9.25 on documenting free status, Article 10.9.26 contains additional surveillance procedures for countries, zones, or compartments regaining ND-freedom after an outbreak. This section is reproduced here.

A Member regaining country, zone or compartment freedom from ND should show evidence of an active surveillance program depending on the epidemiological circumstances of the outbreak to demonstrate the absence of infection.

A Member declaring freedom of a country, zone or compartment after an outbreak of ND (with or without vaccination) should report the results of a surveillance program in which the ND susceptible poultry population undergoes regular surveillance planned and implemented according to the general conditions and methods described in these recommendations.

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<sup>1</sup> For more on sentinel flocks, see B. J. McCluskey, B. Burgess, J. Glover, H. Kinde, and S. Hietala. 2006. "Use of sentinel chickens to evaluate the effectiveness of cleaning and disinfection procedures in noncommercial poultry operations infected with exotic Newcastle disease virus." *J Vet Diagn Invest.* 18, 296–299.

### 6.1.3 Release of Control Area Restrictions

Quarantine and movement control restrictions are maintained until at least 21 days have elapsed since the decontamination of all confirmed IP and negative results of surveillance activities. IC and animal health officials need to plan for a release of quarantine prior to or during the issuance of quarantine and movement controls. Such a plan would specify procedures by which quarantined premises are evaluated for ND freedom and how the quarantine is released (by sections, by risk, or in its entirety).

### 6.1.4 Disposition of Vaccinates

If vaccination was used in the outbreak, ND vaccinates will still be subject to movement control and monitoring measures.

### 6.1.5 Country Freedom Declaration

The United States will apply to the OIE after meeting OIE requirements. ND-free status requires formal submission detailing the ND policy, eradication procedures, surveillance and monitoring of vaccinates, veterinary infrastructure, industry organization, and, if vaccination has been used, the tracing system for vaccinates. Acceptance of the claim for country freedom may also involve an inspection by an international panel to review the eradication program and all available information to verify ND freedom.

## 6.2 REPOPULATION

### 6.2.1 Restocking Guidance

Following official approval of cleaning and disinfection procedures, IP will remain vacant for a minimum of 21 days to ensure that any residual virus has been eliminated. This period may be decreased if external heat is used to raise the temperature of the houses sufficiently to inactivate any residual virus in a shorter period.

### 6.2.2 Testing Requirements for Restocking

Birds placed into previously infected houses or premises are subjected to weekly statistically valid testing by rRT-PCR for the presence of ND virus. The last test will be conducted at least 21 days after the birds are placed in the house:

- ◆ If the houses are left vacant for a period of 60 days after cleaning and disinfection is approved, there are no testing requirements.
- ◆ In the event that part of the premises has not been cleaned and decontaminated (for example, uncleanable buildings), such premises may

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be partially approved if these uncleanable areas are fenced in a manner to prevent access by people, birds, or equipment. If complete cleaning and disinfection procedures still are not possible due to such conditions, restocking may take place after a 120-day fallow period. In such cases, these buildings should be repaired or destroyed.

- ◆ Environmental conditions should be considered in restocking premises.
- ◆ Restocking can take place before the end of the outbreak, under conditions established by the IC.

### 6.2.3 Approved Sources of Poultry

Source flocks for all introduced poultry must test negative through rRT-PCR and other diagnostics, as determined by IC. A 24-hour pre-movement clinical inspection is also required.

# Appendix A

## FAD PReP Materials to Support ND Response

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This appendix lists the Foreign Animal Disease Preparedness and Response Plan (FAD PReP) documents that directly support this *Newcastle Disease (ND) Response Plan (2014)*. The new and revised documents listed below will be useful in preparedness and response efforts related to ND and poultry. Many of these documents have been released; others are forthcoming. These resources are found online at <http://www.aphis.usda.gov/fadprep>.

### ND STANDARD OPERATING PROCEDURES—CRITICAL ACTIVITIES

These documents are templates to provide a common picture or set of procedures for the following tools and strategies used in ND response:

1. Overview of Etiology and Ecology
2. Case Definition Development Process
3. Surveillance
4. Diagnostics (Sample Collection, Surge Capacity, and Reporting)
5. Epidemiological Investigation and Tracing
6. Overview of Information Management
7. Communications
8. Health and Safety and Personal Protective Equipment
9. Biosecurity
10. Quarantine and Movement Control
11. Continuity of Business
12. Overview of Regionalization for International Trade
13. Mass Depopulation and Euthanasia
14. Disposal



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15. Cleaning and Disinfection
  16. Vaccination
  17. Overview of the National Veterinary Stockpile
  18. Overview of Wildlife Management and Vector Control
  19. Overview of Animal Welfare
  20. Overview of Modeling and Assessment Tools
  21. Appraisal and Compensation
  22. Overview of Finance
  23. Overview of the National Response Framework and National Incident Management System.

## INDUSTRY MANUAL

Poultry

## NATIONAL ANIMAL HEALTH EMERGENCY MANAGEMENT SYSTEM GUIDELINES

- ◆ Health and Safety
- ◆ Personal Protective Equipment
- ◆ Biosecurity
- ◆ Mass Depopulation and Euthanasia
- ◆ Disposal
- ◆ Cleaning and Disinfection
- ◆ Vaccination for Contagious Diseases
- ◆ Wildlife Management and Vector Control for an Foreign Animal Disease (FAD) Response in Domestic Livestock
- ◆ National Animal Health Emergency Response Corp (NAHERC) Deployment Guide
- ◆ Surveillance, Epidemiology, and Tracing

- ◆ Continuity of Business.

## STRATEGIC PLANS—CONCEPT OF OPERATIONS

- ◆ APHIS Foreign Animal Disease Framework: Roles and Coordination (FAD PReP Manual 1-0)
- ◆ APHIS Foreign Animal Disease Framework: Response Strategies (FAD PReP Manual 2-0)
- ◆ APHIS Foreign Animal Disease Investigation Manual (FAD PReP Manual 4-0)
- ◆ A Partial List of FAD Stakeholders (FAD PReP Manual 5-0)
- ◆ Incident Coordination Group Plan.

## OVERVIEW OF FAD PReP

### FAD PReP Mission and Goals

The significant threat and potential consequences of FADs and the challenges and lessons-learned of effective and rapid FAD response have led to the development of the Foreign Animal Disease Preparedness and Response Plan, also known as FAD PReP. The mission of FAD PReP is to raise awareness, expectations, and develop capabilities surrounding FAD preparedness and response. The goal of FAD PReP is to integrate, synchronize, and deconflict preparedness and response capabilities as much as possible before an outbreak by providing goals, guidelines, strategies, and procedures that are clear, comprehensive, easily readable, easily updated, and that comply with the National Incident Management System.

In the event of an FAD outbreak, the three key response goals are to: *(1) detect, control, and contain the FAD in animals as quickly as possible; (2) eradicate the FAD using strategies that seek to stabilize animal agriculture, the food supply, the economy, and to protect public health and the environment; and (3) provide science- and risk-based approaches and systems to facilitate continuity of business for non-infected animals and non-contaminated animal products.*

Achieving these three goals will allow individual premises, States, Tribes, regions, and industries to resume normal production as quickly as possible. They will also allow the United States to regain ND-free status without the response effort causing more disruption and damage than the disease outbreak itself.

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## FAD PReP Documents and Materials

FAD PReP is a comprehensive U.S. preparedness and response strategy for FAD threats, both zoonotic and non-zoonotic. Types of FAD PReP documents include:

- ◆ Strategic Plans—Concept of Operations
- ◆ NAHEMS Guidelines
- ◆ Industry Manuals
- ◆ Disease Response Plans
- ◆ Standard Operating Procedures (SOPs) for Critical Activities
- ◆ Continuity of Business Plans (commodity specific plans developed by public-private-academic partnerships)
- ◆ Ready Reference Guides.

## Lessons Learned from Past Outbreaks

The foundation of FAD PReP is lessons learned in managing past FAD incidents. FAD PReP is based on the following:

- ◆ Providing processes for emergency planning that respect local knowledge.
- ◆ Integrating State-Federal-Tribal-industry planning processes.
- ◆ Ensuring that there are clearly defined, obtainable, and unified goals for response.
- ◆ Having a Unified Command with a proper delegation of authority that is able to act with speed and certainty.
- ◆ Employing science and risk-based management approaches to FAD response.
- ◆ Ensuring that all guidelines, strategies, and procedures are communicated effectively to responders and stakeholders.
- ◆ Identifying resources and trained personnel required for an effective incident response.
- ◆ Trying to resolve competing interests prior to an outbreak and addressing them quickly during an outbreak.
- ◆ Achieving rapid FAD detection and tracing.

# Appendix B

## Incident Management

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This appendix contains Chapter 4 from the *APHIS [Animal and Plant Health Inspection Service] Foreign Animal Disease Framework: Roles and Coordination* (FAD PReP Manual 1-0) document. This chapter explains incident management in the event of a Newcastle disease outbreak. Please refer to the *APHIS Foreign Animal Disease Framework: Roles and Coordination* (FAD PReP Manual 1-0) for more information (available at <http://www.aphis.usda.gov/fadprep>.)

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The Homeland Security Presidential Directive-5, Management of Domestic Incidents, directed the development and administration of the National Incident Management System (NIMS). NIMS, in conjunction with the National Response Framework, provides the template for managing incidents and provides the structure and mechanisms for National-level policy on incident management.

NIMS provides a systematic, proactive approach to guide departments and agencies at all levels of government, non-governmental organizations (NGOs), and the private sector to prevent, protect against, respond to, recover from, and mitigate the effects of incidents, regardless of cause, size, location, or complexity, in order to reduce the loss of life and property and harm to the environment.<sup>1</sup>

A basic premise of NIMS is that all incidents begin and end locally. NIMS does not take command away from State and local authorities. NIMS simply provides the framework to enhance the ability of responders, including the private sector and NGOs, to work together more effectively. The Federal government supports State and local authorities when their resources are overwhelmed or anticipated to be overwhelmed.

The Incident Command System (ICS) is a management system designed to enable effective and efficient domestic incident management by integrating a combination of facilities, equipment, personnel, procedures, and communication within a common organizational structure. APHIS has adopted NIMS and ICS organizational structures and processes to manage animal health incidents. Additional information on NIMS can be found at: <http://www.fema.gov/emergency/nims/>. Additional information on ICS can be found at: <http://training.fema.gov/EMIWeb/IS/ICSResource/index.htm>.

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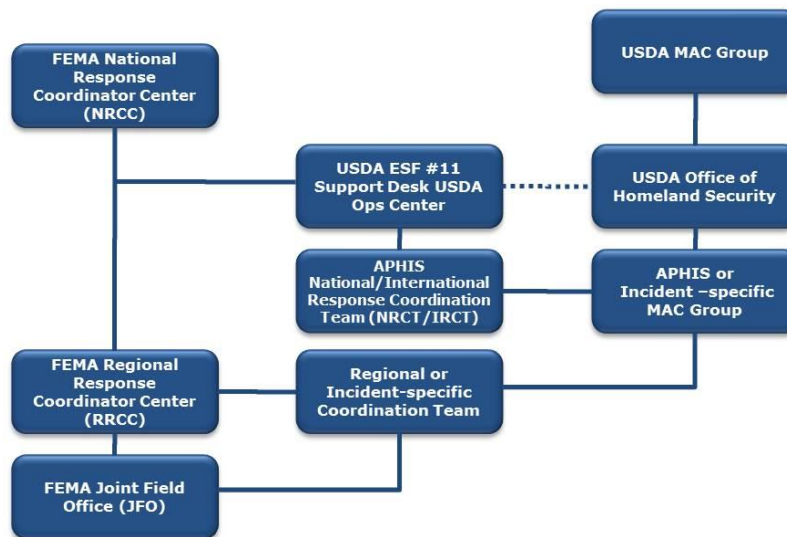
<sup>1</sup> About the National Incident Management System, <http://www.fema.gov/about-national-incident-management-system>.

APHIS policy and procedures for APHIS Emergency Responder positions and APHIS Specialized Emergency Responder positions are described in the *APHIS Emergency Response Qualification Process* and *APHIS Emergency Responder Position Catalog*.<sup>2</sup> APHIS employees can find these documents at: [http://inside.aphis.usda.gov/emergency\\_info/organization/resp\\_cat.shtml](http://inside.aphis.usda.gov/emergency_info/organization/resp_cat.shtml).

## MULTIAGENCY COORDINATION

Multiagency coordination (MAC) is a **process** that allows all levels of government and disciplines to work together more efficiently and effectively. MAC occurs across the different disciplines involved in incident management, across jurisdictional lines, or across levels of government. The *APHIS Emergency Mobilization Guide* defines APHIS coordination for major agricultural disasters and agro-terrorism responses (see Figure B-1). In the event of an animal emergency, an APHIS MAC Group will be formed if the incident response needs more support. Fundamentally, the APHIS MAC Group will provide support, coordination, and assistance with policy-level decisions to the ICS structure managing an incident.

Figure B-1. Coordination Structures: U.S. Department of Agriculture and Department of Homeland Security/Federal Emergency Management Agency<sup>3</sup>



Note: ESF = Emergency Support Function.

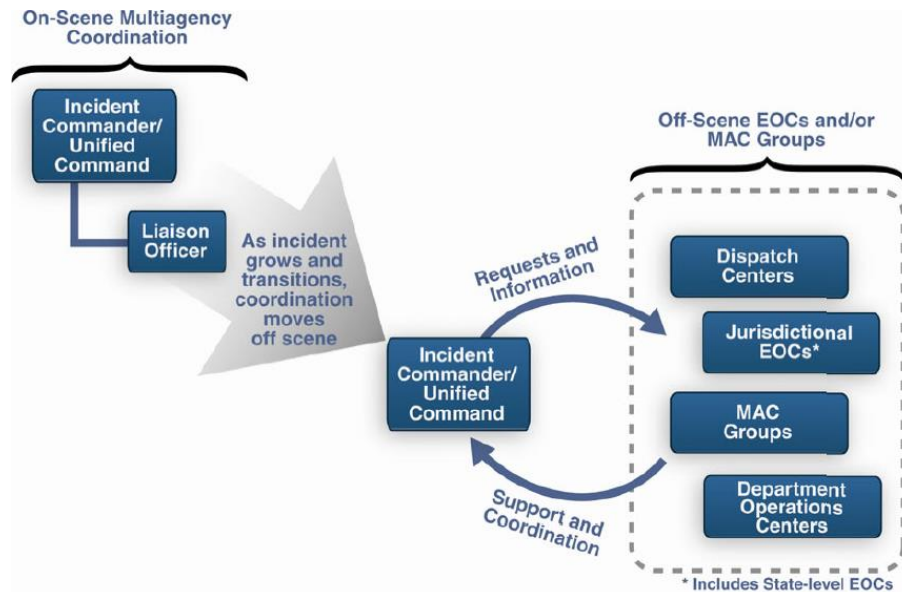
Figure B-2 illustrates an overview of a MAC system according to NIMS. The figure shows the transition over the course of an incident. The incident begins

<sup>2</sup> Information on USDA policies and procedures can be found in Departmental Manual #1800-001. Incident Preparedness, Response, and Recovery. November 2011; and Departmental Regulation #1800-001. Incident Preparedness, Response, and Recovery. November 2011.

<sup>3</sup> USDA APHIS, 2014, *Emergency Mobilization Guide*. [http://www.aphis.usda.gov/library/manuals/pdf/APHIS\\_1050.pdf](http://www.aphis.usda.gov/library/manuals/pdf/APHIS_1050.pdf).

with an on-scene single Incident Command (IC); as the incident expands in size or complexity developing into a Unified Command, the incident may require off-scene coordination and support, which is when MAC Groups are activated.

