NAHEMS GUIDELINES: BIOSECURITY

FAD PReP
Foreign Animal Disease Preparedness & Response Plan

NAHEMS
National Animal Health Emergency Management System

USDA

APHIS

the Center for Food Security & Public Health
Iowa State University

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

JUNE 2013

The Foreign Animal Disease Preparedness and Response Plan (FAD PReP)/National Animal Health Emergency Management System (NAHEMS) Guidelines provide a framework for use in dealing with an animal health emergency in the United States.

This FAD PReP/NAHEMS Guidelines was produced by the Center for Food Security and Public Health, Iowa State University of Science and Technology, College of Veterinary Medicine, in collaboration with the U.S. Department of Agriculture Animal and Plant Health Inspection Service through a cooperative agreement. The content has undergone review by USDA Legislative and Public Affairs.

This FAD PReP/NAHEMS Guidelines reflects review and minor corrections to the 2011 version, completed in June 2013. Please send questions or comments to:

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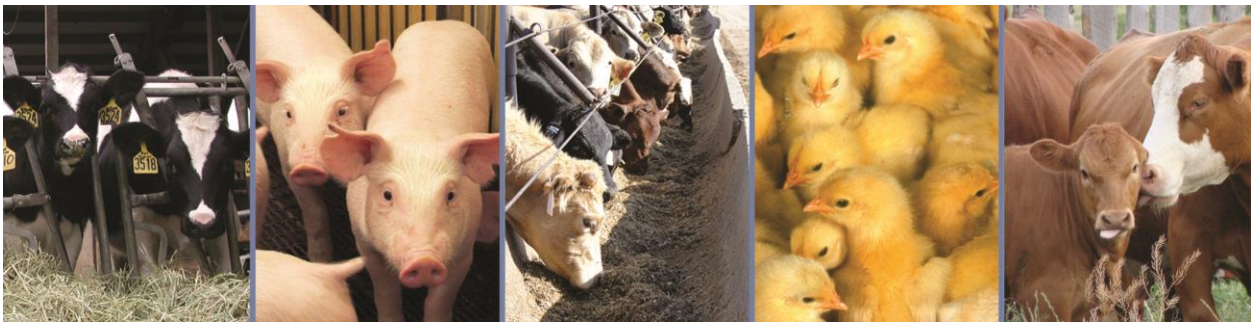
THE IMPERATIVE FOR FOREIGN ANIMAL DISEASE PREPAREDNESS AND RESPONSE

Why Foreign Animal Diseases Matter

Preparing for and responding to foreign animal diseases (FADs), like highly pathogenic avian influenza (HPAI) and foot-and-mouth disease (FMD), are critical measures to safeguard our nation's animal health, public health, and food supply.

There are significant potential consequences of an FAD outbreak in the United States. In addition to the economic impact, the social and psychological impact on both producers and consumers could be severe. The FMD outbreak in the United Kingdom had an estimated impact of between $12–18 billion. Studies have estimated a likely national welfare loss between $2.3–69 billion[1] for an FMD outbreak in California, depending on delay in diagnosing the disease.[2]



Challenges of Responding to an FAD Event

An FAD outbreak will be challenging for all stakeholders. For example, there will be disruptions to interstate commerce and international trade. Response activities are complex, and significant planning and preparation must be conducted before an outbreak. Outbreaks can become large and widespread. Large, geographically dispersed and diverse teams will need to be assembled rapidly and must react quickly. The response effort must have the capability to be rapidly scaled up, involving many times more resources, personnel, and countermeasures. As such, responding to an FAD—large or small—may be a very complex and difficult effort.

Lessons Learned from Past FAD Outbreaks

Past outbreaks both in the United States and in other countries offer important lessons that can be applied to preparedness and response efforts. To achieve successful outcomes in future FAD response, it is vital to identify, understand, and apply these lessons learned:

- Provide a unified State-Federal-Tribal-industry planning process that respects local knowledge.
- Ensure the unified command sets clearly defined and obtainable goals.
- Have a unified command that acts with speed and certainty to achieve united goals.
- Employ science-based and risk-management approaches that protect public health and animal health, stabilize animal agriculture, the food supply, and the economy.
- Ensure guidelines, strategies, and procedures are communicated and understood by responders and stakeholders.

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[1] Carpenter TE, O'Brien JM, Hagerman AD, & McCarl BA. 2011. "Epidemic and economic impacts of delayed detection of foot-and-mouth disease: a case study of a simulated outbreak in California." *J Vet Diagn Invest.* 23:26-33.

[2] Estimates based on models may vary: Ekboir (1999) estimated a loss of between $8.5 and $13.5 billion for an FMD outbreak in California. Ekboir JM. 1999. "Potential Impact of Foot-and-Mouth Disease in California: the Role and Contribution of Animal Health Surveillance and Monitoring Services." *Agricultural Issues Center.* University of California, Davis.

- Acknowledge that high expectations for timely and successful outcomes require the:
  - Rapid scale-up of resources and trained personnel for veterinary activities and countermeasures, and
  - Capability to quickly address competing interests before or during an outbreak.
- Rapid detection and FAD tracing is essential for the efficient and timely control of FAD outbreaks.

FAD PReP Mission and Goals

The significant threat and potential consequences of FADs, and the challenges of 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 de-conflict 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 protect public health; 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 livestock facilities, States, Tribes, regions, and industries to resume normal production as quickly as possible. They will also allow the United States to regain FAD-free status without the response effort causing more disruption and damage than the disease outbreak itself.

FAD PReP Documents and Materials

FAD PReP is not just one, standalone FAD plan. Instead, it is a comprehensive US preparedness and response strategy for FAD threats. This strategy is provided and explained in a series of different types of integrated documents, as illustrated and described below.

FAD PReP Suite of Documents and Materials

Note: APHIS = Animal and Plant Health Inspection Service, NAHEMS = National Animal Health Emergency Management System, SOP = standard operating procedures.

- Strategic Plans—Concept of Operations
  - *APHIS Foreign Animal Disease Framework: Roles and Coordination*: This document provides an overall concept of operations for FAD preparedness and response for APHIS, explaining the framework of existing approaches, systems, and relationships.
  - *APHIS Foreign Animal Disease Framework: Response Strategies and Activities:* This document provides significant detail on response strategies and activities that will be conducted in an FAD outbreak.
  - *National Center for Animal Health Emergency Management (NCAHEM) Stakeholder Coordination and Collaboration Resource Guide*: This guide describes key stakeholders with whom NCAHEM collaborates.
  - *NCAHEM Incident Coordination Group Plan*: This document explains how APHIS headquarters will organize in the event of an animal health emergency.
- NAHEMS Guidelines
  - These documents describe many of the critical preparedness and response activities, and can be considered as a competent veterinary authority for responders, planners, and policy-makers.
- Industry Manuals
  - These manuals describe the complexity of industry to emergency planners and responders and provide industry a window into emergency response.
- Disease Response Plans
  - Response plans are intended to provide disease-specific information about response strategies. These documents offer guidance to all stakeholders on capabilities and critical activities that would be required to respond to an FAD outbreak.
- Critical Activity Standard Operating Procedures (SOPs)
  - For planners and responders, these SOPs provide details for conducting 23 critical activities such as disposal, depopulation, cleaning and disinfection, and biosecurity that are essential to effective preparedness and response to an FAD outbreak. These SOPs provide operational details that are not discussed in depth in strategy documents or disease-specific response plans.
- Continuity of Business (commodity specific plans developed by public-private-academic partnerships)
  - *Secure Egg Supply (SES) Plan:* The SES Plan uses proactive risk assessments, surveillance, biosecurity, and other requirements to facilitate the market continuity and movement of eggs and egg products during an HPAI outbreak.
  - *Secure Milk Supply (SMS) Plan:* Currently under development, the SMS Plan will help facilitate market continuity for milk and milk products during an FMD outbreak. This Plan also will employ proactive risk assessments.
  - *Secure Pork Supply (SPS) Plan:* Currently under development, the SPS Plan will help facilitate market continuity for pork and pork products during an FMD, classical swine fever, swine vesicular disease, or African swine fever outbreak.
  - *Secure Turkey Supply (STS) Plan:* Currently under development, the STS Plan will help facilitate market continuity for the turkey sector during an HPAI outbreak.
- Outbreak Response Tools
  - Case definitions, appraisal and compensation guidelines and formulas, and specific surveillance guidance are examples of important outbreak response tools.
- State/Tribal Planning
  - State and Tribal planning is essential for an effective FAD response. These plans are tailored to the particular requirements and environments of the State or Tribal area, taking into account animal populations, industry, and population needs.

- Industry, Academic, and Extension Planning
  - Industry, academia, and extension stakeholder planning is critical and essential: emergency management is not just a Federal or State activity.
- APHIS Emergency Management
  - APHIS directives and Veterinary Services Memorandums provide critical emergency management policy. APHIS Emergency Management documents provide guidance on topics ranging from emergency mobilization, to the steps in investigating a potential FAD, to protecting personnel from HPAI.

Strategic documents, response plans, and NAHEMS Guidelines are available here: http://www.aphis.usda.gov/animal_health/emergency_management/.

For those with access to the APHIS intranet, they are available on the internal APHIS FAD PReP website: http://inside.aphis.usda.gov/vs/em/fadprep.shtml.

PREFACE

The Foreign Animal Disease Preparedness and Response Plan (FAD PReP)/National Animal Health Emergency Response System (NAHEMS) Guidelines provide the foundation for a coordinated national, regional, state and local response in an emergency. As such, they are meant to complement non-Federal preparedness activities. These guidelines may be integrated into the preparedness plans of other Federal agencies, State and local agencies, Tribal Nations, and additional groups involved in animal health emergency management activities.

The Biosecurity Guidelines are a component of APHIS' FAD PReP/NAHEMS Guideline Series, and are designed for use by APHIS Veterinary Services (VS), and other official response personnel in the event of an animal health emergency, such as the natural occurrence or intentional introduction of a highly contagious foreign animal disease in the United States.

The Biosecurity Guidelines provide guidance for USDA employees, including National Animal Health Emergency Response Corps (NAHERC) members, on biosecurity principles for animal health emergency deployments. This Guideline provides information for Biosecurity Group Supervisors and other personnel associated with biosecurity activities. The general principles discussed in this document are intended to serve as a basis for making sound decisions regarding biosecurity. As always, it is important to evaluate each situation and adjust procedures to the risks present in the situation.

The FAD PReP/NAHEMS Guidelines are designed for use as a preparedness resource rather than as a comprehensive response document. For more detailed response information, consult the FAD PReP Standard Operating Procedures (SOP): 9. Biosecurity and plans developed specifically for the incident. Additional Biosecurity resources are included in the Appendix and in the references at the end of this document.

NOTE: This "FAD PReP/NAHEMS Guidelines: Biosecurity 2013" is the result of a content update to the NAHEMS Operational Guidelines: Biosecurity 2005.

APHIS DOCUMENTS

This "FAD PReP/NAHEMS Guidelines: Biosecurity" has corresponding disease-specific FAD PReP Standard Operating Procedures (SOP): 9. Biosecurity.

Several key APHIS documents complement this "FAD PReP/NAHEMS Guidelines: Biosecurity" and provide further details when necessary. This document references the following APHIS documents:

- FAD PReP/NAHEMS Guidelines:
  - Cleaning and Disinfection (2011)
  - Health and Safety (2011)
  - Personal Protective Equipment (PPE) (2011)

- FAD PReP Standard Operating Procedures (SOP):
  - 8. Health and Safety/Personal Protective Equipment
  - 9. Biosecurity
  - 15. Cleaning and Disinfection

- Incident Health and Safety Plan

Strategic documents, response plans, and NAHEMS Guidelines are available here: http://www.aphis.usda.gov/animal_health/emergency_management/.

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National Animal Health Emergency Management System

Guidelines: Biosecurity

1. INTRODUCTION

In the event of a major animal health emergency in the United States, the Department of Agriculture, in its role as an emergency response agency, is authorized to deploy personnel to assist with response and recovery efforts. APHIS employees as well as members of the National Animal Health Emergency Response Corps (NAHERC) may be deployed.

During an animal health emergency, local, State, and Federal Governments and private sector partners (e.g., industry and academia) must work together in a coordinated, mutually supportive effort to

- Determine the nature of the outbreak;
- Initiate a response;
- Eliminate or control the disease; and
- Help facilitate recovery (e.g., resumption of trade).

1.1 Biosecurity Guidelines

Biosecurity is a series of management practices designed to prevent the introduction and spread of disease agents on an animal production facility.

During an animal disease emergency, biosecurity measures are necessary to

- Help keep disease agents out of livestock and poultry populations (e.g., herds, flocks, or other groups of animals) where the agents are not already present; and
- Prevent the spread of disease agents from infected groups in the population to uninfected groups within the same population.

An animal health emergency may adversely affect

- Producers, who may suffer the loss of animals and decreased production;
- Livestock and associated industries, which may see decreased production, sales, and international trade; and
- Public health, in the case of zoonotic diseases.

When properly implemented and enforced, biosecurity measures help reduce the risk of spreading pathogenic agents during the movement of personnel and materials necessary for activities associated with an animal health emergency response (e.g., surveillance, vaccination, appraisal, depopulation, and disposal). In the case of an outbreak involving a zoonotic agent, biosecurity measures can help protect the health of responders and the general public.

2. GENERAL BIOSECURITY PRINCIPLES FOR RESPONSE PERSONNEL

2.1 Biosecurity Awareness

A biosecurity plan can only be useful if all emergency response personnel strictly adhere to the guidance as written. Fatigue, stress, distraction, and lack of forethought can cause even the most conscientious individual to lose focus on the crucial importance of biosecurity measures. It is essential that all personnel exercise the utmost thought, patience, persistence, and care in creating and carrying out a biosecurity plan—both under normal circumstances and during an outbreak. A little advanced thinking, planning, and extra effort in following biosecurity procedures can go a long way toward preventing pathogen transmission, protecting the well-being of livestock and poultry, and safeguarding American agriculture.