Figure B-2. Multiagency Coordination System<sup>4</sup>



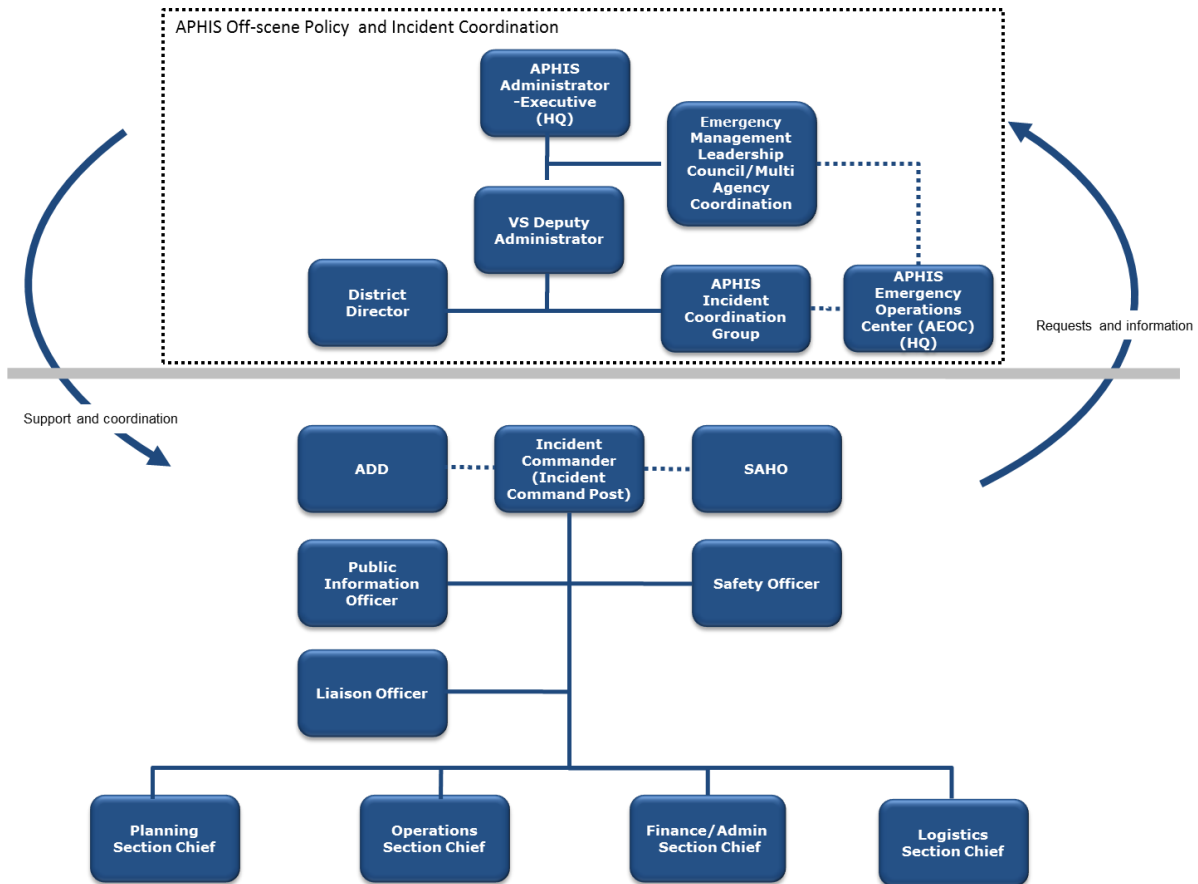
Note: EOC = Emergency Operations Center.

## APHIS INCIDENT MANAGEMENT STRUCTURE

Figure B-3 displays the APHIS foreign animal disease (FAD) incident management organizational structure, starting with the APHIS Administrator.

<sup>4</sup> Federal Emergency Management Agency (FEMA), 2008. *National Incident Management System*. [http://www.fema.gov/pdf/emergency/nims/NIMS\\_core.pdf](http://www.fema.gov/pdf/emergency/nims/NIMS_core.pdf).

Figure B-3. APHIS Multiagency Coordination Structures and APHIS Emergency Operations Center: Relationship to Incident Management Team (Assuming a Single Incident)



Note: SAHO = State Animal Health Official, ADD = Assistant District Director.

The APHIS Administrator is the primary Federal executive responsible for implementing APHIS policy during an FAD outbreak. The APHIS Administrator will delegate many of the actual MAC functions to the Veterinary Services (VS) Deputy Administrator (Chief Veterinary Officer of the United States) and the APHIS Emergency Management Leadership Council (EMLC).

The VS Deputy Administrator and the EMLC will establish an APHIS Incident Coordination Group (ICG) to oversee the staff functions associated with the incident at the APHIS headquarters level. The APHIS ICG will work closely with the personnel in charge of establishing operations for the incident response at the Area Command (AC) or Incident Command Post (ICP) in the field and coordinate with the APHIS MAC Group.

## APHIS MULTIAGENCY COORDINATION GROUP

In the event of a significant FAD emergency, the EMLC typically serves as the APHIS MAC Group, unless it transfers responsibility for a specific incident. The EMLC is co-chaired by Plant Protection and Quarantine's Associate Director, Emergency and Domestic Programs and VS' Associate Deputy Administrator, Surveillance, Preparedness, and Response Services (SPRS). The EMLC is comprised of the following headquarters and regional members:

- ◆ Plant Protection and Quarantine,
- ◆ VS,
- ◆ Animal Care,
- ◆ Wildlife Services,
- ◆ International Services,
- ◆ Biotechnology Regulatory Services,
- ◆ Marketing and Regulatory Programs Business Services,
- ◆ Legislative and Public Affairs,
- ◆ Policy and Program Development,
- ◆ Investigative Enforcement Services,
- ◆ Emergency Management and Safety and Security Division, and
- ◆ APHIS Chief Information Officer.

The APHIS MAC Group may include additional members if the response requires them and may be activated if one or more of the following conditions take place:

- ◆ complex incidents that overwhelm local and regional assets;
- ◆ overlapping USDA agency jurisdictions;
- ◆ an incident that crosses international borders; or
- ◆ the existence of or potential for a high level of National political and media interest.

The APHIS MAC Group provides a forum to discuss actions that need to be taken to ensure that an adequate number of resources are available to meet anticipated



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needs. The APHIS MAC Group strategically coordinates the incident response, but does not typically direct the APHIS ICG.

The APHIS MAC Group offers guidance on the most efficient way to allocate resources during an animal health event. Specific responsibilities vary from disease to disease, but the general functions of the APHIS MAC Group include

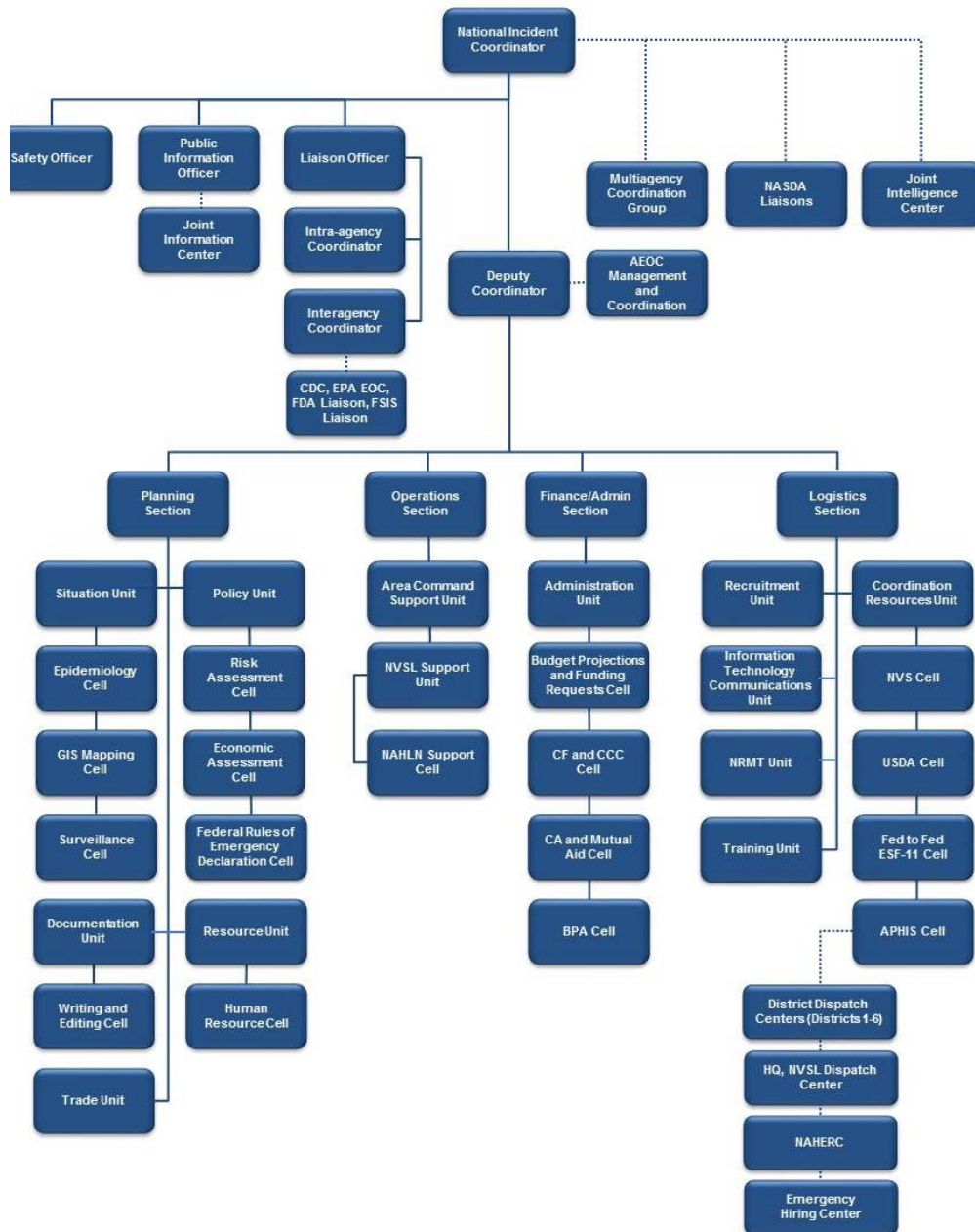
- ◆ incident prioritization,
- ◆ resource allocation and acquisition, and
- ◆ identification and resolution of issues common to all parties.

## APHIS INCIDENT COORDINATION GROUP

The APHIS ICG is responsible for supporting an IC and AC in acquiring resources, formulating policy options, and assisting in developing and implementing response and recovery strategies for FAD outbreaks. For additional information and details, see the *Incident Coordination Group Plan*. Figure B-4 illustrates an example organizational chart for an APHIS ICG. The group has the following responsibilities:

- ◆ providing guidelines to ensure responder and public health and safety;
- ◆ supporting IC(s) and AC(s);
- ◆ assisting in development of response policy as needed;
- ◆ coordinating effective communication;
- ◆ coordinating resources;
- ◆ assisting in establishing epidemiological priorities;
- ◆ assisting in developing incident objectives and approving response strategies for emergency vaccination as needed;
- ◆ assisting in integrating response organizations into the ICS;
- ◆ assisting in developing protocols as needed;
- ◆ providing information to the Joint Information Center for use in media and stakeholder briefings;
- ◆ providing budget requests and projections as needed; and
- ◆ assessing response progress, response strategies, and providing economic analyses as needed.

Figure B-4. Example APHIS Incident Coordination Group—Organizational Structure (for Foreign Animal Disease Outbreak)



Note: CDC = Centers for Disease Control and Prevention, EPA = Environmental Protection Agency, EOC = Emergency Operations Center, FDA = Food and Drug Administration, FSIS = Food Safety and Inspection Service, AEOC = APHIS Emergency Operations Center, NASDA = National Association of State Departments of Agriculture, GIS = Geographic Information System, NVSL = National Veterinary Services Laboratories, NAHLN = National Animal Health Laboratory Network, CF = Contingency Fund, CCC = Commodity Credit Corporation, CA = Cooperative Agreement, BPA = Blanket Purchase Agreement, ESF = Emergency Support Function, NVS = National Veterinary Stockpile, NRMT = National Response Management Team, NAHERC = National Animal Health Emergency Response Corps.

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## APHIS ORGANIZATION FOR A SINGLE INCIDENT

The ICP is a physical location that administers the on-scene IC and the other main incident management functions. An Emergency Operations Center (EOC) is a physical location that is located separately from the on-scene ICP and supports the on-scene response by providing external coordination and securing of additional resources. A MAC Group does not have any direct IC involvement and will often be located some distance from the incident site(s). EOC/MAC Groups do not command the on-scene level of the incident, but rather supports the ICP's command and management efforts.

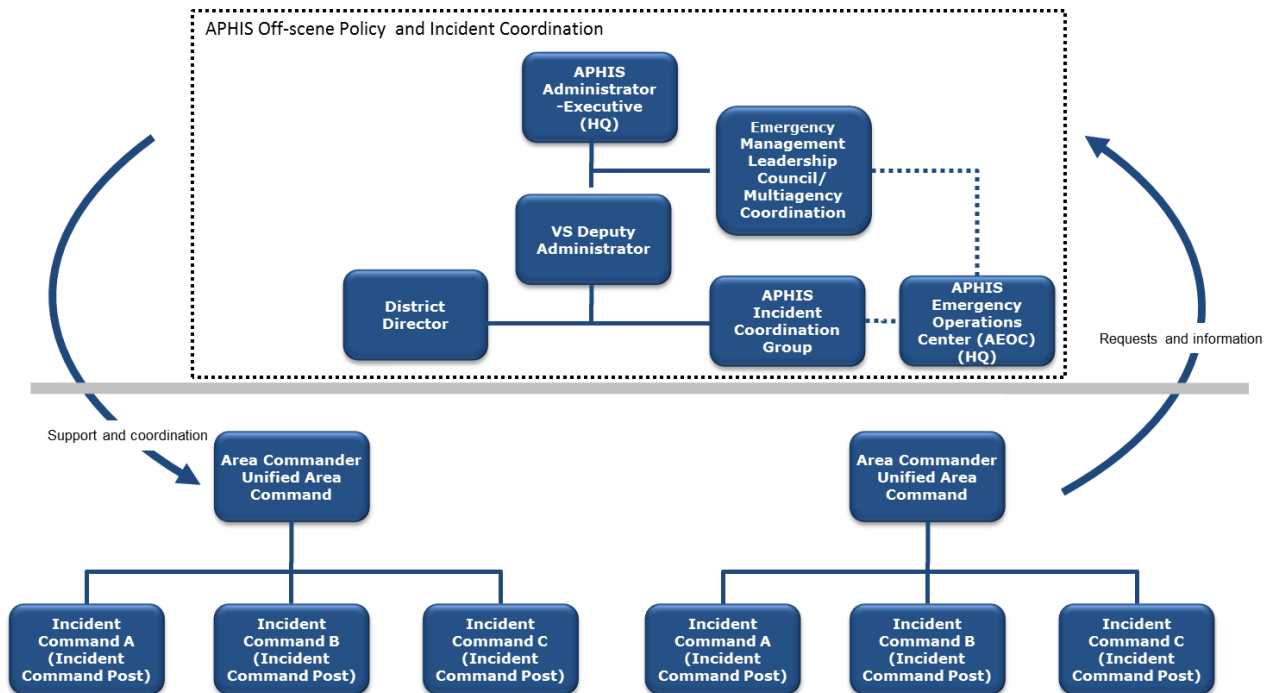
At the start of any FAD outbreak, the State Animal Health Official (SAHO), or designee, and Assistant District Director (ADD) (formerly Area Veterinarian in Charge [AVIC]), or designee, will initially serve as the co-Incident Commanders for the Unified Command. The ADD and SAHO may be relieved by an Incident Management Team (IMT) if there is a delegation of authority to the IMT. Figure B-3 is an example of an APHIS organization chart for a single incident.

## APHIS ORGANIZATION FOR MULTIPLE INCIDENTS

When more than one incident is occurring at the same time, more than one IC may be established. An AC may also be established. An AC is an organization that oversees the management of multiple incidents handled individually by separate IC organizations or to oversee the management of a very large or evolving incident engaging multiple IMTs. An AC should not be confused with the functions performed by MAC, as an AC oversees management coordination of the incident(s), while a MAC element (such as a communications/dispatch center, EOC, or MAC Group) coordinates support.

In terms of MAC Group structures, if the emergency response becomes too large for an APHIS MAC Group to handle efficiently—for example, a large multistate incident with numerous response activities—cooperation from other agencies or committees will be implemented. MAC Groups will coordinate additional resources and make decisions regarding the prioritization of incidents and the sharing and use of critical resources, but are not a part of the on-scene IC. Figure B-5 is an example of the command structure when multiple incidents are involved.