During an animal health emergency response, some response personnel may be required to visit multiple premises during the course of a work day. These personnel must be aware that these activities increase the risk of disease transmission and must be especially diligent with respect to compliance with biosecurity practices.

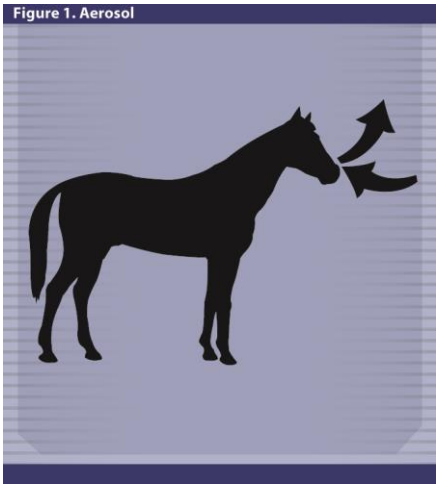
2.2 Routes of Transmission

Pathogenic agents can be transmitted from animal to animal or animal to human, and vice-versa through a variety of routes. Understanding the routes of transmission is essential to developing an effective biosecurity plan. The most common routes of transmission are aerosol, oral, direct contact, fomites, vectors, and zoonotic.

2.2.1 Aerosol

Aerosol transmission (Figure 1) occurs when droplets containing pathogenic agents from an infected animal are inhaled by a susceptible animal. Most pathogenic agents that may be transmitted via aerosols do not survive for extended periods of time in droplets, so infected and susceptible animals must be in close proximity for disease transmission to occur. Typically, respiratory diseases and some diarrheal diseases can be spread via aerosol transmission.

Figure 1. Aerosol



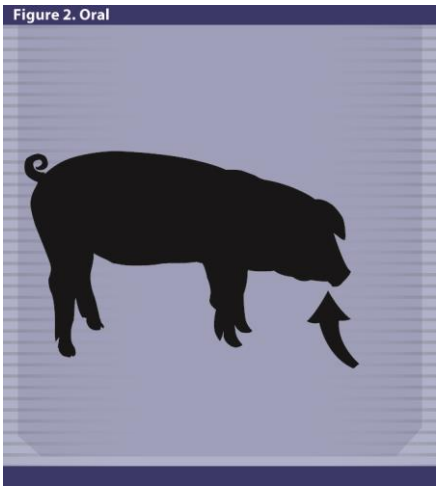
Examples of diseases spread by aerosol transmission include

- Exotic Newcastle Disease (END);
- Foot-and-Mouth Disease (FMD);
- Influenza A; and
- Q fever, also known as Query fever.

2.2.2 Oral

Oral transmission (Figure 2) occurs when pathogenic agents are consumed by a susceptible animal. Feces, urine, saliva, and other secretions may contain pathogenic agents which can contaminate feed, water, or other items (fomites) in the environment that animals lick or chew, such as feed bunks, equipment, fencing, water troughs, and salt and mineral blocks, etc.

Figure 2. Oral



Examples of diseases spread by oral transmission include

- END;
- FMD;
- Hendra;
- Nipah; and
- Q fever.

2.2.3 Direct Contact

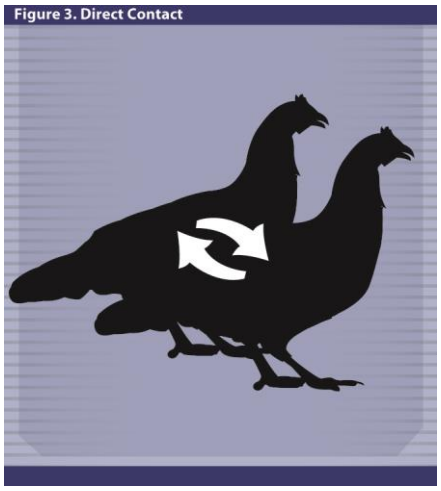


Figure 3. Direct Contact

Direct contact transmission (Figure 3) occurs when a susceptible animal physically contacts an infected animal or a pathogenic agent in the environment. The susceptible animal is exposed when the pathogenic agent comes in direct contact with its skin, mucus membranes, or an open wound. Transmission can occur through rubbing, biting, licking, by contact with the blood or saliva of an infected animal, or through contact with fomites. Diseases spread during breeding or from dam to offspring during gestation are also considered to be transmitted by direct contact. Direct contact transmission can occur between animals of different species and through contact with humans.

Examples of diseases spread by direct contact include

- African Swine Fever (ASF);
- Contagious Equine Metritis (CEM);
- FMD; and
- Q fever.

2.2.4 Fomites

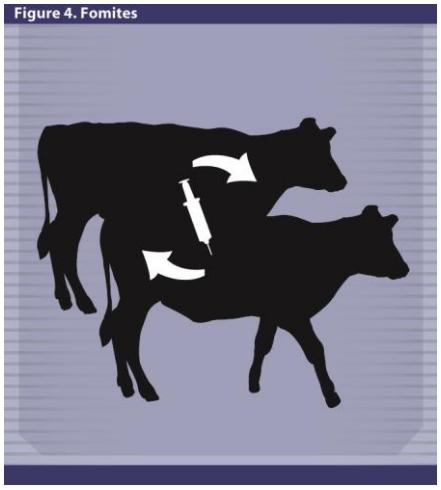


Figure 4. Fomites

Fomites are inanimate objects capable of transferring disease agents through either direct contact (Figure 4) or oral transmission. Fomites can include boots, clothing, vehicles, shovels, tools, bowls or buckets, tack, brushes, clippers, needles, and other medical equipment. Vehicles and trailers with contaminated tires, wheel wells, and undercarriages can serve as fomites. Humans with contaminated clothing, shoes, or boots are also considered fomites with the potential for moving disease agents within the facility or from one facility to another.

Examples of diseases spread by fomites include

- ASF;
- Classical Swine Fever (CSF);
- FMD; and
- Influenza.

2.2.5 Vectors


Figure 5. Vectors

Vectors are insects or arachnids capable of transmitting pathogens from an infected animal to a healthy animal (Figure 5). Vectors can transmit disease agents either mechanically or biologically. In mechanical transmission, the vector transports the disease agent from one animal to another, with the disease agent remaining unchanged. Many species of flies serve as mechanical vectors. Biological transmission occurs when the vector acquires the agent from an infected animal, usually through a blood meal, and the agent replicates or develops within the vector. The disease agent is subsequently introduced to a susceptible host, usually through a bite. Fleas, ticks, and mosquitoes are common biological disease vectors.

Examples of diseases spread by vectors include

- Bluetongue;
- Equine Infectious Anemia (EIA); and
- West Nile virus (WNV).

2.2.6 Zoonotic

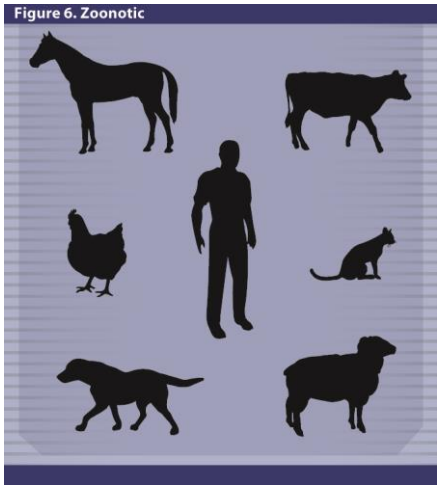


Figure 6. Zoonotic

Zoonotic diseases are transmissible between animals and humans (Figure 6). Human exposure to zoonotic diseases may occur through any of the five routes of transmission discussed previously. Because of public health concerns, the zoonotic risk of a particular pathogenic agent should be considered in a biosecurity risk assessment.

Examples of zoonotic diseases include

- Brucellosis;
- END;
- Influenza;
- Hendra;
- Nipah;
- Q fever; and
- Tuberculosis.

2.3 Clothing and Personal Protective Equipment (PPE)

Pathogenic agents can be transmitted via contaminated clothing. Careful attention to clothing is essential to a successful biosecurity plan.

2.3.1 Outerwear

Before entering animal areas, ask about biosecurity procedures and make sure you understand them and comply with them. All responders, visitors, and employees should put on clean outerwear to cover their street clothes. The outerwear may be either disposable or reusable once cleaned. Coveralls are recommended. In some types of facilities (e.g., swine and poultry barns), biosecurity protocols may have shower-in and shower-out procedures and require the use of clothing provided at the site.

2.3.1.1 Disposable Outerwear

Disposable outerwear is highly recommended for all visitors and employees, regardless of the level of risk. In some cases, disposable outerwear is more economical than reusable outerwear because it does not have to be cleaned, disinfected, and maintained. Examples include disposable coveralls (e.g., Tyvek®), boot covers, hats, and gloves that can be disposed of after use.

2.3.1.2 Reusable Outerwear

Examples of reusable outwear consist of machine washable coveralls and rubber boots capable of being cleaned and disinfected between premises.

Waterproof or nylon coveralls may be used in wet or dirty conditions. Nylon coveralls, although not completely waterproof, offer more protection against moisture than cotton. They are also lightweight and wind resistant,

withstand repeated machine washings, and air dry quickly. Automatic dryers may damage nylon if too high a heat setting is used.

In some situations, reusable outerwear must be left at the premises for cleaning and disinfection. In other situations, guidance will be provided for the proper storage and transportation of contaminated outerwear removed from the site. For more detailed information, refer to *FAD PReP Standard Operating Procedures (SOP): Biosecurity* and *FAD PReP SOP: Cleaning and Disinfection*.

2.3.2 Personal Protective Equipment (PPE)

The phrase "personal protective equipment" (PPE) refers to special clothing and equipment that places a barrier between an individual and a hazard. PPE serves two purposes in an animal health emergency: 1) the protection of the responder against potential hazards that could result in injury or occupational illness, e.g., highly pathogenic avian influenza, and 2) with appropriate donning (putting on), doffing (taking off), use, and cleaning and disinfection/disposal, the prevention of the spread of hazards, e.g., foot-and-mouth disease, between animals or locations. Selection of the PPE must take into consideration both of these purposes. Additional factors must also be considered when selecting PPE to ensure a safe and effective response.

The level of protection, and therefore the level of PPE, required for a response will vary with the situation and the pathogenic agent(s) involved. The level of PPE for a particular response will be based on Occupational Safety and Health Administration (OSHA), Centers for Disease Control and Prevention (CDC), and APHIS guidance and will be determined by the Incident Safety Officer. Responders will be briefed on PPE requirements upon arrival at the Incident Command Post.

APHIS has developed a Health and Safety Plan (HASP) which is to be modified with incident-specific information before being utilized. All types of PPE are addressed based on responder safety. The HASP can be accessed at: http://www.aphis.usda.gov/emergency_response/hasp/employee_health.shtml.

OSHA classifies PPE into four levels of protection. The levels range from D (lowest level of protection) to A (highest level). Level C is the protection most often used with highly contagious foreign animal diseases.

Levels D through A are described below and an example of the type of hazard for which that level of PPE would likely be recommended is given.

Level D: This is the lowest level of protection and consists of a basic work uniform to protect against nuisance contamination. For example, this would be sufficient for responding to a non-zoonotic, vector-borne animal disease. In Section 5 Personal Protective Equipment, the APHIS HASP also describes Level D Modified as the same as Level D for respiratory protection, but the skin protection is increased to that of Level C.

Level C: This level is used when the concentration and types of airborne substances are known and the criteria for using air purifying respirators are met. This level would be recommended when responding to a highly pathogenic avian influenza (HPAI) outbreak. General agreement exists that Level C PPE would be adequate protection for veterinary responders in most animal disease situations.

Level B: This level is used when the highest level of respiratory protection is necessary but a lesser level of skin protection is needed than in Level A. This may be the level required in a Nipah virus outbreak.

Level A: This is the level of protection selected when the greatest level of skin, respiratory, and eye protection is required. An example where this level would be required would be when responding to a large chlorine spill.

Emergency response activities in which veterinary responders are involved will almost never necessitate the use of Level B or A PPE. However, it is possible that veterinary responders may be needed to assist in emergency situations where these expanded levels of protection will be required. A basic familiarity with all levels of PPE protection will expedite onsite training in an actual animal health emergency. See *FAD PReP/NAHEMS Guidelines: Personal Protective Equipment (PPE) (2011)* for more details on the equipment appropriate to provide each level of protection.

Some PPE may be bulky and interfere with the wearer's normal range of motion, making walking and other movements more difficult. Use care to prevent falls or other mishaps. Some PPE may have limitations for the duration of safe use. In addition, working in PPE can create challenges for the wearer such as overheating. Precautions need to be taken and warning signs of physical stress need to be recognized. Be sure to understand and follow all established guidelines for the use and care of PPE.

PPE needs to be donned and doffed in a proper sequence to effectively protect the wearer and to prevent the spread of the hazard. Donning and Doffing protocols for the different levels of protection can be found in *FAD PReP/NAHEMS Guidelines: PPE (2011).*

The PPE provided for a response may be disposable or reusable. Cleaning and disinfection of PPE may present biosecurity challenges. Be sure to understand and follow incident-specific protocols regarding cleaning and disinfection of PPE. Pay special attention to the appropriate use of PPE in a zoonotic disease situation.