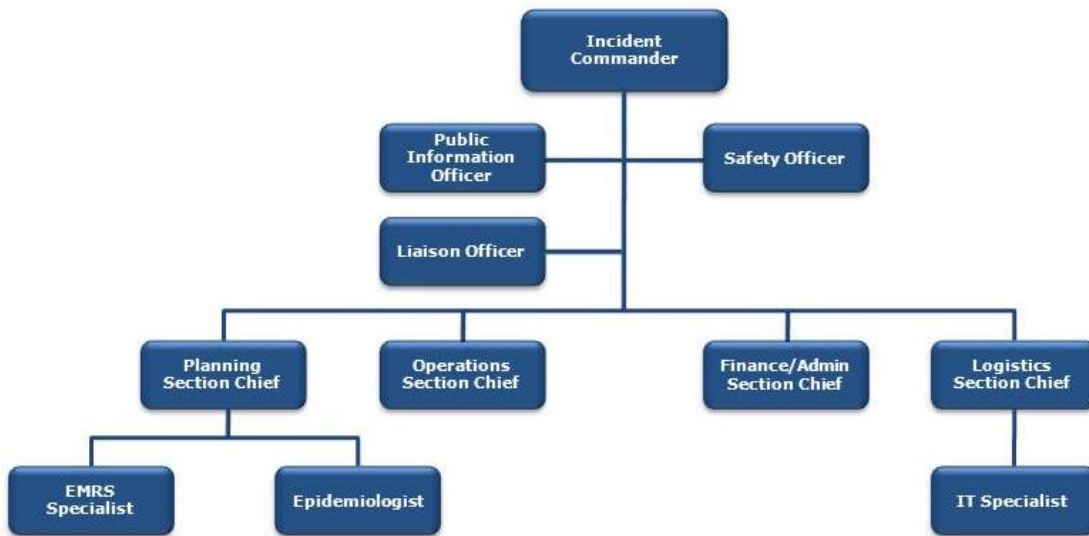
Figure B-5. APHIS Multiagency Coordination Structures and APHIS Emergency Operations Center: Relationship to Multiple Incident Management Team Structures (Assuming Multiple Incidents and a Unified Area Command)



# APHIS INCIDENT MANAGEMENT TEAMS

Upon detection and confirmation of an FAD incident, the SAHO or ADD establishes an ICP with an IMT, headed by an Incident Commander. Figure B-6 depicts the organization of the APHIS VS IMT for managing an incident.

Figure B-6. Current APHIS VS Incident Management Team—Short Team Configuration



The IMT includes an Incident Commander and staff for various types of communication, safety, and liaison purposes. This staff and the heads of the Incident Commander’s line organization sections are considered the Incident Commander’s general staff. The IMT also includes four line organizations to perform all of the efforts required to identify, contain, eradicate, recover, and return the situation to normal business practices. These line organizations include sections for operations, planning, logistics, and finance and administration. Within each of these sections is the capability to accomplish all of the tasks necessary to ensure a successful outcome to an FAD incident.

For single-incident outbreaks where the potential for spread is low, a short team configuration as depicted in Table B-1 will suffice.

Table B-1. List of Short Team Configuration Positions

APHIS VS IMT Short Team	APHIS Emergency Responder Position Catalog
Incident Commander	A800 Incident Commander
Deputy Incident Commander	A800 Incident Commander
Operations Section Chief	A810 Operations Section Chief
Deputy Operations Section	A810 Operations Section Chief
Planning Section Chief	A820 Planning Section Chief

*Table B-1. List of Short Team Configuration Positions*

APHIS VS IMT Short Team	APHIS Emergency Responder Position Catalog
Deputy Planning Section	A820 Planning Section Chief
Logistics Section Chief	A830 Logistics Section Chief
Deputy Logistics Section	A830 Logistics Section Chief
Finance Section Chief	A840 Finance Section Chief
Deputy Finance Section	A840 Finance Section Chief
Safety Officer	A805 Safety Officer (or A001)
Assistant Safety Officer	A805 Safety Officer
Public Information Officer	A803 Public Information Officer
Liaison Officer	A807 Liaison Officer
Assistant Liaison Officer	A807 Liaison Officer
Information Technology (IT) Specialist	A122 IT Specialist
Assistant IT Specialist	A122 IT Specialist
EMRS Specialist	A813 Group Supervisor (or Specialist)
Assistant EMRS Specialist	A813 Group Supervisor (or Specialist)
Epidemiologist	A813 Group Supervisor (or Specialist)
Assistant Epidemiologist	A813 Group Supervisor (or Specialist)

Note: EMRS = Emergency Management Response System.

When an outbreak occurs that is complex or large scale, a long team configuration, as listed in Table B-2, will be established. The long team consists of additional team members beyond those in the initial short team configuration. Figure B-7 shows an example long team configuration; however, the exact makeup of the long teams will depend on the type of disease and magnitude of spread.

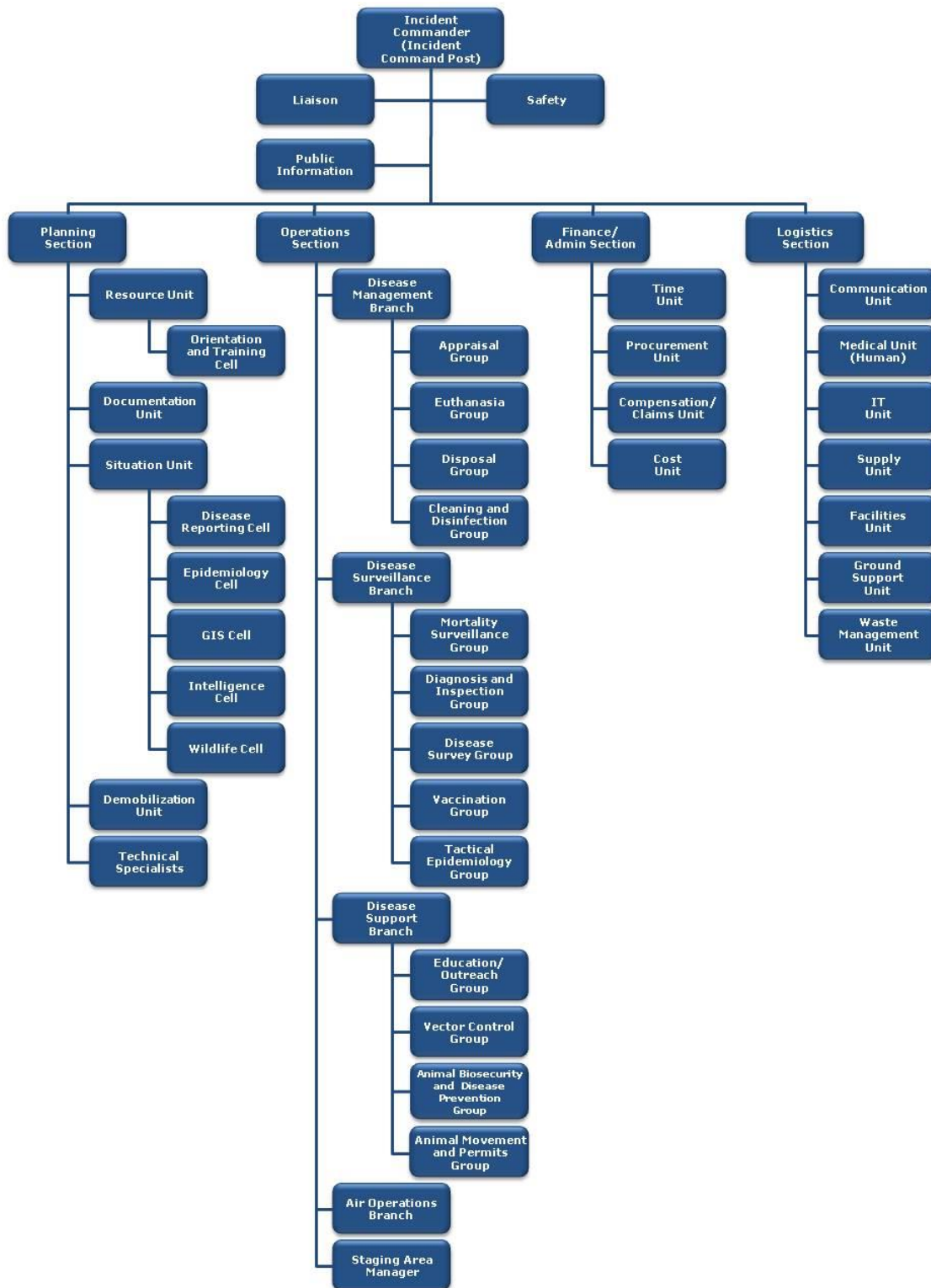
*Table B-2. Typical Positions—Long Team Configuration*

APHIS VS Long IMT Configuration	APHIS Emergency Responder Position Catalog
Deputy Operations Section Chief	A810 Operations Section Chief
Deputy Planning Section Chief	A820 Planning Section Chief
Deputy Logistics Section Chief	A830 Logistics Section Chief
Deputy Finance Section Chief	A840 Finance Section Chief
Disease Management Branch Director	A813 Group Supervisor
◆ Appraisal Group Supervisor	A813 Group Supervisor
◆ Euthanasia Group Supervisor	A813 Group Supervisor
◆ Disposal Group Supervisor	A813 Group Supervisor
◆ Cleaning and Disinfection Group Supervisor	A813 Group Supervisor

*Table B-2. Typical Positions—Long Team Configuration*

APHIS VS Long IMT Configuration	APHIS Emergency Responder Position Catalog
Disease Surveillance Branch Director ♦ Mortality Surveillance Group Supervisor ♦ Diagnosis and Inspection Group Supervisor ♦ Disease Survey Group Supervisor ♦ Vaccination Group Supervisor ♦ Tactical Epidemiology Group Supervisor	A813 Group Supervisor A813 Group Supervisor A813 Group Supervisor A813 Group Supervisor A813 Group Supervisor A813 Group Supervisor
Disease Support Branch Director ♦ Education/Outreach Group Supervisor ♦ Vector Control Group Supervisor ♦ Biosecurity and Disease Prevention Group Supervisor ♦ Movement and Permits Group Supervisor	A813 Group Supervisor A813 Group Supervisor A813 Group Supervisor A813 Group Supervisor A813 Group Supervisor
Air Operations Branch	—
Staging Area Manager (Operations)	—
Resources Unit Leader ♦ Orientation and Training Group Supervisor	A821 Resources Unit Leader A813 Group Supervisor
Documentation Unit Leader	A823 Documentation Unit Leader
Situation Unit Leader ♦ Disease Reporting Cell Supervisor ♦ Epidemiology Cell Supervisor ♦ Geographic Information System (GIS) Cell Supervisor ♦ Intelligence Cell Supervisor ♦ Wildlife Cell Supervisor	A813 Group Supervisor (or A822) A813 Group Supervisor A813 Group Supervisor A813 Group Supervisor (or A825) A813 Group Supervisor A813 Group Supervisor (or A045)
Demobilization Unit Leader	A824 Demobilization Unit Leader
♦ Communications Unit Leader ♦ Medical Unit Leader ♦ Information Technology Specialist ♦ Supply Unit Leader ♦ Facilities Unit Leader ♦ Ground Support Unit Leader ♦ Waste Management Unit Leader	A831 Communications Unit Leader A815 Team Leader (or A001 or A057) A122 IT Specialist A833 Supply Unit Leader A834 Facilities Unit Leader A832 Ground Support Unit Leader A003 Environmental Protection Specialist
♦ Time Unit Leader ♦ Procurement Unit Leader ♦ Compensation/Claims Unit Leader ♦ Cost Unit Leader	A842 Time Unit Leader A841 Procurement Unit Leader A844 Compensation/Claims Unit Leader A843 Cost Unit Leader

Figure B-7. Example APHIS VS Incident Management Team—Long Team Configuration





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## RESPONSE RESOURCES

The IMT, ICG, and APHIS MAC Group can use a number of systems to aid in staffing and resourcing during an event such as the Emergency Qualification System (EQS) and the Resource Ordering and Status System (ROSS), which are discussed below. The *APHIS Emergency Mobilization Guide* and the *Incident Coordination Group Plan* are two planning documents that are used as response resources.

### APHIS Emergency Mobilization Guide

The *APHIS Emergency Mobilization Guide* provides information and policy for mobilizing APHIS personnel for emergency events. The *APHIS Emergency Mobilization Guide* is available [here](#).

### Incident Coordination Group Plan

The *Incident Coordination Group Plan* provides details on how the VS program unit will provide incident coordination support during FAD outbreaks.

### APHIS Emergency Qualification System

The APHIS EQS is used to store the skills and qualifications of emergency response personnel and other data imported from the National Finance Center and AgLearn and to feed certification data to ROSS. It is customizable to APHIS program needs and can house training documents. Training documentation flow into EQS from AgLearn for APHIS employees. If the National Animal Health Emergency Response Corps (NAHERC) volunteers do not have access to AgLearn, their training documentation can be manually entered or imported through an Excel spreadsheet.

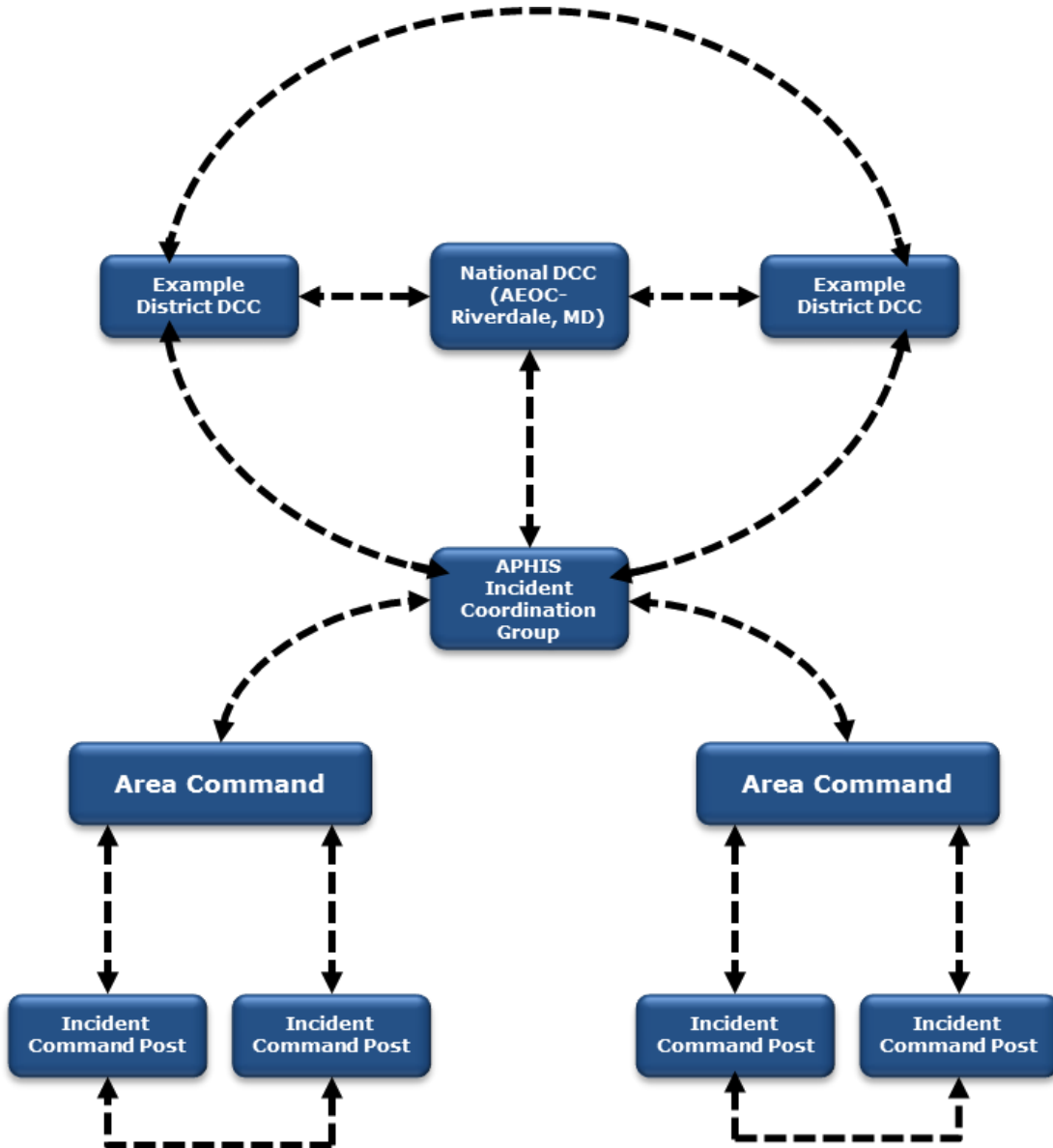
### APHIS Resource Ordering and Status System

The APHIS ROSS allows APHIS to identify, track, and mobilize the resources needed to support emergency response. It provides a database of qualified emergency response personnel. The database can be searched according to personnel training levels and subject of expertise, such as procurement, epidemiology, or public information. Being able to quickly identify and dispatch appropriate personnel and supplies is a key component of emergency response, and ROSS facilitates that process. ROSS initiatives include the following:

- ◆ developing the *APHIS Emergency Responder Position Catalog*
- ◆ integrating ROSS into APHIS emergency management practices
- ◆ training and sustaining an APHIS dispatch community.