For more information on PPE, health and safety issues while wearing PPE, and other hazards that threaten responders' health, see *FAD PReP/NAHEMS Guidelines: Health and Safety (2011), FAD PReP/NAHEMS Guidelines: PPE (2011), FAD PReP SOP: Health and Safety/PPE,* as well as the incident-specific Health and Safety Plan.

2.4 General Biosecurity Practices

Personnel whose job responsibilities require them to visit multiple premises may come into contact with infectious agents. Without proper biosecurity precautions, they can transfer these pathogenic agents to other premises.

The following is an overview of general basic biosecurity practices all field personnel should follow. A more detailed protocol is found in the *FAD PReP SOP: Biosecurity*. In the event of an animal health emergency, additional biosecurity measures may be implemented. Always refer to protocols developed for a particular response. See also, *FAD PReP/NAHEMS Guidelines: Cleaning and Disinfection (2011).*

2.4.1 Premises Visits

- Do not enter an animal area unless accompanied by a facility employee or authorized to do so by the facility owner.
- "Backyard" facilities are considered animal facilities. Follow all biosecurity practices when visiting these sites.

2.4.2 Clothing

- Wear rubber boots, other footwear that can be cleaned and disinfected, or disposable plastic boots.
- Wear disposable or clean coveralls, laboratory coats, smocks, or other suitable outerwear when coming in contact with animals, their secretions, or manure. If visiting multiple facilities, be sure to have an adequate supply of clean or disposable coveralls, so a fresh pair can be used at each site. Remove outerwear when leaving a premises. Dirty items should be placed into a double plastic bag which is sealed and kept in the vehicle's "dirty" area.
- Wear disposable latex gloves. Hands should be washed after removing gloves.

2.4.3 Cleaning and Disinfection

- Remove all dirt and organic matter (mud, manure, straw, etc.) from boots and thoroughly disinfect them before entering and before leaving an animal facility. Use a bucket of water with an appropriate broad-spectrum disinfectant and a brush to disinfect your boots.
- Thoroughly wash hands with antibacterial soap before entering and leaving the premises. Wearing disposable gloves is not a substitute for hand washing. Hands should be washed even if gloves are worn.
- If possible, dispose of used disposable boots, gloves, and coveralls at the facility. Otherwise, place the items in a plastic garbage bag, seal it, and double bag it for disposal later in a designated container at a designated location.
- Keep all equipment used in the field clean. Use disposable equipment or disinfect all equipment that comes in contact with animals or their secretions prior to leaving the premises. For field use, select equipment that is easily disinfected (e.g., plastic vs. wooden clipboards). For more information, see *FAD PReP/NAHEMS Guidelines: Cleaning and Disinfection (2011).*

2.4.4 Vehicles

- Designate "clean" and "dirty" storage areas in the vehicle and keep clean and dirty/contaminated clothes, supplies, and equipment in separate areas of the vehicle.
- When at a premises, avoid driving through manure or wastewater. Park on concrete or paved areas and away from barns, pens, pastures, or other animal areas. Avoid parking in areas where the vehicle may come in contact with run-off.
- Clean response vehicles between visits to animal production facilities. Cleaning should include tires and floor mats. Vehicle carpets should be covered by plastic floor mats. Commercial car washes with wheel-well washing provide adequate exterior cleaning. Tire sprays may be needed in some situations.

2.4.5 Contact with Infected Animals

Personnel who come in contact with sick, dying, or dead animals should be considered "carriers" of the disease and should follow proper disinfection procedures prior to coming in contact with other animals. Vehicles used at the premises must also be cleaned and disinfected prior to visiting another premises.

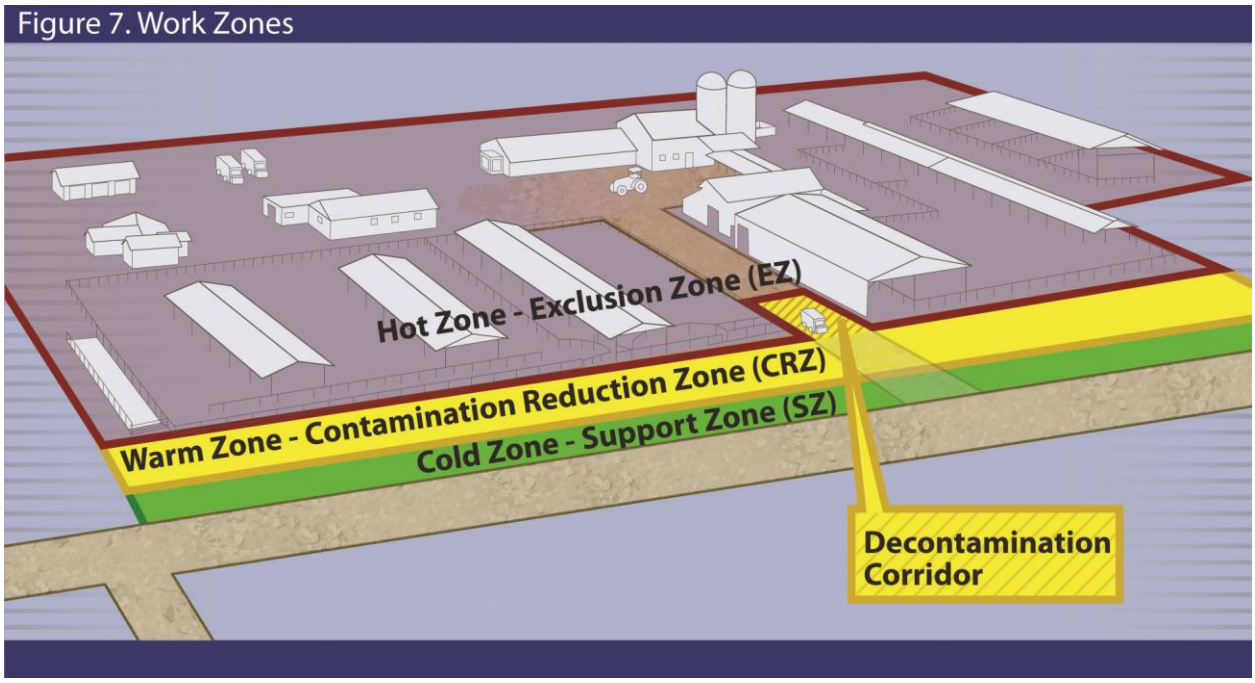
2.5 Control of Work Zones

Access to premises on which response teams are engaged in activities such as appraisal, depopulation, disposal, and decontamination should be controlled to prevent the dissemination of disease agents from infected premises to uninfected areas. Biosecurity work zones will be established according to protocols found in *FAD PReP SOP: Biosecurity*. Zones will be marked using signs, fencing, traffic cones, or caution tape.

2.5.1 Work Zones

The following are descriptions of the three major work zones and corridor (Figure 7) established to control access to contaminated areas and prevent the spread of infectious agents. See *FAD PReP SOP: Biosecurity* for protocols for establishing control zones.