Figure B-8 illustrates the relationships among the APHIS ICG, Dispatch Coordination Centers, ACs, and ICPs.

Figure B-8. Resource Ordering Coordination<sup>5</sup>



Note: AEOC = APHIS Emergency Operations Center, DCC = Dispatch Coordinating Center.

<sup>5</sup> As described in: USDA APHIS, 2014. *Emergency Mobilization Guide*. [http://www.aphis.usda.gov/library/manuals/pdf/APHIS\\_1050.pdf](http://www.aphis.usda.gov/library/manuals/pdf/APHIS_1050.pdf).

## Appendix C

# Laboratory Network List for ND

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National Animal Health Laboratory Network (NAHLN) laboratories are listed at [http://www.aphis.usda.gov/animal\\_health/nahln/downloads/nd\\_lab\\_list.pdf](http://www.aphis.usda.gov/animal_health/nahln/downloads/nd_lab_list.pdf). This list was last revised August 2013. The following laboratories (Table C-1) can currently perform testing for Newcastle Disease (ND), after National Veterinary Services Laboratories (NVSL) confirmation of the disease (please see Section 5.4.1).

*Table C-1. ND NAHLN Laboratories*

#	State	Laboratory	Phone numbers
1	Alabama	Thompson-Bishop-Sparks State Diagnostic Laboratory 890 Simms Road, PO Box 2209 Auburn, AL 36832	334-844-4987 Fax 334-844-7206
2	Arizona	Arizona Veterinary Diagnostic Laboratory 2831 N. Freeway Tucson, AZ 85705	520-621-2356 Fax 520-626-8696
3	Arkansas	Arkansas Livestock and Poultry Commission Lab One Natural Resources Drive Little Rock, AR 72205	501-907-2430 Fax 501-907-2410
4	California	California Animal Health and Food Safety Lab University of California, School of Vet Med W. Health Science Drive Davis, CA 95616	530-752-8709 Fax 530-752-5680
5	Colorado	Colorado State University Veterinary Diagnostic Lab 300 West Drake Road, Bldg C Fort Collins, CO 80523-1644	970-297-1281 Fax 970-297-0320
6	Connecticut	Connecticut Veterinary Medical Diagnostic Laboratory University of Connecticut, Unit 3089 61 N. Eagleville Road Storrs, CT 06269-3089	860-486-3738 Fax 860-486-2737
7	Delaware	University of Delaware Lasher Laboratory 16684 County Seat Hi-Way Georgetown, DE 19947	302-856-0046 ext 700 or 702
8	Delaware	Charles C. Allen Biotechnology Laboratory Dept of Animal and Food Sciences, University of Delaware 531 South Collage Ave., Room 44 Townsend Hall Newark, DE 19716	302-275-2759 Fax 302-831-2822

#	State	Laboratory	Phone numbers
9	Florida	Bronson Animal Disease Diagnostic Laboratory Florida Dept. of Ag and Consumer Services 2700 N. John Young Parkway Kissimmee, FL 34741	321-697-1400 Fax 321-697-1467
10	Georgia	University of Georgia Tifton Veterinary Diagnostic Laboratory 43 Brighton Road, PO Box 1389 Tifton, GA 31793-3000	229-386-3340 Fax 229-386-3399
11	Georgia	Athens Veterinary Diagnostic Laboratory 501 DW Brooks Drive University of Georgia Athens, GA 30602	706-542-5568 Fax 706-542-5977
12	Georgia	Georgia Poultry Laboratory Network 4457 Oakwood Road Oakwood, GA 30566	770-535-5996
13	Illinois	University of Illinois Veterinary Diagnostic Laboratory Veterinary Diagnostic Laboratory 2001 S. Lincoln Urbana, IL 61802-6199	217-333-1620 Fax 217-244-2439
14	Illinois	Illinois Department of Agriculture, Animal Disease Laboratory Galesburg Animal Disease Lab 2100 S. Lake Storey Rd. Galesburg, IL 61401	309-344-2451 Fax 309-344-7358
15	Indiana	Indiana Animal Disease Diagnostic Laboratory at Purdue University 406 South University Street West Lafayette, IN 47907	765-494-7440 Fax 765-494-9181
16	Iowa	Iowa State University Veterinary Diagnostic Laboratory 1600 S. 16th Street Ames, IA 50011	515-294-1950 Fax 515-294-3564
17	Iowa	USDA, APHIS, VS, NVSL, Diagnostic Virology Laboratory 1920 Dayton Avenue Ames, IA 50010	515-337-7200 Fax 515-337-7418
18	Kansas	Kansas State Veterinary Diagnostic Laboratory Kansas State University, CVM L232 Mosier Hall, 1800 Dennison Avenue Manhattan, KS 66506	785-532-5650 Fax 785-532-4039
19	Kentucky	Breathitt Veterinary Center Murray State University 715 North Drive Hopkinsville, KY 42240	270-886-3959 Fax 270-886-4295
20	Kentucky	University of Kentucky, Veterinary Diagnostic Laboratory 1490 Bull Lea Road Lexington, KY 40511	859-257-8283 Fax 859-255-1624

Laboratory Network List for ND

#	State	Laboratory	Phone numbers
21	Louisiana	Louisiana Animal Disease Diagnostic Laboratory 1909 Skip Bertman Drive Baton Rouge, LA 70803	225-578-9777 Fax 225-578-9784
22	Maryland	Frederick Animal Health Laboratory 1840 Rosemont Ave Frederick, MD 21801	301-600-1548 Fax 301-600-6111
23	Maryland	Maryland Department of Agriculture and Salisbury Animal Health Laboratory 27722 Nanticoke Road Salisbury, MD 21801	410-543-6610 Fax 410-543-6676
24	Michigan	Diagnostic Center for Population and Animal Health Michigan State University 4125 Beaumont Road, Suite 201H Lansing, MI 48910	517-353-1683 Fax 517-432-5836
25	Minnesota	University of Minnesota Veterinary Diagnostic Lab 1333 Gortner Avenue, 244 Vet D L St. Paul, MN 55108	612-625-8787 Fax 612-624-8707
26	Mississippi	Mississippi Veterinary Research and Diagnostic Laboratory 3137 Hwy 468 West Pearl, MS 39208	601-420-4700 Fax 601-420-4719
27	Missouri	Veterinary Medical Diagnostic Laboratory University of Missouri 1600 East Rollins Columbia, MO 65211	573-882-6811 Fax 573-882-1411
28	Missouri	Missouri Department of Agriculture Veterinary Diagnostic Laboratory PO Box 2510 Springfield, MO 65801	417-895-6861
29	Montana	Montana Veterinary Diagnostic Laboratory PO Box 997 Marsh Laboratory, 1911 W. Lincoln Bozeman, MT 59771	406-994-4885 Fax 406-994-6344
30	Nebraska	Veterinary Diagnostic Center University of Nebraska East Campus Loop and Fair Street Lincoln, NE 68583-0907	402-472-1434 Fax 402-472-3094
31	New Jersey	New Jersey Department of Agriculture, Division of Animal Health, Animal Health Diagnostic Laboratory, NJPHEAL 3 Schwarzkopf Drive Ewing, NJ 08628	609-984-2293 Fax 609-777-8395
32	New York	Animal Health Diagnostic Center Upper Tower Road College of Vet Med, Cornell University Ithaca, NY 14853	607-253-3900

#	State	Laboratory	Phone numbers
33	North Carolina	Rollins Diagnostic Laboratory North Carolina Department of Agriculture 2101 Blue Ridge Road Raleigh, NC 27607	919-733-3986 Fax 919-733-0454
34	North Dakota	Veterinary Diagnostic Laboratory North Dakota State University NDSU Dept. 7691, PO Box 6050 Fargo, ND 58108-6050	701-231-8307 Fax 701-231-7514
35	Ohio	Ohio Department of Agriculture Animal Disease Diagnostic Lab 8995 E. Main Street, Building 6 Reynoldsburg, OH 43068	614-728-6220 Fax 614-728-6310
36	Oklahoma	Oklahoma Animal Disease Diagnostic Laboratory Oklahoma State University College of Vet. Med. Farm and Ridge Road Stillwater, OK 74078	405-744-6623 Fax 405-744-8612
37	Oregon	Oregon State University Veterinary Diagnostic Lab Magruder Hall 134 Corvallis, OR 97331	541-737-3261 Fax 541-737-6817
38	Pennsylvania	Pennsylvania Veterinary Laboratory Pennsylvania Department of Agriculture 2305 N. Cameron Street Harrisburg, PA 17110	717-787-8808 Fax 717-772-3895
39	Pennsylvania	University of Pennsylvania, School of Veterinary Medicine New Bolton Center, PADLS 382 West Street Road Kennett Square, PA 19348-1692	610-444-5800 Fax 610-925-6806
40	Pennsylvania	Pennsylvania State University, Animal Diagnostic Laboratory Orchard Road University Park, PA 16802	814-863-0837 Fax 814-865-3907
41	South Carolina	Clemson Veterinary Diagnostic Center 500 Clemson Road, PO Box 102406 Columbia, SC 29229	803-788-2260 Fax 803-788-8058
42	South Dakota	Animal Disease Research and Diagnostic Laboratory South Dakota State University Box 2175, N. Campus Drive Brookings, SD 57007	605-688-5171 Fax 605-688-6003
43	Tennessee	CE Kord Animal Disease Diagnostic Laboratory Ellington Agricultural Center 440 Hogan Road Nashville, TN 37220	615-837-5125 Fax 615-837-5250
44	Texas	Texas Veterinary Medical Diagnostic Laboratory 1 Sippel Road, Drawer 3040 College Station, TX 77843	979-845-3414 Fax 979-845-1794

Laboratory Network List for ND

#	State	Laboratory	Phone numbers
45	Texas	Texas Veterinary Medical Diagnostic Laboratory – Amarillo 6610 Amarillo Blvd West Amarillo, TX 79106	806-353-7478 Fax 806-359-0636
46	Texas	Texas Veterinary Medical Diagnostic Laboratory – Center 635 Malone Drive Center, TX 75935	936-598-4451 Fax 806-676-4582
47	Texas	Texas A&M Veterinary Medical Diagnostic Laboratory – Gonzalez 1162 East Sarah DeWitt Drive Gonzalez, TX 78629	830-672-2834 Fax 830-672-4582
48	Utah	Utah Veterinary Diagnostic Laboratory 950 E. 1400 North Logan, UT 84341	435-797-1895 Fax 435-797-2805
49	Virginia	Harrisonburg Regional Animal Health Laboratory 261 Mount Clinton Pike Harrisonburg, VA 22802	Fax 540-434-3880
50	Washington	Washington Animal Disease Diagnostic Laboratory PO Box 647034 Bustad Hall, Room 155-N Pullman, WA 99164-7034	509-335-9696/ 509-335-6190 Fax 509-335-7424
51	Washington	Washington Animal Disease Diagnostic Laboratory Avian Health and Food Safety Lab, Puyallup 2607 W Pioneer Puyallup, WA 98371-4919	253-445-4537 Fax 253-445-4544
52	West Virginia	West Virginia Department of Ag. Poultry Health Division 60B Moorefield Industrial Park Moorefield, WV 26836	304-538-2397 Fax 304-538-8133
53	Wisconsin	Wisconsin Veterinary Diagnostic Laboratory University of Wisconsin-Madison 445 Easterday Road Madison, WI 53706	608-262-5432 Fax 847-574-8085
54	Wisconsin	USGS National Wildlife Health Center 6006 Schroeder Road Madison, WI 53711	608-270-2419/ 608-270-2400 Fax 608-270-2415
55	Wyoming	Wyoming State Veterinary Laboratory 1174 Snowy Range Road Laramie, WY 82070	307-766-9925 Fax 307-721-2051

# Appendix D

## Updated ND Outbreak Surveillance Guidance and Rationale for Poultry

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### ND OUTBREAK SURVEILLANCE GUIDELINES FOR POULTRY

These guidelines are updated recommendations for Newcastle Disease (ND) outbreak surveillance, prepared by the Center for Epidemiology and Animal Health, Science, Technology, and Analysis Services, Veterinary Services, Animal and Plant Health Inspection Service. These guidelines may be updated periodically.

#### Purpose

The purpose of these guidelines is to provide recommendations for surveillance activities in poultry for this *ND Response Plan*. These are sample guidelines.

Surveillance will be conducted at intervals as specified by the Incident Command (IC) using the most current scientific information and best practice guidance available. APHIS will collaborate with public health agencies regarding the threat of ND to humans.

These are strategies regarding sampling sizes and sampling frequencies for premises located in the Infected Zone (IZ), Buffer Zone (BZ), Surveillance Zone (SZ), and for proof of disease freedom (DF) that do not require daily bird or product movement for business continuity (such as layer, broiler, turkey, and game birds).

#### Objectives

The objectives of ND outbreak surveillance are to

- ◆ detect ND Infected Premises (IP) during an outbreak;
- ◆ determine the size and extent of an ND outbreak;
- ◆ supply information to evaluate outbreak control activities;
- ◆ provide information for animal and product movement within the Control Area (CA);



- 
- ◆ provide information for animal and product movement out of the CA; and
  - ◆ prove DF to regain disease-free status after eradication of the outbreak.

## Definitions

There are four key definitions that are important in outbreak surveillance.

- ◆ *Dead Birds* are the dead or euthanized sick birds found each day in every house on a premises.
- ◆ *50-Dead-Bird Group* consists of 50 or fewer dead birds (and each multiple of 50 or fewer dead birds) from each house on the premises each day.
- ◆ *5-Bird Pool* combines samples taken from five dead or euthanized sick birds out of the house's (flock's) daily dead birds into one sample.
  - In all cases where a 5-bird pool is mentioned, an 11-bird pool (samples taken from eleven dead or euthanized sick birds) may be collected instead (an additional option for sampling).
  - Tracheal/oropharyngeal swabs are preferred.
- ◆ *Detection Probability* is the probability the sampling scheme will detect at least one infected bird of each 50-dead-bird group (at the 95 percent confidence level) if there are 20 or more infected birds (40 percent prevalence) in the target population of daily dead birds, where the Fusion-gene (F-gene) real-time reverse transcriptase polymerase chain reaction (rRT-PCR) test sensitivity of the 5-bird pool is 85.1 percent.

## Rationale for the 20-Bird Detection Prevalence

The following reasons provide the rationale for the 20-bird detection prevalence threshold:

- ◆ This is used as basic surveillance in the Highly Contagious Disease Plan, and starts immediately **after ND outbreak response authorization**.
- ◆ It is rapidly exceeded because ND quickly spreads throughout a house, killing many birds.
- ◆ It is logistically feasible, flexible, simple, and standardized.
- ◆ It is consistent with surveillance schemes used for disease detection, business continuity, and proof of DF.

## SAMPLING SCHEME PROCEDURES FOR POULTRY

1. Start sampling immediately upon ND outbreak response authorization.
2. Implement disease detection sampling schemes.
3. For all schemes discussed in this Appendix, tracheal/oropharyngeal swabs are preferred.

### Surveillance Sampling Schemes

The following sampling unit is used for both commercial and backyard premises.

- ◆ *Sampling Unit:* Flock or house.
- ◆ *Sample:* A pooled sample that combines swabs taken from five (or eleven) dead or euthanized sick birds out of the house's (flock's) daily dead or ill birds.
  - The frequency recommendations for premises that are not moving birds daily are based on
    - the incubation period (2–15 days; likely incubation period of virulent ND is 2–6 days<sup>1</sup>).<sup>2</sup> Sampling should be based on the mean incubation period observed;
    - sufficient available personnel for surveillance activities;
    - decreased probability of spreading ND due to earlier detection of ND;
    - recommendations for changing frequency of premises inspection or sampling are listed in Table D-3; and
    - recommendations for sampling frequency of live birds without clinical signs, in instances where flock sizes are small and daily mortality is limited are listed in Table D-4.

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<sup>1</sup> A.R. Spickler, J.A. Roth, J. Gaylon, and J. Lofstedt (Eds). 2010. *Emerging and Exotic Diseases of Animals*, 4<sup>th</sup> Ed. Ames, IA: Center for Food Security and Public Health, Iowa State University.

<sup>2</sup> OIE incubation period for ND is 21 days. OIE. 2013. *Terrestrial Animal Health Code*. Chapter 10.9.1: Newcastle Disease. <http://www.oie.int>.

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## Disease Detection Surveillance Scheme

This information is also summarized in Table D-1.

### COMMERCIAL PREMISES

#### Infected Zone

- ◆ Census of premises within zone; sample premises as prioritized by epidemiological investigation and continuity of business requirements.
- ◆ If ND compatible signs are observed or epidemiological links found: collect swabs for the 5-bird or 11-bird pool(s) from each 50-dead-bird group from each flock on the premises.
- ◆ Sampling frequency:
  - Contact Premises (CP), Suspect Premises (SP), and Monitored Premises (MP):
    1. Collect swabs for the 5-bird or 11-bird pool sample(s) on each premises 2 times per week for 28 days. If the mean or median incubation period is observed to be 3 days or less, the sampling frequency should be increased; if the mean or median incubation period is 6 days or more, the sampling frequency may be decreased (see Table D-3).
    2. CP, SP, or MP that test negative in the above sampling regime should then be sampled as described for At-Risk Premises (ARP).
    3. MP may be sampled more frequently depending on the need to ship product but at the minimum must be sampled as listed above.
  - ARP:
    - Collect swabs for the 5-bird or 11-bird pool(s) on each premises once every 5 days for the duration of the quarantine.

#### Buffer Zone

- ◆ Census of premises within zone; sample premises as prioritized by epidemiological investigation and continuity of business requirements.

- ◆ Sampling frequency:
  - MP, CP, and SP:
    1. Collect swabs for the 5-bird or 11-bird pool sample(s) on each premises 2 times per week for 28 days. If the mean or median incubation period is observed to be 3 days or less, the sampling frequency should be increased; if the mean or median incubation period is 6 days or more, the sampling frequency may be decreased (see Table D-3).
    2. MP, CP, or SP that test negative in the above sampling regime should then be sampled as described for ARP.
    3. MP may be sampled more frequently depending on need to ship product but at the minimum must be sampled as listed above.
  - ARP:
    - Collect swabs for the 5-bird or 11-bird pool(s) on each premises once every 5 days for the duration of the quarantine.<sup>3</sup>

## Surveillance Zone

- ◆ Number of premises to be sampled:
  - Calculate the number of premises to be sampled using the sample size calculators located in the Outbreak Surveillance Toolbox<sup>4</sup> or Cannon formula.
  - The number of premises to be sampled is based on detecting at least one IP with 95 percent confidence, where:
    - The IP prevalence equals or exceeds 5 percent of all premises with susceptible birds,
    - or a census, if the number of premises within the zone is small, and
    - in order as prioritized by epidemiological investigation and continuity of business requirements.

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<sup>3</sup> The ARP in the BZ and IZ are sampled with the same frequency because infected but undetected premises in the BZ have higher consequences when not detected than those in the IZ (see #11 in Assumptions).

<sup>4</sup> Available from <http://inside.aphis.usda.gov/vs/ceah/nsu/toolbox/index.html> (for APHIS employees).

- 
- ◆ Sampling frequency:
    - Randomly select the calculated number of premises to be sampled (as determined above, such as 60), and collect swabs for the 5-bird or 11-bird pool(s) on each of the selected premises once during the first 3-week period of the quarantine.
    - Randomly select (include in the sampling list the premises sampled in the first 3-week period) and sample an equal number of premises (as calculated above) once during each additional 3-week period of the quarantine. For example, randomly select and sample 60 premises once during the first 3-week period, then reselect (with replacement) another 60 premises to be sampled in the second 3-week period for the duration of quarantine.

## BACKYARD PREMISES

The same sampling unit and sample is used in backyard premises as in commercial premises.

## Infected Zone

- ◆ Census of premises within zone; sample premises as prioritized by epidemiological investigation and continuity of business requirements.
- ◆ Observe the flock for ND compatible signs.
- ◆ If ND compatible signs are observed or epidemiological links found: collect swabs for the 5-bird or 11-bird pool(s) from each 50-dead-bird group from each flock on the premises (most backyard flocks have less than 50 birds, thereby requiring one 5-bird or 11-bird pool).
- ◆ Observation/sampling frequency:
  - CP and SP:
    1. Observe entire flock for ND signs (swab if there are any ND signs or epidemiological links found) 2 times per week for 28 days.
      - a. Frequency of observation/sampling depends on available personnel, number of premises to be sampled, owner resistance (hostility), and other factors.
      - b. The Incident Commander must balance premises' transmission risks and detection costs in deciding on observation/sampling frequency.

2. CP and SP that test negative or that have no signs of ND or epidemiological links found in the above observation/sampling regime should then be observed as described for ARP.

➤ ARP:

- Observe entire flock (swab if there are ND signs or epidemiological links) on each premises once every 5 days for the duration of the quarantine.

## Buffer Zone

- ◆ Census of premises within zone; sample premises as prioritized by epidemiological investigation and continuity of business requirements.
- ◆ Observe the flock for ND compatible signs.
- ◆ If ND compatible signs are observed or epidemiological links found: collect swabs for the 5-bird or 11-bird pool from each 50-dead-bird group from each flock on the premises.
- ◆ Observation and sampling frequency:
  - CP and SP:
    1. Observe entire flock for ND signs (swab if there are any ND signs or epidemiological links) 2 times per week for 28 days.
    2. CP and SP that test negative or that have no signs of ND in the above observation/sampling regime should then be observed as described for ARP.
  - ARP:
    - Observe entire flock (swab if there are ND signs or epidemiological links) on each premises once every 5 days for the duration of the quarantine.

## Surveillance Zone

- ◆ Observe the flock for ND compatible signs.
- ◆ If ND compatible signs are observed or epidemiological links found, collect swabs for 5-bird or 11-bird pool from the dead birds in each flock on the premises.
- ◆ Number of premises to be observed/sampled:

- 
- Calculate the number of premises to be observed/sampled using the sample size calculators located in the Outbreak Surveillance Toolbox or Cannon formula.
  - The number of premises to be observed/sampled is based on detecting at least one IP with 95 percent confidence, where
    - the IP prevalence equals or exceeds 5 percent of all premises with susceptible birds;
    - or a census, if the number of premises within the zone is small; and
    - in order as prioritized by epidemiological investigation and continuity of business requirements.
  - ◆ Sampling frequency:
    - Randomly select the calculated number of premises to be observed or sampled (as determined above, such as 60), and swab the dead or euthanized sick birds on each of the selected premises once during the first 3-week period of quarantine.
    - Randomly reselect (include the premises observed/sampled in the first 3-week period in the sampling list frame) and sample an equal number of premises (as calculated above) once during each additional 3-week period of the quarantine. For example, randomly select and observe or sample 60 premises once during the first 3-week period, then reselect (with replacement) another 60 premises to be observed/sampled in each subsequent 3-week period for the duration of the quarantine.

## Proof of Disease Freedom Surveillance Scheme

The definitions of “dead birds,” “50-dead-bird group,” “5-bird pool,” and “detection probability” remain the same. Also see Table D-2 which summarizes proof of DF surveillance for ND in poultry.

- ◆ Surveillance for proof of DF starts 21 days (OIE incubation period, as this is the international standard) after depopulation of last IP and is in effect for 3 months per OIE.<sup>5</sup>
- ◆ The goal is to identify sero-positive farms that lack clinical signs. Clinically ill flocks will be detected via increased surveillance methods listed below and investigation of flocks with suspicious signs.

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<sup>5</sup> OIE. 2013. *Terrestrial Animal Health Code*. Chapter 10.9, Newcastle Disease, Article 10.9.1. <https://www.oie.int>.

- ◆ OIE recommends intensifying surveillance schemes in conjunction with surveillance of the CA. In a U.S. ND outbreak, this may be conducted by
  - actively investigating flocks with suspicious clinical signs,
  - increasing slaughter sero-surveillance, and
  - considering the limited use of sentinel flocks in specific circumstances.<sup>6</sup>

## COMMERCIAL PREMISES DISEASE FREEDOM

### Infected Zone, Buffer Zone, and Surveillance Zone as One Unit

- ◆ Number of samples per flock:
  - Calculate the number of premises to sample using the sample size calculators located in the Outbreak Surveillance Toolbox or Cannon formula.
  - The number of premises to be sampled is based on detecting at least one IP with 95 percent confidence, where
    - the IP prevalence equals or exceeds 5 percent where the maximum birds sampled doesn't exceed 60 birds per flock, and
    - one 5-bird or 11-bird pool sample is submitted for each 50-dead-bird group.
- ◆ Number of premises to be sampled (serology and swabs of dead and euthanized sick birds):
  - Calculate the number of premises to sample using the sample size calculators located in the Outbreak Surveillance Toolbox or Cannon formula.
  - The number of premises to be sampled is based on detecting at least one IP with 95 percent confidence, where
    - the IP prevalence equals or exceeds 5 percent of all premises with susceptible birds in the IZ.

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<sup>6</sup> For more on sentinel flocks, see B.J. McCluskey, B. Burgess, J. Glover, H. Kinde, and S. Hietala. 2006. "Use of sentinel chickens to evaluate the effectiveness of cleaning and disinfection procedures in noncommercial poultry operations infected with exotic Newcastle disease virus." *J Vet Diagn Invest.* 18, 296–299.



- 
- ◆ Sampling frequency:
    - Sample the number of premises calculated above (for example, 60 premises) once per month for 3 months after the last positive test result or completion of depopulation.

## BACKYARD PREMISES (DISEASE FREEDOM)

### Infected Zone, Buffer Zone, and Surveillance Zone as One Unit

- ◆ Number of samples per flock:
  - Calculate the number of premises to sample using the sample size calculators located in the Outbreak Surveillance Toolbox or Cannon formula.
  - The number of premises to be sampled is based on detecting at least one IP with 95 percent confidence, where
    - the IP prevalence equals or exceeds 5 percent where the maximum birds sampled doesn't exceed 60 birds per flock, and
    - one 5-bird or 11-bird pool sample submitted for each 50-dead-bird group.
- ◆ Number of premises to be sampled (serology and swabs of dead and euthanized sick birds):
  - Calculate the number of premises to sample using the sample size calculators located in the Outbreak Surveillance Toolbox or Cannon formula.
  - The number of premises to be sampled is based on detecting at least one IP with 95 percent confidence, where
    - the IP prevalence equals or exceeds 5 percent of all premises with susceptible birds in the IZ.
- ◆ Sampling frequency:
  - Sample the number of premises calculated above (for example, 60 premises) once per month for 3 months after the last positive test result or completion of depopulation.

## SURVEILLANCE FOR BIRD/PRODUCT MOVEMENT (NON-DAILY MOVEMENT REQUIREMENT)

- ◆ Inspect or sample premises located in the IZ or BZ that wish to move birds or products.
- ◆ The following three steps are required *prior* to bird/product movement:
  1. Two, consecutive, negative 5-bird or 11-bird pool tests of birds to be moved or of the birds that produced the products to be moved.
  2. Sample (swab) immediately prior to moving product. For example, start sampling 3 days before product movement if 24 hours are required before receiving test results or 2 days if test results will be received on the day of testing.
  3. Visual inspection of birds in all houses on premises for 2 consecutive days including the day before and day of movement.

## FURTHER SURVEILLANCE INFORMATION

Table D-1 summarizes the outbreak surveillance scheme for disease detection.

*Table D-1. Outbreak Surveillance for Disease Detection*

Disease Detection						
Post Outbreak Response Authorization						
	Commercial			Backyard		
Sampling	Infected Zone	Buffer Zone	Surveillance Zone <sup>a</sup>	Infected Zone	Buffer Zone	Surveillance Zone <sup>a</sup>
Number of Premises	Census	Census	5% Prevalence Threshold <sup>o</sup>	Census	Census	5% Prevalence Threshold <sup>o</sup>
Unit*	5 or 11-bird Pool	5 or 11-bird Pool	5 or 11-bird Pool	Observation then 5 or 11-bird Pool <sup>^</sup>	Observation then 5 or 11-bird Pool <sup>^</sup>	Observation then 5 or 11-bird Pool <sup>^</sup>
Frequency						
Free Premises	-		21 Days	-		21 Days
Monitored Premises	Two times per week for 28 days.		-	-		-
At-Risk Premises	5 Days <sup>#</sup>		-	5 Days <sup>#</sup>		-
Contact and Suspect Premises <sup>a</sup>	Two times per week for 28 days.		-	Two times per week for 28 days.		-
Product Movement	2 consecutive negative tests <sup>@</sup>			2 consecutive negative tests <sup>@</sup>		

<sup>a</sup> Suspect Premises in a Surveillance Zone will be subject to surveillance procedures and diagnostic testing as indicated by relevant authorities.

\* Sampling Unit used in all Surveillance Schemes: One 5-bird or 11-bird pool (pooled swabs from five dead or euthanized sick birds) selected from each group of 50 or less daily dead or euthanized sick birds (and for each multiple of 50 or less dead or euthanized sick birds).

<sup>o</sup> Prevalence threshold is a predetermined proportion of Infected Premises (for example, 5 percent) used to calculate the number of premises to be sampled at a specific confidence level (for example, 95 percent) in a population of a given size (for example, 1,000 premises) based on detecting at least one Infected Premises.

<sup>^</sup> Initial visual observation only, swab upon observation of ND compatible signs. If the Incident Command thinks that the flock needs sampling based on epidemiological information, they may also sample the flock.

<sup>#</sup> Identical frequency of sampling in the Infected Zone and Buffer Zone due to the need to detect undetected but Infected Premises in the Buffer Zone due to the high consequences of undetected Infected Premises in the Buffer Zone.

<sup>@</sup> Two consecutive negative 5-bird or 11-bird pool tests are required before movement of birds or of the birds that produced the product to be moved to achieve the 95 percent confidence level of detecting at least one infected 5-bird pool.

Table D-2 shows the surveillance requirements to prove ND-freedom.

Table D-2. Surveillance for Proof of Disease Freedom

Proof of Disease Freedom <sup>^</sup>						
Post Outbreak Eradication						
	Commercial			Backyard		
Sampling	Infected Zone <sup>§</sup>	Buffer Zone <sup>§</sup>	Surveillance Zone <sup>§</sup>	Infected Zone <sup>§</sup>	Buffer Zone <sup>§</sup>	Surveillance Zone <sup>§</sup>
Number of Serology Samples per Premises	5% Prevalence Threshold <sup>&amp;</sup>	5% Prevalence Threshold <sup>&amp;</sup>	5% Prevalence Threshold <sup>&amp;</sup>	5% Prevalence Threshold <sup>&amp;</sup>	5% Prevalence Threshold <sup>&amp;</sup>	5% Prevalence Threshold <sup>&amp;</sup>
Number of Premises	5% Prevalence Threshold <sup>°</sup>	5% Prevalence Threshold <sup>°</sup>	5% Prevalence Threshold <sup>°</sup>	5% Prevalence Threshold <sup>°</sup>	5% Prevalence Threshold <sup>°</sup>	5% Prevalence Threshold <sup>°</sup>
Unit*	5 or 11-bird Pool	5 or 11-bird Pool	5 or 11-bird Pool	Observation 5 or 11-bird Pool	Observation 5 or 11-bird Pool	Observation 5 or 11-bird Pool
<b>Frequency</b>	Sample each premises of the Calculated Number of Premises once per month for 3 months after the last positive test result.					

<sup>^</sup> Sero-surveillance conducted in the area to be proved disease free in addition to dead bird sampling.

<sup>§</sup> Infected, Buffer, and Surveillance Zones combine as one unit for proof of disease freedom.

<sup>&</sup> Number of birds sero-sampled based on 5 percent prevalence in flock at the 95 percent confidence level where the maximum number of birds sampled per house does not exceed 60 birds.

<sup>°</sup> Prevalence threshold is a predetermined proportion of Infected Premises (e.g., 5 percent) used to calculate the number of premises to be sampled at a specific confidence level (e.g., 95 percent) in a population of a given size (for example, 1,000 premises) based on detecting at least one Infected Premises. A census of the premises in a zone will be sampled if there are few premises. Sample premises in order as by epidemiological investigation and continuity of business requirements.

\* Sampling Unit used in all Surveillance Schemes: One (1) 5 or 11-bird pool (pooled swabs from five dead or euthanized sick birds) selected from each group of 50 or less daily dead or euthanized birds (and for each multiple of 50 or less dead or euthanized sick birds).

Table D-3 shows the complexity of sampling based on the incubation period of the ND virus and feasible sampling frequency.