Figure 7. Work Zones



Hot Zone – Exclusion Zone (EZ)

This high-risk area is where infected animals were housed and is potentially contaminated and considered unsafe. Examples include an area of a farm, local market or roadside stand. PPE must be worn. Appraisal, depopulation, disposal, and facility cleaning and decontamination of the site and equipment occur in this area. Personnel and equipment enter and exit the Hot Zone through designated access points in the Warm Zone - Contamination Reduction Zone (CRZ).

Warm Zone – Contamination Reduction Zone (CRZ)

This is a high-risk area due to the potential of exposure to pathogens and chemical disinfectants. All personnel are required to wear full PPE. Entry from the Warm Zone - Contamination Reduction Zone **(**CRZ) to either the Cold Zone - Support Zone (SZ) or Hot Zone - Exclusion Zone (EZ) occurs through designated access points. For workers exiting the Hot Zone - Exclusion Zone (EZ), final decontamination and disinfection of PPE and equipment as well as final doffing of PPE occur in the Decontamination Corridor of the Warm Zone - Contamination Reduction Zone (CRZ). Site-specific protocols for PPE, decontamination, and disinfection must be strictly followed.

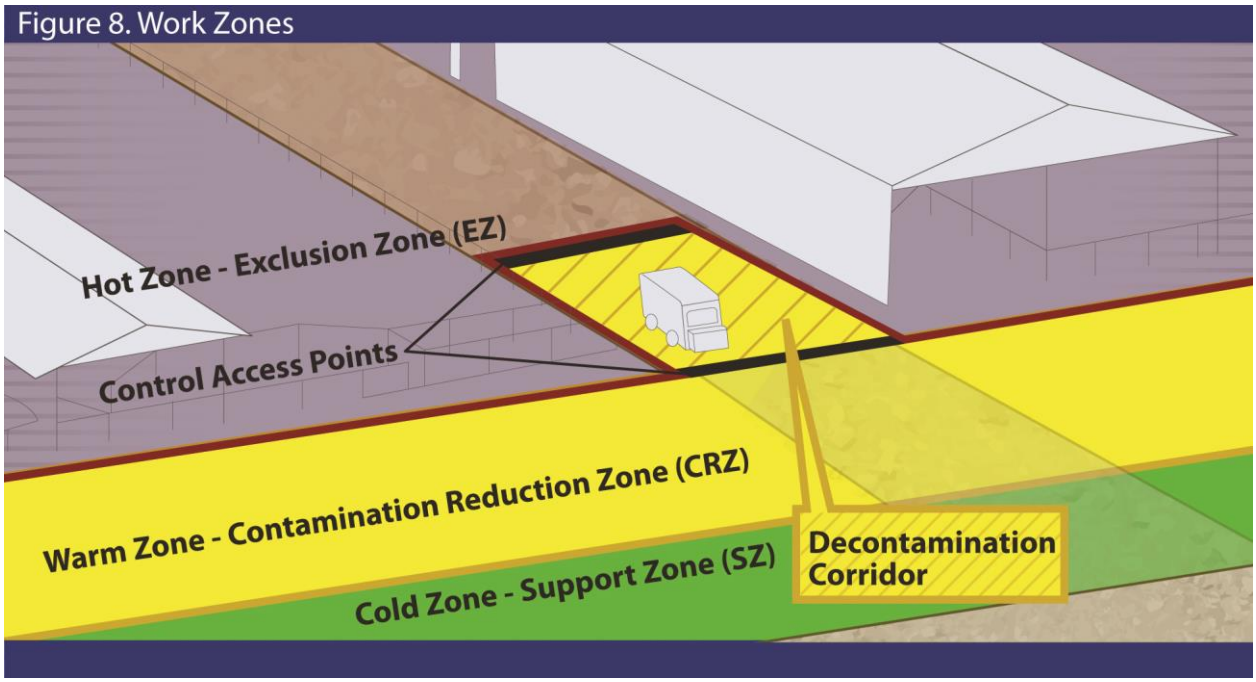
Cold Zone – Support Zone (SZ)

This is the "cleanest" work zone with the lowest relative risk of exposure to pathogens and other hazards such as decontamination chemicals. In this zone personnel are not required to wear PPE; however, facilities for donning PPE before entering other zones are provided. Administrative, clerical, and other support functions are based here. Medical support is provided to personnel in this zone. Facilities for personal needs such as eating, drinking, and bathroom use are provided. Air and surface monitoring is conducted as needed to ensure that the area is free from contamination. Contaminated articles and equipment are prohibited in this area. Decontamination activities are also prohibited.

Decon (Decontamination) Corridor

This is the area between the Hot Zone - Exclusion Zone (EZ) Control Line and the Warm Zone - Contamination Reduction Zone (CRZ) Control Line. Decontamination of personnel and equipment occurs along the corridor with stations for depositing tools, equipment, protective clothing, and other items. The level of contamination should decrease along this corridor from the Hot Zone - Exclusion Zone (EZ) to the Cold Zone - Support Zone (SZ). Emergency response teams enter and exit the Hot Zone - Exclusion Zone **(**EZ) through the access control points at each end of the corridor.

Figure 8. Work Zones



2.5.2 Decontamination and Disinfection

Establish a decontamination area before allowing personnel or equipment to enter areas where there is a risk of exposure to hazardous substances. For detailed information on establishing decontamination areas and decontamination methods see *FAD PReP SOP: Biosecurity*.

The selection and proper use of disinfectants is essential to any decontamination procedure. For further details, see *FAD PReP/NAHEMS Guidelines: Cleaning and Disinfection (2011); FAD PReP SOP: Cleaning and Disinfection;* and site-specific information.

2.5.3 Preventing Contamination

One of the most important aspects of decontamination is understanding how to prevent contamination. Measures taken to prevent contamination help minimize worker exposure and reduce cross contamination of test samples.

General contamination prevention measures include the following:

- Avoid walking through known contaminated areas.
- Avoid direct contact with contaminated items, surfaces, and vehicles.
- Prior to donning PPE, make sure it is free of cuts or tears.
- Fasten all closures on suits using tape, if necessary.
- Protect any skin injuries from contamination.
- Stay upwind of airborne contaminants.
- Do not carry items such as cigarettes, gum, food, drink, etc. into contaminated areas.

Similar precautions should be taken to minimize contamination of equipment, including:

- Limit exposure and contact time heavy equipment and vehicles have with contaminated areas;
- When obtaining samples from a contaminated site, set contaminated containers and tools in clean plastic bags before placing them on non-contaminated equipment, and/or vehicles for transportation to decontamination stations prior to taking them to clean areas; and
- If samples must be taken from the site, bag sample containers before removing them from the site.

For further information, see *FAD PReP SOP: Biosecurity* and *FAD PReP/NAHEMS Guidelines: Cleaning and Disinfection (2011).*

3. ROLES AND RESPONSIBILITIES OF BIOSECURITY PERSONNEL DURING AN ANIMAL HEALTH EMERGENCY

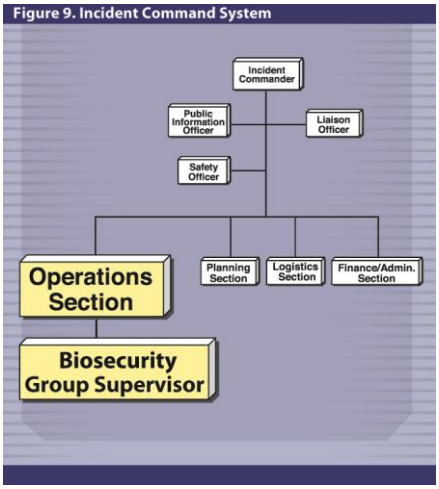
USDA APHIS utilizes the Incident Command System (ICS) to organize Animal Health Emergency Responses. Under the ICS, the Incident Commander (IC) has overall responsibility for the management of the entire incident. The Command Staff includes the Logistics, Operations, Finance, and Planning Section Chiefs. Each of these sections is further divided into units or groups.

Prior to deployment, all responders should have received training about the organization and structure of the ICS, their roles and responsibilities within the ICS, and their duties upon arrival at the incident site. (See the Introduction to NAHERC web or print module).

As part of initial orientation upon arrival at the Incident Command Post (ICP), all responders should receive a biosecurity briefing. All responders are expected to adhere to the biosecurity protocols in place at the incident.

The Animal Biosecurity and Disease Prevention Group is responsible for ensuring appropriate biosecurity protocol. All members of this Group, for brevity also referred to as the Biosecurity Group, should be familiar with the basic biosecurity principles described in this Guidelines document. Upon arrival at the ICP, Team Members of this Biosecurity Group will receive training regarding biosecurity procedures and practices specific to the incident. Prior to beginning work in the field, Biosecurity Team Members should receive incident-specific information about disease agents of concern, routes of transmission, movement controls, cleaning and disinfection procedures, health and safety, PPE, and other information specific to response activities.

3.1 Animal Biosecurity and Disease Prevention Group



The Animal Biosecurity and Disease Prevention Group, also known as the Biosecurity Group, is part of the Operations Section (Figure 9). This Biosecurity Group is led by the Biosecurity Group Supervisor, who reports to the Operations Section Chief. Biosecurity Team Members work on infected or contact premises and provide frontline assistance in containing and controlling a disease outbreak.

3.1.1 Biosecurity Group Supervisor

The Biosecurity Group Supervisor is assigned to the ICP and is in charge of all Biosecurity Teams and Biosecurity Team Members. Individuals selected as Biosecurity Group Supervisors should be identified and trained before an animal health emergency occurs.

The Biosecurity Group Supervisor is responsible for ensuring that appropriate biosecurity measures are implemented during an animal health emergency response to prevent the disease agent from moving from infected premises to uninfected premises and/or from infected animals to uninfected animals on the same premises. The Biosecurity Group Supervisor prepares the site-specific biosecurity plan in consultation with the Safety Officer. The site-specific biosecurity plan must be approved by the Incident Commander.

Other duties of the Biosecurity Group Supervisor include the following:

- Consulting with Biosecurity Team Leaders to assess the need for biosecurity personnel, vehicles, and equipment during a response
- Determining the number and type of personnel and resources needed to conduct biosecurity operations
- Communicating with the Operations Section Chief to ensure availability of resources and advising the Operations Section Chief of personnel requirements that cannot be satisfied locally so that arrangements for additional personnel can be made
- Verifying the credentials, training, and security clearances of all personnel assigned to the Biosecurity Group. Maintaining documentation indicating that credentialing requirements have been met
- Working with appropriate officials to issue leases and contracts regarding equipment or personnel for the biosecurity operation
- Appointing Biosecurity Team Leaders and assigning personnel to Biosecurity Teams
- Identifying personnel-training requirements and ensuring that responders receive the appropriate orientation training upon arrival at the Incident Site. Orientation training should include information about biosecurity policies and procedures, Biosecurity Team Members' duties and responsibilities, health and safety hazards present at the job site, and appropriate personal protective equipment. For general guidance on these topics, see *FAD PReP/NAHEMS Guidelines: Health and Safety (2011)* and *FAD PReP/NAHEMS Guidelines: PPE (2011).*
- Ensuring all biosecurity personnel receive training on the routes of pathogen transmission and measures to reduce the spread of disease
- Ensuring that Biosecurity Team Leaders carry out their tasks in accordance with established biosecurity policies and procedures
- Coordinating Biosecurity Group activities with the activities of other groups (e.g., Appraisal, Euthanasia, and Disposal)
- Establishing and maintaining effective working relationships with industry groups and producers, including producer groups, processing plant managers, renderers, feed-mill operators, transportation company representatives, and other stakeholders

- Preparing regular briefings and reports. Verifying the accuracy and completeness of all required reports and submitting them promptly to the Operations Section Chief
- Informing the Operations Section Chief of any problems
- Serving as a resource for technical information about biosecurity methods and procedures and maintaining files and resource materials on these topics

3.1.2 Biosecurity Team Leader

The Biosecurity Team Leader supervises a Biosecurity Team assigned to a clearly defined area or a number of premises. Depending on the size of the response, there may be several Biosecurity Teams, each with its own Team Leader. Biosecurity Team Leaders report to the Biosecurity Group Supervisor.

The Biosecurity Team Leader's duties include the following:

- Assisting the Biosecurity Group Supervisor in determining the number and types of resources needed to effectively and efficiently carry out biosecurity and disease prevention activities
- Assigning and supervising Biosecurity Team Members
- Establishing a communication system between Team Members and the Team Leader
- Assisting the Biosecurity Group Supervisor with training personnel
- Assisting Biosecurity Team Members with their specific duties and biosecurity policies and procedures
- Ensuring that all personnel follow biosecurity measures and that biosecurity measures are implemented for all people, animals, vehicles, equipment, and other materials entering or leaving the control area at a specific premises
- Working with premises owners and/or managers to create detailed property maps identifying roads, neighboring premises, fences, gates, property access points, and other relevant geographic information
- Ensuring all movements on and off premises are controlled. This may include the following:
  - Assigning Biosecurity Team Members to establish a premises security system or to serve as guards at entrances
  - Preventing the entry of unauthorized people, animals, equipment, or vehicles on to the premises
  - Monitoring the cleaning and disinfection of vehicles prior to exiting the premises
  - Arranging for patrols of boundary fences and repairing fences as necessary
  - Providing daily briefings to security staff on activities and issues related to biosecurity
- Encouraging premises owners and/or managers to establish or upgrade premises biosecurity plans and assisting with the implementation of such plans. For more information, see Appendix B: General On-Farm Biosecurity Measures, Appendix C: Developing a Biosecurity Plan for Producers, and the references at the end of this Guidelines document.
- Ensuring that Biosecurity Team Members work with owners and managers of infected premises to increase biosecurity awareness and ensure compliance with established movement restrictions. In cases where residents leave their property, ensuring that biosecurity and cleaning and disinfection protocols are followed on the premises
- Ensuring that the movement of animals and/or animal products arriving at or leaving the affected premises is closely monitored to guarantee compliance with movement and permit restrictions. In consultation with the Biosecurity Group Supervisor, ensuring compliance with the permit system implemented to facilitate interstate and intrastate movement of animals and animal products
- Verifying that quarantine notices are posted at all premises entrances.
- Establishing a system to identify, monitor, and control individuals entering premises and to prevent the entry of unauthorized individuals. Ensuring that Biosecurity Team Members maintain accurate logs of all personnel, equipment, and vehicles entering and leaving each infected and contact premises
- Reporting all possible biosecurity breaches to the Biosecurity Group Supervisor and immediately notifying the Biosecurity Group Supervisor of any issues or problems