*Table D-3. Influence of Incubation Period on Feasible Sample Collection Frequency*

<b>Estimated Incubation Period Based on Field Information*</b>			
Incubation Period	Frequency of Sampling (days between sampling)		Sampling Duration (one week minimum)
	Minimum (Days)	Maximum (Days)	Days
1–2 days	1	1	28
3–4 days	2	3	28
5–7 days	4	6	28
8–14 days	7	10	28
> 14 days	10		28

Table D-4 shows the number of live birds that need to be sampled (the sample size) in order to detect at least one infected bird with 95 percent confidence assuming that exposure to the virus has been at least 3, 7, or 10 days past (as indicated in the table).

*Table D-1. Sampling Frequency for Live Birds without Clinical Signs  
(with 95 Percent Confidence)*

<b>Sample Size on Day 3, 7, 10 After Exposure</b>			
Flock Size	Day 3	Day 7	Day 10
10	4	1	1
20	8	2	1
30	12	2	1
50	20	2	2
100	40	5	2
200	80	11	2
400	160	22	4
500	200	28	5
600	240	33	7
800	320	44	9
1,000	401	56	11
2,000	802	113	23
3,000	1203	170	36
4,000	1604	227	48
5,000	2006	284	60

These estimates are based on a Reed-Frost transmission model where contact rate is defined as the 5<sup>th</sup> percentile of an expert opinion distribution  $[\text{RiskPert}(2.1, 4.7, 10.4)]^7$  (i.e., having 95 percent confidence that the disease would have progressed to the point that enough birds would shed virus to

<sup>7</sup> National A.I. Surveillance Plan, APHIS, December 15, 2006.

allow detection of at least one if the test diagnostic sensitivity is 95 percent or greater.) The calculation is based on approximation of the hypergeometric distribution<sup>8</sup> assuming 0 positive detected out of the sample size shown above, where the number of birds shedding or dead are equal to the output of the transmission model.

## Assumptions for Surveillance Schemes

1. The 5-bird pool F-gene rRT-PCR assay sensitivity is 85.1 percent.
2. Confidence Level: The probability of detecting at least one infected bird in the target population is 97.9 percent, which is limited by the sensitivity of the matrix assay on the 5-bird pool.
3. ND infected birds die within 2–15 days post infection and rapidly infects the flock, thereby increasing the probability of quickly detecting IP.
4. In commercial premises, the producer detects, collects, and places all dead birds into the target population from which the 5-bird or 11-bird pool is drawn.
5. The 20 infected ND bird prevalence threshold for each 50-dead-bird group is reached early in the disease spread in a house and is a logical feasible sample size.
6. All ND infected birds are included in each house's daily dead bird target population.
7. Outbreak response field personnel visiting backyard premises, with observation, will detect ill birds with ND compatible signs.
8. The majority of backyard flocks have less than 100 birds; sampling frequently and sampling the daily dead birds maximizes the probability of detection, minimizes the trauma and disruption to the owner, and increases efficiency because less time will be spent capturing live birds.
9. Sampling a 5-bird pool per 50 dead birds will sample a majority of daily dead birds in commercial broiler operations, commercial turkey premises and backyard premises because the dead bird number varies from 5.1 to 27 birds per day (see daily death rate and house sizes of commercial producers in the Updated Background Information section below).
10. Production parameters will be monitored for indications of ND intrusion.

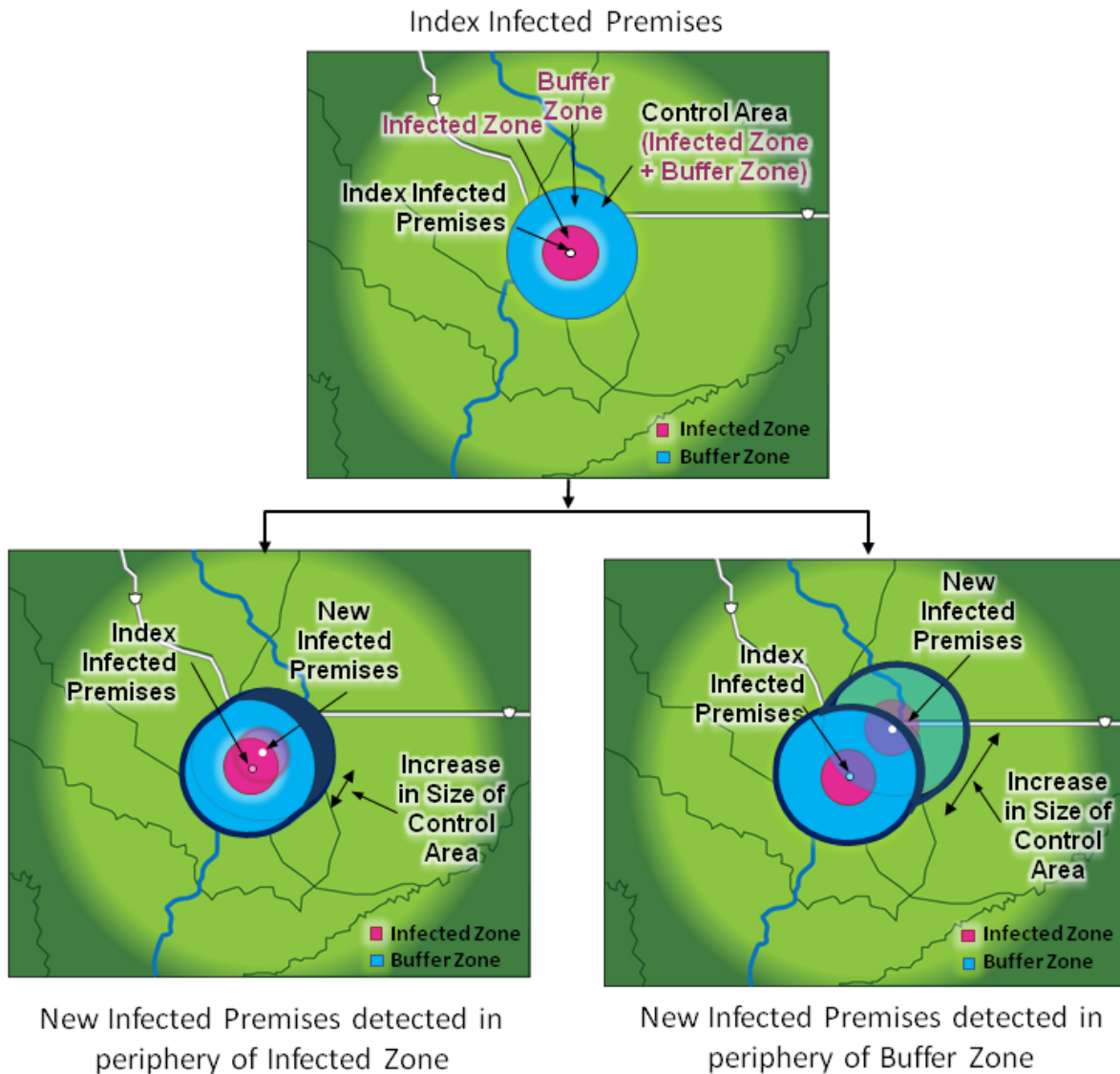
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<sup>8</sup> Cannon, R. M., and R. T. Roe, 1982: Livestock Disease Surveys: A Field Manual for Veterinarians. Australian Bureau of Animal Health, Canberra. Also see Cannon, R.M. 2001. Sense and Sensitivity-Designing Surveys Based on an Imperfect Test. *Preventative Veterinary Medicine*, 49, 141–163.

- 
11. The consequences of an infected but undetected premises is greater if it is located at the periphery of the BZ vs. the periphery of the IZ:
- a. Increased opportunity of disease spread due to less stringent movement requirements in the BZ.
  - b. Increased difficulty of surveillance:
    - i. A larger number of ARP that require sampling.
    - ii. A larger geographic area over which to sample ARP.
  - c. Increased size of the CA: An IP will increase the size of the CA by the radius of the IZ. However, if the newly detected IP is located on the periphery of the BZ, the size of the CA will increase by the radius of the IZ and the BZ.

Figure D-1 shows that the size of the CA depends on where the new IP is located.

Figure D-1. Infected Premises' Effect on Size of Control Area





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## Updated Background Information

- ◆ *Daily Mortality Rate:* The expected daily death rate ranges from 0.00051 (5.1/10,000) in hen turkeys to 0.00079 (7.9/10,000) in tom turkeys and a high of 0.00086 (8.6/10,000) in broilers per house. The daily death rate is higher in “meat type” poultry than in layers, where the daily death rate varies from 0.0001 to 0.0005. Major factors influencing the daily mortality rate are: bird strain, bird age (early, mid, or late cycle), and house construction design and age.
- ◆ *House Size:* The number of birds per house varies from 7,000 in tom turkeys to 10,000 in hen turkeys, but a high of 27,000 broilers per house. In layers, house sizes of 300,000 to 350,000 birds have become the norm.
- ◆ *Expected Daily Mortality:* Using information supplied above, the estimated number of expected dead birds per day in commercial houses varies from 5.0 to 5.5 birds per day in turkey flocks to 23 birds per day in broiler flocks. The numbers of dead birds per day that is expected to signal that producers take “diagnostic action” are 20 hen turkeys, 14 tom turkeys, and 47 broilers, all the numbers of “expected” daily dead birds on which surveillance calculations are based are 40 percent or less of the “diagnostic action” numbers of dead birds.
- ◆ *Recommendations:* Test one 5-bird (or 11-bird) pool for every 50-dead-bird groups using the sampling schemes detailed in Table D-1 and Table D-2.

## References for this Appendix

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Agriculture and Life Sciences, Extension Poultry Science), and Dave Halvorson (poultry veterinarian, University of Minnesota, School of Veterinary Medicine).

“The North Carolina Layer Performance and Management Test” (2009).

The “United Egg Producers” ([www.uepcertified.org](http://www.uepcertified.org) and [www.unitedegg.org](http://www.unitedegg.org)).

# Appendix E

## Procedures for ND Investigation and Specimen Submission

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Veterinary Services (VS) Guidance Document 12001 provides guidance for the investigation of potential foreign animal disease/emerging disease incidents. VS Guidance Document 12001 is available at <http://inside.aphis.usda.gov/vs/em/fadprep.shtml> (for Animal and Plant Health Inspection Service employees) and for the public at [http://www.aphis.usda.gov/animal\\_health/lab\\_info\\_services/downloads/VSG\\_12001.pdf](http://www.aphis.usda.gov/animal_health/lab_info_services/downloads/VSG_12001.pdf).

# Appendix F

## Epidemiological Investigation Questionnaire

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This appendix contains a sample epidemiological questionnaire that could be employed in the event of a Newcastle Disease (ND) outbreak.

This epidemiological questionnaire is only an example template, and is based on the movement of eggs and egg products. Based on the epidemiological situation, the type of product being moved, or the types of premises involved in the actual outbreak, it may be appropriate to add other questions regarding other risk factors which may play a role in transmission.

## ND Epidemiology Questionnaire

Date: \_\_\_\_\_

Business/farm name: \_\_\_\_\_

Primary contact: \_\_\_\_\_

Business address: \_\_\_\_\_

Business telephone number: \_\_\_\_\_

Cell telephone number: \_\_\_\_\_

Fax number: \_\_\_\_\_

Home telephone number: \_\_\_\_\_

E-mail address: \_\_\_\_\_

Secondary contact: \_\_\_\_\_

Business address: \_\_\_\_\_

Business telephone number: \_\_\_\_\_

Cell telephone number: \_\_\_\_\_

Fax number: \_\_\_\_\_

Home telephone number: \_\_\_\_\_

E-mail address: \_\_\_\_\_

Farm address (911 and Animal Location): \_\_\_\_\_

City: \_\_\_\_\_ ZIP code: \_\_\_\_\_

County: \_\_\_\_\_ Township: \_\_\_\_\_

Range: \_\_\_\_\_ Section: \_\_\_\_\_

GPS coordinates (decimal degrees): \_\_\_\_\_

Premises identification number: \_\_\_\_\_

**The purpose of this epidemiological questionnaire is to help provide the Incident Management Team determine a premises Classification: Suspect Premises, Contact Premises, At-Risk Premises, or Monitored Premises. Additional information will be considered (e.g., daily PCR testing and production data) when decisions regarding permits are made.**

**A. General Information**

1. Type of premises (commercial or noncommercial): \_\_\_\_\_
2. Are there backyard premises with birds nearby?  
 Yes  No  Don't know
3. Do you have other premises to which you travel and work?  
 Yes  No
4. Are there contiguous premises with birds (premises not owned by you)?  
 Yes  No
5. Have you observed any increase in illness or death loss in your birds in the last 21 days?  
 Yes  No
6. Premises inventory:

Avian Species on Premises	Males > 1 year	Females > 1 year	< 1 year

Non-avian species on premises (type and number): \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Have any of the non-avian species moved on or off the premises in the past 21 days?

Yes  No

If yes, provide details: \_\_\_\_\_  
 \_\_\_\_\_

**B. Trace Back Information.**

In the last 21 days, did the following movements **ONTO** the farm occur? If yes, please provide as much accurate information as possible for each unique source. You can add more rows by 'right clicking' in the box and selecting "Insert > Insert Rows Below".

1. Eggs (e.g., sideloading)  Yes  Don't know  No

Source/name	Truck and equipment C&D before entering (Yes/No)	Truck and equipment C&D when leaving (Yes/No)	Personnel enter bird housing (Yes/No)	Entered in visitor log (Yes/No)

2. Live Birds (including placements, chicks, pullets, backfilling, etc.)  Yes  Don't know  No

If yes,

Source/name	Truck and equipment C&D before entering (Yes/No)	Truck and equipment C&D when leaving (Yes/No)	Personnel enter bird housing (Yes/No)	Entered in visitor log (Yes/No)	Were the birds rRT-PCR tested for Newcastle Disease (or was the breeding flock tested) prior to moving these birds onto your farm? (Yes/No)

3. Feed trucks  Yes  Don't know  No

Source/name	Truck and equipment C&D before entering (Yes/No)	Truck and equipment C&D when leaving (Yes/No)	Personnel enter bird housing (Yes/No)	Entered in visitor log (Yes/No)

4. Fresh litter/bedding  Yes  Don't know  No

Source/name	Truck and equipment C&D before entering (Yes/No)	Truck and equipment C&D when leaving (Yes/No)	Personnel enter bird housing (Yes/No)	Entered in visitor log (Yes/No)

5. Manure  Yes  Don't know  No

Source/name	Truck and equipment C&D before entering (Yes/No)	Truck and equipment C&D when leaving (Yes/No)	Personnel enter bird housing (Yes/No)	Entered in visitor log (Yes/No)

**Movements ONTO the farm (continued)**

6. Catch/vaccination/beak trim crews  Yes  Don't know  No

Source/name	Truck and equipment C&D before entering (Yes/No)	Truck and equipment C&D when leaving (Yes/No)	Personnel enter bird housing (Yes/No)	Entered in visitor log (Yes/No)

7. Renderer/Off-Site  Yes  Don't know  No

Source/name	Truck and equipment C&D before entering (Yes/No)	Truck and equipment C&D when leaving (Yes/No)	Personnel enter bird housing (Yes/No)	Entered in visitor log (Yes/No)

Did the driver leave the vehicle while on this premises?  Yes  Don't know  No

If Yes,

a. What area of the premises did s/he enter? \_\_\_\_\_

b. Was driver required to wear outer clothes and foot wear provided by this premises?  Yes  Don't know  No

8. Company vet/service tech  Yes  Don't know  No

Source/name	Truck and equipment C&D before entering (Yes/No)	Truck and equipment C&D when leaving (Yes/No)	Personnel enter bird housing (Yes/No)	Entered in visitor log (Yes/No)

9. Noncompany vet/consultant  Yes  Don't know  No

Source/name	Truck and equipment C&D before entering (Yes/No)	Truck and equipment C&D when leaving (Yes/No)	Personnel enter bird housing (Yes/No)	Entered in visitor log (Yes/No)

10. Construction or service person (e.g., gas, plumbing, pest control)  Yes  Don't know  No

Source/name	Truck and equipment C&D before entering (Yes/No)	Truck and equipment C&D when leaving (Yes/No)	Personnel enter bird housing (Yes/No)	Entered in visitor log (Yes/No)



**Movements ONTO the farm (continued)**

11. Customer/buyer/dealer

Yes  Don't know  No

Source/name	Truck and equipment C&D before entering (Yes/No)	Truck and equipment C&D when leaving (Yes/No)	Personnel enter bird housing (Yes/No)	Entered in visitor log (Yes/No)

12. Other producer

Yes  Don't know  No

Source/name	Truck and equipment C&D before entering (Yes/No)	Truck and equipment C&D when leaving (Yes/No)	Personnel enter bird housing (Yes/No)	Entered in visitor log (Yes/No)

13. Nonbusiness visitor (friend/neighbor)

Yes  Don't know  No

Source/name	Truck and equipment C&D before entering (Yes/No)	Truck and equipment C&D when leaving (Yes/No)	Personnel enter bird housing (Yes/No)	Entered in visitor log (Yes/No)

**C. Trace Forward Information.**

In the last 21 days, did the following movements **OFF** the farm occur? If yes, please provide as much accurate information as possible for each unique source. You can add more rows by 'right clicking' in the box and selecting "Insert > Insert Rows Below".

1. Eggs

Yes  Don't know  No

Destination/ name	Truck and equipment C&D before entering (Yes/No)	Truck and equipment C&D when leaving (Yes/No)	Personnel enter bird housing (Yes/No)	Entered in visitor log (Yes/No)

**Movement OFF the farm (continued)**

2. Live Birds (including placements, chicks, pullets, backfilling, etc.)  Yes  Don't know  No

If yes,

Destination/ name	Truck and equipment C&D before entering (Yes/No)	Truck and equipment C&D when leaving (Yes/No)	Personnel enter bird housing (Yes/No)	Entered in visitor log (Yes/No)	Were the birds rRT- PCR tested for Newcastle Disease (or was the breeding flock tested) prior to moving these birds off your farm? (Yes/No)

3. Feed trucks  Yes  Don't know  No

Destination/ name	Truck and equipment C&D before entering (Yes/No)	Truck and equipment C&D when leaving (Yes/No)	Personnel enter bird housing (Yes/No)	Entered in visitor log (Yes/No)

4. Fresh litter/bedding  Yes  Don't know  No

Destination/ name	Truck and equipment C&D before entering (Yes/No)	Truck and equipment C&D when leaving (Yes/No)	Personnel enter bird housing (Yes/No)	Entered in visitor log (Yes/No)

5. Manure  Yes  Don't know  No

Destination/ name	Truck and equipment C&D before entering (Yes/No)	Truck and equipment C&D when leaving (Yes/No)	Personnel enter bird housing (Yes/No)	Entered in visitor log (Yes/No)

6. Catch/vaccination/beak trim crews  Yes  Don't know  No

Destination/ name	Truck and equipment C&D before entering (Yes/No)	Truck and equipment C&D when leaving (Yes/No)	Personnel enter bird housing (Yes/No)	Entered in visitor log (Yes/No)

**Movement OFF the farm (continued)**

7. Renderer/Off-Site

Yes  Don't know  No

Destination/ name	Truck and equipment C&D before entering (Yes/No)	Truck and equipment C&D when leaving (Yes/No)	Personnel enter bird housing (Yes/No)	Entered in visitor log (Yes/No)

Did the driver leave the vehicle while on this premises?

Yes  Don't know  No

If Yes,

a. What area of the premises did s/he enter? \_\_\_\_\_

b. Was driver required to wear outer clothes  
and foot wear provided by this premises?

Yes  Don't know  No

8. Company vet/service tech

Yes  Don't know  No

Destination/ name	Truck and equipment C&D before entering (Yes/No)	Truck and equipment C&D when leaving (Yes/No)	Personnel enter bird housing (Yes/No)	Entered in visitor log (Yes/No)

9. Noncompany vet/consultant

Yes  Don't know  No

Destination/ name	Truck and equipment C&D before entering (Yes/No)	Truck and equipment C&D when leaving (Yes/No)	Personnel enter bird housing (Yes/No)	Entered in visitor log (Yes/No)

10. Construction or service person (e.g., gas, plumbing, pest control)

Yes  Don't know  No

Destination/ name	Truck and equipment C&D before entering (Yes/No)	Truck and equipment C&D when leaving (Yes/No)	Personnel enter bird housing (Yes/No)	Entered in visitor log (Yes/No)

**Movement OFF the farm (continued)**

11. Customer/buyer/dealer  Yes  Don't know  No

Destination/ name	Truck and equipment C&D before entering (Yes/No)	Truck and equipment C&D when leaving (Yes/No)	Personnel enter bird housing (Yes/No)	Entered in visitor log (Yes/No)

12. Other producer  Yes  Don't know  No

Destination/ name	Truck and equipment C&D before entering (Yes/No)	Truck and equipment C&D when leaving (Yes/No)	Personnel enter bird housing (Yes/No)	Entered in visitor log (Yes/No)

13. Non-business visitor (friend/neighbor)  Yes  Don't know  No

Destination/ name	Truck and equipment C&D before entering (Yes/No)	Truck and equipment C&D when leaving (Yes/No)	Personnel enter bird housing (Yes/No)	Entered in visitor log (Yes/No)

**D. Employee Risk Factors**

1. Do any of your personnel work at other poultry premises or have they visited other poultry premises, hatcheries, processing plants, or poultry slaughtering facilities within the past 21 days?  Yes  No

If yes, what premises? \_\_\_\_\_

2. Do any of your workers live with someone who works at another poultry farm, hatchery, processing plant, slaughter facility or rendering plant?  Yes  No

3. Have you hired new personnel during the past 21 days?  Yes  No

If yes, did they work for another poultry premises before you hired them?  Yes  No  
 If yes, where did they work prior to coming to your premises? \_\_\_\_\_

4. Has an employee from this premises visited a rendering plant within the past 21 days?  Yes  No

If yes, what plant? \_\_\_\_\_

If yes, did the person clean and disinfect his vehicle?  Yes  No

If yes, did the person change outer clothes?  Yes  No

If yes, did the person disinfect footwear or change into footwear assigned to this premises upon return?  Yes  No

5. Have you, your family, or any of your employees been out of the country in the last 21 days?

Yes  No

If yes, where? \_\_\_\_\_

**E. Biosecurity Risk Factors**

1. Have migratory waterfowl been seen on the property in the last 21 days?  Yes  No

2. Have free flying birds been observed in contact with your birds in the past 21 days?  Yes  No

3. Is feed and water protected from exposure to feces from wild birds and waterfowl?  Yes  No

4. Is feed and water protected from exposure to feces from rodents and wild animals?  Yes  No

5. Which of the following **best** describes this farm's usual carcass (daily mortality) disposal method?

- Rendering
- Composting on site
- Burial on site
- Incineration on site
- Other (specify: \_\_\_\_\_)

6. Do you dispose of dead birds for other farms?  Yes  No

7. Have you maintained all requirements since your last regular biosecurity audit?  Yes  No

If no, what requirements have not been met?

8. What additional biosecurity measures have been implemented? (For example, once the premises has been determined to be within a Control Area, all poultry-related vehicles, including feed trucks, must now be cleaned and disinfected prior to entry to the premises.)

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**F. Other Information**

Is there any other information that would assist with movement tracing? Have there been any unusual movements for the premises within the last 21 days that were not captured on this form?

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# Appendix G

## Examples of Movement Control Notices

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This appendix provides two examples—Federal and State—of halting movement of animals during a disease outbreak.

### EXAMPLE—WEST VIRGINIA

#### **Commissioner of Agriculture Halts Poultry Shows and Sales after AI-Positive Flock Discovered in Virginia**

Commissioner of Agriculture Gus R. Douglass has ordered a halt to poultry shows and sales throughout West Virginia in response to a turkey flock that tested positive for low pathogenicity avian influenza (LPAI) in Mt. Jackson, Va., just across the West Virginia border.

The strain is not the “bird flu” that has been plaguing Southeast Asia and parts of Europe and poses no threat to human health.

The order applies to any gathering of live birds, including shows at fairs and festivals and sales of poultry. The order is effective Monday, July 9, and will be in place for 30 days unless another positive flock is discovered.

The order does not apply to the commercial industry, which tests every flock for AI before it is moved off the farm to ensure that infected birds are not trucked past other poultry farms.

“Having already dealt with a positive flock in West Virginia earlier this year, we want to take every precaution to protect our poultry industry from a potentially devastating situation,” said Commissioner Douglass.

He also noted that the West Virginia Department of Agriculture is on high alert for any signs of the disease here, and that the industry has been exercising enhanced surveillance protocols since a 2002 AI outbreak that affected West Virginia and Virginia.

Poultry companies on both sides of the border have instructed their growers not to spread litter or move it from their farms until further notice.

According to the Virginia Department of Agriculture and Consumer Services (VDACS), testing over the weekend by the USDA’s National Veterinary Services Laboratory (NVSL) in Ames, Iowa, confirmed the presence of AI antibodies, which indicates possible prior exposure to the virus. The turkeys did not show any signs of illness prior to testing.

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Virginia is closely monitoring all poultry operations within a six-mile radius of the affected farm.

NVSL is doing further testing to help identify the virus and hopefully determine its source. VDACS, USDA and the poultry owner are working cooperatively to minimize the possibility that the virus will move beyond this farm.

The affected flock contains 54,000 birds, which will be euthanized as a precaution as soon as possible and composted on-site. While LPAI poses no risk to human health, federal and state policy is to eradicate H5 and H7 subtypes because of their potential to change into more serious types, which have a higher mortality rate among birds.

Source: [http://www.wvagriculture.org/news\\_releases/2007/7-9-07.html](http://www.wvagriculture.org/news_releases/2007/7-9-07.html)

## EXAMPLE—FEDERAL

Source: <http://www.federalregister.gov/articles/2003/04/16/03-9322/exotic-newcastle-disease-additions-to-quarantined-area#p-3>





18531

## Rules and Regulations

Federal Register

Vol. 68, No. 73

Wednesday, April 16, 2003

This section of the FEDERAL REGISTER contains regulatory documents having general applicability and legal effect, most of which are keyed to and codified in the Code of Federal Regulations, which is published under 50 titles pursuant to 44 U.S.C. 1510.

The Code of Federal Regulations is sold by the Superintendent of Documents. Prices of new books are listed in the first FEDERAL REGISTER issue of each week.

### DEPARTMENT OF AGRICULTURE

#### Animal and Plant Health Inspection Service

#### 9 CFR Part 82

[Docket No. 02-117-5]

#### Exotic Newcastle Disease; Additions to Quarantined Area

**AGENCY:** Animal and Plant Health Inspection Service, USDA.

**ACTION:** Interim rule and request for comments.

**SUMMARY:** We are amending the exotic Newcastle disease regulations by quarantining El Paso and Hudspeth Counties, TX, and Dona Ana, Luna, and Otero Counties, NM, and prohibiting or restricting the movement of birds, poultry, products, and materials that could spread exotic Newcastle disease from the quarantined area. This action is necessary on an emergency basis to prevent the spread of exotic Newcastle disease from the quarantined area.

**DATES:** This interim rule was effective April 10, 2003. We will consider all comments that we receive on or before June 16, 2003.

**ADDRESSES:** You may submit comments by postal mail/commercial delivery or by e-mail. If you use postal mail/commercial delivery, please send four copies of your comment (an original and three copies) to: Docket No. 02-117-5, Regulatory Analysis and Development, PPD, APHIS, Station 3C71, 4700 River Road Unit 118, Riverdale, MD 20737-1238. Please state that your comment refers to Docket No. 02-117-5. If you use e-mail, address your comment to [regulations@aphis.usda.gov](mailto:regulations@aphis.usda.gov). Your comment must be contained in the body of your message; do not send attached files. Please include your name and address in your message and "Docket No. 02-117-5" on the subject line.

You may read any comments that we receive on this docket in our reading room. The reading room is located in room 1141 of the USDA South Building, 14th Street and Independence Avenue SW., Washington, DC. Normal reading room hours are 8 a.m. to 4:30 p.m., Monday through Friday, except holidays. To be sure someone is there to help you, please call (202) 690-2817 before coming.

APHIS documents published in the **Federal Register**, and related information, including the names of organizations and individuals who have commented on APHIS dockets, are available on the Internet at <http://www.aphis.usda.gov/ppd/rad/webrepor.html>.

**FOR FURTHER INFORMATION CONTACT:** Dr. Aida Boghossian, Senior Staff Veterinarian, Emergency Programs Staff, VS, APHIS, 4700 River Road Unit 41, Riverdale, MD 20737-1231; (301) 734-8073.

#### SUPPLEMENTARY INFORMATION:

##### Background

Exotic Newcastle disease (END) is a contagious and fatal viral disease affecting the respiratory, nervous, and digestive systems of birds and poultry. END is so virulent that many birds and poultry die without showing any clinical signs. A death rate of almost 100 percent can occur in unvaccinated poultry flocks. END can infect and cause death even in vaccinated poultry.

The regulations in "Subpart A—Exotic Newcastle Disease (END)" (9 CFR 82.1 through 82.15, referred to below as the regulations) were established to prevent the spread of END in the United States in the event of an outbreak. In § 82.3, paragraph (a) provides that any area where birds or poultry infected with END are located will be designated as a quarantined area, and that a quarantined area is any geographical area, which may be a premises or all or part of a State, deemed by epidemiological evaluation to be sufficient to contain all birds or poultry known to be infected with or exposed to END. Less than an entire State will be designated as a quarantined area only if the State enforces restrictions on intrastate movements from the quarantined area that are at least as stringent as the regulations. The regulations prohibit or restrict the movement of birds, poultry, products,

and materials that could spread END from quarantined areas. Areas quarantined because of END are listed in § 82.3, paragraph (c).

On October 1, 2002, END was confirmed in the State of California. The disease was confirmed in backyard poultry, which are raised on private premises for hobby, exhibition, and personal consumption, and in commercial poultry.

In an interim rule effective on November 21, 2002, and published in the **Federal Register** on November 26, 2002 (67 FR 70674-70675, Docket No. 02-117-1), we amended the regulations in § 82.3(c) by quarantining Los Angeles County, CA, and portions of Riverside and San Bernardino Counties, CA, and restricting the interstate movement of birds, poultry, products, and materials that could spread END from the quarantined area.

In a second interim rule effective on January 7, 2003, and published in the **Federal Register** on January 13, 2003 (68 FR 1515-1517, Docket No. 02-117-2), we further amended § 82.3(c) by adding Imperial, Orange, San Diego, Santa Barbara, and Ventura Counties, CA, and the previously non-quarantined portions of Riverside and San Bernardino Counties, CA, to the list of quarantined areas. Because the Secretary of Agriculture signed a declaration of extraordinary emergency with respect to the END situation in California on January 6, 2003 (see 68 FR 1432, Docket No. 03-001-1, published January 10, 2003), that second interim rule also amended the regulations to provide that the prohibitions and restrictions that apply to the interstate movement of birds, poultry, products, and materials that could spread END will also apply to the intrastate movement of those articles in situations where the Secretary of Agriculture has issued a declaration of extraordinary emergency (new § 82.16).

On January 16, 2003, END was confirmed in backyard poultry on a premises in Las Vegas, NV. Therefore, in a third interim rule effective January 17, 2003, and published in the **Federal Register** on January 24, 2003 (68 FR 3375-3376, Docket No. 02-117-3), we amended § 82.3(c) by quarantining Clark County, NV, and a portion of Nye County, NV, and prohibiting or restricting the movement of birds, poultry, products, and materials that

could spread END from the quarantined area. On January 17, 2003, the Secretary of Agriculture signed a declaration of extraordinary emergency because of END in Nevada (see 68 FR 3507, Docket No. 03-001-2, published January 24, 2003).

On February 4, 2003, END was confirmed in backyard poultry on a premises in the Colorado River Indian Nation in Arizona. Therefore, in a fourth interim rule effective February 10, 2003, and published in the **Federal Register** on February 14, 2003 (68 FR 7412-7413, Docket No. 02-117-4), we amended § 82.3(c) by quarantining La Paz and Yuma Counties, AZ, and a portion of Mohave County, AZ, and prohibiting or restricting the movement of birds, poultry, products, and materials that could spread END from the quarantined area. On February 7, 2003, the Secretary of Agriculture signed a declaration of extraordinary emergency because of END in Arizona (see 68 FR 7338, Docket No. 03-001-3, published February 13, 2003).

On April 9, 2003, END was confirmed in backyard poultry on a premises in El Paso County, TX. Therefore, in this interim rule, we are amending § 82.3(c) by designating El Paso and Hudspeth Counties, TX, and Dona Ana, Luna, and Otero Counties, NM, as a quarantined area and prohibiting or restricting the movement of birds, poultry, products, and materials that could spread END from the quarantined area. As provided for by the regulations in § 82.3(a), this quarantined area encompasses the area where poultry infected with END were located and a surrounding geographical area deemed by epidemiological evaluation to be sufficient to contain all birds or poultry known to be infected with or exposed to END.

**Emergency Action**

This rulemaking is necessary on an emergency basis to prevent the spread of END. Under these circumstances, the Administrator has determined that prior notice and opportunity for public comment are contrary to the public interest and that there is good cause under 5 U.S.C. 553 for making this rule effective less than 30 days after publication in the **Federal Register**.

We will consider comments that we receive during the comment period for this interim rule (see **DATES** above). After the comment period closes, we will publish another document in the **Federal Register**. The document will include a discussion of any comments we receive and any amendments we are making to the rule.

**Executive Order 12866 and Regulatory Flexibility Act**

This rule has been reviewed under Executive Order 12866. For this action, the Office of Management and Budget has waived its review under Executive Order 12866.

This rule amends the regulations by quarantining El Paso and Hudspeth Counties, TX, and Dona Ana, Luna, and Otero Counties, NM, and prohibiting or restricting the movement of birds, poultry, products, and materials that could spread END from the quarantined area. This action is necessary on an emergency basis to prevent the spread of END from the quarantined area.

This emergency situation makes timely compliance with section 604 of the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*) impracticable. We are currently assessing the potential economic effects of this action on small entities. Based on that assessment, we will either certify that the rule will not have a significant economic impact on a substantial number of small entities or publish a final regulatory flexibility analysis.

**Executive Order 12372**

This program/activity is listed in the Catalog of Federal Domestic Assistance under No. 10.025 and is subject to Executive Order 12372, which requires intergovernmental consultation with State and local officials. (See 7 CFR part 3015, subpart V.)

**Executive Order 12988**

This rule has been reviewed under Executive Order 12988, Civil Justice Reform. This rule: (1) Preempts all State and local laws and regulations that are in conflict with this rule; (2) has no retroactive effect; and (3) does not require administrative proceedings before parties may file suit in court challenging this rule.

**Paperwork Reduction Act**

This rule contains no new information collection or recordkeeping requirements under the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq.*).

**List of Subjects in 9 CFR Part 82**

Animal diseases, Poultry and poultry products, Quarantine, Reporting and recordkeeping requirements, Transportation.

■ Accordingly, 9 CFR part 82 is amended as follows:

**PART 82—EXOTIC NEWCASTLE DISEASE (END) AND CHLAMYDIOSIS; POULTRY DISEASE CAUSED BY SALMONELLA ENTERITIDIS SEROTYPE ENTERITIDIS**

■ 1. The authority citation for part 82 continues to read as follows:

**Authority:** 7 U.S.C. 8301-8317; 7 CFR 2.22, 2.80, and 371.4.

■ 2. In § 82.3, paragraph (c) is amended by adding, in alphabetical order, entries for New Mexico and Texas to read as follows:

**§ 82.3 Quarantined areas.**

\* \* \* \* \*  
(c) \* \* \* \* \*

**New Mexico**

*Dona Ana County.* The entire county.  
*Luna County.* The entire county.  
*Otero County.* The entire county.

**Texas**

*El Paso County.* The entire county.  
*Hudspeth County.* The entire county.

Done in Washington, DC, this 10th day of April 2003.

**Bobby R. Acord,**  
*Administrator, Animal and Plant Health Inspection Service.*

[FR Doc. 03-9322 Filed 4-15-03; 8:45 am]

BILLING CODE 3410-34-P

**FARM CREDIT ADMINISTRATION**

**12 CFR Part 615**

**RIN 3052-AC05**

**Funding and Fiscal Affairs, Loan Policies and Operations, and Funding Operations; Capital Adequacy**

**AGENCY:** Farm Credit Administration.

**ACTION:** Final rule.

**SUMMARY:** The Farm Credit Administration (FCA or agency) amends its capital adequacy regulations to add a definition of total liabilities for the net collateral ratio calculation, limit the amount of term preferred stock that may count as total surplus, clarify the circumstances in which we may waive disclosure requirements for an issuance of equities by a Farm Credit System (FCS, Farm Credit or System) institution, and make several nonsubstantive technical changes. These amendments update, modify, and clarify certain capital requirements.

**EFFECTIVE DATE:** This regulation will become effective 30 days after publication in the **Federal Register** during which either or both houses of

# Appendix H

## Glossary

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Animal product	Blood or any of its components, bones, bristles, feathers, flesh, offal, skins, and any by product containing any of those components that originated from an animal or bird.
Anseriformes	An order of birds that includes ducks, geese, and swans. There are about 150 living species of birds in three extant families: the Anhimidae (the screamers), Anseranatidae (the Magpie Goose), and the Anatidae, which includes more than 140 species of waterfowl.
Case	Any individual animal infected by Newcastle disease (ND) virus, with or without clinical signs.
Compartment (compartmentalization)	An animal subpopulation contained in one or more establishments under a common biosecurity management system with a distinct health status with respect to a specific disease or specific diseases for which required surveillance, control, and biosecurity measures have been applied for the purpose of international trade.
Control Area	A Control Area (an Infected Zone and a Buffer Zone) has individual premises quarantine for Infected Premises, Suspect Premises, and Contact Premises and movement restrictions for At-Risk Premises and Monitored Premises.
Domestic birds	See poultry.
Domestic poultry	See poultry.
Emergency vaccination	A disease control strategy using the immunization of susceptible animals through the administration of a vaccine comprising antigens appropriate to the disease to be controlled.
Etiology	The causes or origin of disease, or the factors that produce or predispose toward a certain disease or disorder.
Euthanasia	The humane destruction of an animal accomplished by a method that produces rapid unconsciousness and subsequent death with a minimum of pain or distress or a method that utilizes anesthesia produced by an agent that causes painless loss of consciousness and subsequent death.

FAD PReP (Foreign Animal Disease Preparedness and Response Plan)	Document used to identify veterinary functions and countermeasures necessary to contain and control a foreign animal disease (FAD) outbreak. It is also used to integrate functions and countermeasures with emergency management systems and operations conducted in Unified Command by local, State, and Federal personnel.
Fomites	Inanimate objects that can transmit infectious agents from one animal or person to another.
Foreign animal disease	A transboundary animal disease not known to exist in the U.S. animal population.
Galliformes	An order of birds containing turkeys, grouse, chickens, quails, and pheasants. Common names are gamefowl or gamebirds, landfowl, gallinaceous birds, or galliformes.
Incident Command System	A standardized, on-scene, all-hazards incident management approach that <ul style="list-style-type: none"> <li>◆ allows for the integration of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure;</li> <li>◆ enables a coordinated response among various jurisdictions and functional agencies, both public and private; and</li> <li>◆ establishes common processes for planning and managing resources.</li> </ul>
Incubation period (OIE)	For the purposes of the OIE <i>Terrestrial Code (2013)</i> the incubation period for ND shall be 21 days. The incubation period is the longest period which elapses between the introduction of the pathogen into the animal and the occurrence of the first clinical signs of the disease.
Index case	The first or original case identified in a disease outbreak.
Mass depopulation	Method by which large numbers of animals must be destroyed quickly and efficiently with as much consideration given to the welfare of the animals as practicable, but where the circumstances and tasks facing those doing the depopulation are understood to be extenuating.
Modified stamping-out policy	Animal health measures for stamping out that are not implemented in full.

National Animal Health Laboratory Network (NAHLN)	NAHLN is a cooperative effort between two U.S. Department of Agriculture agencies and the American Association of Veterinary Laboratory Diagnosticians. It is a national network of State and University veterinary diagnostic laboratories, which use common testing methods and software platforms to perform diagnostics and share information.
Newcastle Disease (U.S. CFR)	Newcastle disease is an acute, rapidly spreading, and usually fatal viral infection of poultry caused by an avian paramyxovirus serotype 1 that meets one of the following criteria for virulence: The virus has an intracerebral pathogenicity index (ICPI) in day-old chicks ( <i>Gallus gallus</i> ) of 0.7 or greater; or multiple basic amino acids have been demonstrated in the virus (either directly or by deduction) at the C-terminus of the F2 protein and phenylalanine at residue 117, which is the N-terminus of the F1 protein. The term “multiple basic amino acids” refers to at least three arginine or lysine residues between residues 113 and 116. In this definition, amino acid residues are numbered from the N-terminus of the amino acid sequence deduced from the nucleotide sequence of the F0 gene; 113-116 corresponds to residues -4 to -1 from the cleavage site. Failure to demonstrate the characteristic pattern of amino acid residues as described above may require characterization of the isolated virus by an ICPI test. A failure to detect a cleavage site that is consistent with virulent strains does not confirm the absence of a virulent virus.
Newcastle Disease (OIE)	<p>For the purposes of the <i>Terrestrial Code</i>, Newcastle disease (ND) is defined as an infection of poultry caused by a virus (NDV) of avian paramyxovirus serotype 1 (APMV-1) that meets one of the following criteria for virulence:</p> <ol style="list-style-type: none"><li data-bbox="558 1276 1422 1346">a. the virus has an intracerebral pathogenicity index (ICPI) in day-old chicks (<i>Gallus gallus</i>) of 0.7 or greater; or</li><li data-bbox="558 1352 1422 1640">b. multiple basic amino acids have been demonstrated in the virus (either directly or by deduction) at the C-terminus of the F2 protein and phenylalanine at residue 117, which is the N-terminus of the F1 protein. The term ‘multiple basic amino acids’ refers to at least three arginine or lysine residues between residues 113 and 116. Failure to demonstrate the characteristic pattern of amino acid residues as described above would require characterization of the isolated virus by an ICPI test.</li></ol> <p>In this definition, amino acid residues are numbered from the N-terminus of the amino acid sequence deduced from the nucleotide sequence of the F0 gene, 113-116 corresponds to residues -4 to -1 of the cleavage site.</p>

Non-susceptible animal	Animal that does not develop a particular disease when exposed to the causative infectious agent of that disease.
OIE (World Organization for Animal Health)	Organization that collects and publishes information on animal diseases from 178 (in 2013) countries and develops standards for animal health.
Outbreak	The occurrence of cases of a disease that are in excess of what is normally expected in a given population.
Pet bird	Any bird that is kept for personal pleasure and is not for sale (9 CFR 53).  Birds, except raptures, that are kept for the personal pleasure of their individual owners and not intended for resale (9 CFR 82).
Poultry	Definitions of poultry may vary. The following definitions are found in the CFR: <ul style="list-style-type: none"> <li>◆ Chickens, ducks, geese, swans, turkeys, pigeons, doves, pheasants, grouse, partridges, quail, guinea fowl, and pea fowl (9 CFR 53).</li> <li>◆ Chickens, doves, ducks, geese, grouse, guinea fowl, partridges, pea fowl, pheasants, pigeons, quail, swans, and turkeys (9 CFR 82).</li> </ul>
Personal protective equipment (PPE)	Clothing and equipment to prevent occupational injuries and diseases through control of exposure to potential hazards in the work place after engineering and administrative controls have been implemented to the fullest extent.
Preemptive slaughter	Depopulation under the competent authority of susceptible animal species in herds or flocks on premises that have been exposed to infection by direct animal-to-animal contact or by indirect contact of a kind likely to cause the transmission of ND virus prior to the expression of clinical signs.
Premises	A geographically and epidemiologically defined location, including a ranch, farm, stable, or other establishment.
Reassortment (genetic)	The mixing of the genetic material of a species into new combinations in different individuals. For example, reassortment occurs frequently in influenza viruses, whose genomes consist of eight distinct segments of RNA. These segments act like mini-chromosomes, and each time a flu virus is assembled, it requires one copy of each segment.

Regionalization (also known as zoning)	An animal subpopulation defined primarily on a geographical basis (using natural, artificial, or legal boundaries).
Stamping-out	Means carrying out under the authority of the Veterinary Authority, on confirmation of a disease, the killing of the animals which are affected and those suspected of being affected in the herd and, where appropriate, those in other herds which have been exposed to infection by direct animal to animal contact, or by indirect contact of a kind likely to cause the transmission of the causal pathogen. All susceptible animals, vaccinated or unvaccinated, on an infected premises should be killed and their carcasses destroyed by burning or burial, or by any other method which will eliminate the spread of infection through the carcasses or products of the animals killed ( <i>OIE Terrestrial Animal Health Code</i> ).
Susceptible animal	Any animal that can be infected with and replicate the disease pathogen of concern. The susceptible animals of primary concern to this plan are poultry.
Susceptible species	See susceptible animal.
Trace back	The identification of the origin and movements of all animals, animal products, possible fomites, people, possible vectors, and so on that have entered onto an infected premises.
Trace forward	The tracing of all animals, people, fomites, and so on that have left an infected premises. The premises that received the animals or goods should be investigated and kept under surveillance or quarantine.
Vector	An insect or any living carrier that transports an infectious agent from an infected individual to a susceptible individual or its food or immediate surroundings.
Wild birds	Migratory game birds, upland game birds, and all undomesticated feathered vertebrates.
Zoonotic	Any disease or infection that is naturally transmissible from animals to humans.

# Appendix I

## Abbreviations

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3D	depopulation, disposal, and decontamination
AC	Area Command
ADD	Assistant District Director
AHPA	Animal Health Protection Act
APHIS	Animal and Plant Health Inspection Service
APMV-1	avian paramyxovirus serotype-1
ARP	At-Risk Premises
AVMA	American Veterinary Medical Association
BZ	Buffer Zone
C&D	cleaning and disinfection
CA	Control Area
CCC	Commodity Credit Corporation
CDC	Centers for Disease Control and Prevention
CEAH	Center for Epidemiology and Animal Health
CF	Contingency Fund
CFR	U.S. Code of Federal Regulations
CP	Contact Premises
CVO	Chief Veterinary Officer
CVZ	Containment Vaccination Zone
DF	disease freedom
DHS	U.S. Department of Homeland Security
DOI	U.S. Department of the Interior
ELISA	enzyme-linked immunosorbent assay
EMLC	Emergency Management Leadership Council
EMRS	Emergency Management Response System
END	exotic Newcastle disease (now ND)
EOC	emergency operations center
EPA	Environmental Protection Agency



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EQS	Emergency Qualification System
ESF	Emergency Support Function
FA	Free Area
FAD	foreign animal disease
FADDL	Foreign Animal Disease Diagnostic Laboratory
FAD PReP	Foreign Animal Disease Preparedness and Response Plan
FEMA	Federal Emergency Management Agency
FFS	Federal-to-Federal support
F0	fusion protein precursor
FP	Free Premises
HA	hemagglutination
HHS	U.S. Department of Health and Human Services
HI	hemagglutination inhibition
IC	Incident Command
ICG	Incident Coordination Group
ICP	Incident Command Post
ICPI	intracerebral pathogenicity index
ICS	Incident Command System
IMT	Incident Management Team
IP	Infected Premises
IZ	Infected Zone
JIC	Joint Information Center
LBMS	live bird marketing system
loNDV	low virulence Newcastle disease virus
LPA	Legislative and Public Affairs
MAC	multiagency coordination
MP	Monitored Premises
NAHEMS	National Animal Health Emergency Management System
NAHERC	National Animal Health Emergency Response Corps
NAHLN	National Animal Health Laboratory Network
ND	Newcastle disease
NDV	Newcastle disease virus

NGO	non-governmental organizations
NIMS	National Incident Management System
NPIC	National Preparedness and Incident Coordination Center
NRF	National Response Framework
NVS	National Veterinary Stockpile
NVSL	National Veterinary Services Laboratories
NVSL-Ames	NVSL location for FAD diagnostic testing in Ames, IA
NVSL-FADDL	NVSL location for FAD diagnostic testing in Plum Island, NY
OIE	World Organization for Animal Health
PCR	polymerase chain reaction
PPE	personal protective equipment
PVZ	Protection Vaccination Zone
RNA	ribonucleic acid
ROSS	Resource Ordering and Status System
rRT-PCR	real-time reverse polymerase chain reaction
SAHO	State Animal Health Official
SITC	Smuggling Interdiction and Trade Compliance
SOP	standard operating procedure
SP	Suspect Premises
SPF	specific pathogen free
SPRS	Surveillance, Preparedness, and Response Services
SZ	Surveillance Zone
USDA	U.S. Department of Agriculture
VI	virus isolation
vNDV	virulent Newcastle disease virus
VP	Vaccinated Premises
VS	Veterinary Services
VZ	Vaccination Zone

## Appendix J

# Selected References and Resources

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**Note:** This appendix lists documents related to Newcastle disease (ND) response. All related FAD PReP documents listed in Appendix A are also references for this *ND Response Plan*.

APHIS USDA. *Standard Operating Procedures*. Exotic Newcastle Disease (END) Task Force. October 30, 2003.

APHIS USDA. *Foreign Animal Disease Framework: Roles and Coordination Manual 1-0*. <http://www.aphis.usda.gov/fadprep>.

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