- Providing information and advice to owners and the appropriate officials in order to secure support and acceptance of biosecurity procedures
- Staying current on information related to disease prevention principles and practices
- Preparing briefings and reports for the Biosecurity Group Supervisor

3.1.3 Biosecurity Team Members

Biosecurity Team Members are assigned to work on infected or contact premises and provide front line assistance in containing and controlling a disease outbreak. Biosecurity Team Members may be assigned to premises by either the Biosecurity Team Leader or the Biosecurity Group Supervisor. Biosecurity Team Members usually work on assigned premises with the owner, the owner's family, employees, and visitors.

Following arrival at the ICP and assignment to a Biosecurity Team, Biosecurity Team Members will receive a briefing regarding the nature of the animal health emergency. Specific safety precautions and/or hygiene requirements will be explained before the team enters the premises. This is particularly important if a zoonotic disease is involved. Team members will be supplied with all necessary PPE and safety equipment including respirators, gloves, and eye protection, if necessary. For additional information, see *FAD PReP/NAHEMS Guidelines: Health and Safety (2011); FAD PReP/NAHEMS Guidelines: PPE (2011)* and the Incident Health and Safety Plan (HASP).

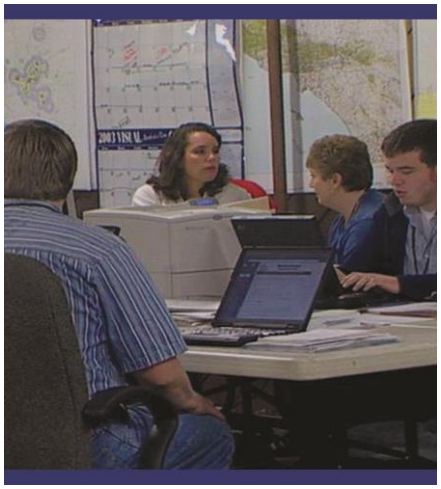
After arriving on the premises, the Biosecurity Team Members assist the Biosecurity Team Leader in completing required tasks including the following:

- Briefing the owner, the owner's family, and premises employees about hazards associated with the animal health emergency, taking special care when the hazard involves a zoonotic disease
- Encouraging the owner to establish and/or upgrade an ongoing premises biosecurity plan. The plan should include the following elements: Cleaning and disinfection (C&D); movement controls for people, including residents, employees and visitors, animals, vehicles, and equipment; isolation of new, returning, or ill animals; assessment of the risks posed by visitors; and plans for dealing with visitor risk during the outbreak. For more information, see Appendix B: General On-Farm Biosecurity Measures, Appendix C: Developing a Biosecurity Plan for Producers, and the references at the end of this Guidelines document
- Increasing biosecurity awareness and ensuring compliance with established movement restrictions. In cases where residents leave their property, ensuring that biosecurity and cleaning and disinfection protocols are followed
- Coordinating activities with teams from other groups (e.g., appraisal, euthanasia, or disposal) that may visit the premises. (These teams should have been briefed previously on hazards)
- Monitoring the disposal, laundering, and cleaning of contaminated materials (e.g., disposable or reusable uniforms, coveralls, shovels, boots, etc.)
- Monitoring the inventory of biosecurity-related supplies on hand (e.g., disinfectants, uniforms, footwear, sprayers, etc.) and notifying the Biosecurity Team Leader of any supply needs

4. DEVELOPING A SITE-SPECIFIC BIOSECURITY PLAN

A site-specific biosecurity plan for the response is developed by the Biosecurity Group Supervisor in consultation with the Safety Officer and approved by the Incident Commander. The implementation and exercise of biosecurity protocols are integral to many response activities. Thus, the site-specific biosecurity plan must recognize and create plans to ensure adequate biosecurity measures are in place for each part of the response. This section describes some of the response activities which would require special biosecurity protocols.

4.1 Fixed Operations



Fixed operations are sites which will be visited by responders multiple times over multiple days. Fixed sites are premises undergoing depopulation, disposal, and decontamination. The Biosecurity Group must work closely with the Premises Quarantine Team in establishing a premises security system and identifying and authorizing the movement of personnel, equipment, vehicles, and animals entering or exiting the premises.

4.2 On-Premises Movements

A biosecurity plan must include protocols for the movement of personnel and equipment between different areas of a single premises, e.g., movements between barns or other facilities on the same premises.

4.3 Mobile Activities

Mobile Activities include surveillance and testing activities conducted by response personnel. These personnel may travel between multiple sites throughout the course of a workday. Biosecurity procedures must be in place to prevent the spread of infectious agents between premises.

4.4 Coordination with Other Groups

The Biosecurity Group works closely with the Quarantine and Movement Control Group and the Cleaning and Disinfection Group to ensure the implementation and enforcement of biosecurity measures in quarantined areas and premises.

For additional information regarding development of a biosecurity plan, see *FAD PReP Standard Operating Procedures (SOP): Biosecurity*.

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6. ACKNOWLEDGEMENTS

The Guidelines: Biosecurity for the Foreign Animal Disease Preparedness and Response Plan/National Animal Health Emergency Management System reflects the efforts of a number of people including USDA APHIS staff members, the Center for Food Security and Public Health at Iowa State University and a wide range of reviewers and subject matter experts.

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7. PHOTO AND ILLUSTRATION CREDITS

Page 2 **(Top)** Aerosol disease transmission. Graphic illustration by: Andrew Kingsbury, Iowa State University
(Bottom) Oral disease transmission. Graphic illustration by: Andrew Kingsbury, Iowa State University

Page 3 **(Top)** Disease transmission through direct contact. Graphic illustration by: Andrew Kingsbury, Iowa State University
(Middle) Disease transmission via a fomite such as a needle and syringe shared between cattle. Graphic illustration by: Andrew Kingsbury, Iowa State University
(Bottom) Disease transmission via a vector such as ticks. Graphic illustration by: Andrew Kingsbury, Iowa State University

Page 4 **(Top)** Various animal species can transmit zoonotic diseases to humans. Graphic illustration by: Andrew Kingsbury, Iowa State University
(Bottom) This is a photograph of various disposable outerwear and PPE. Photo source: Center for Food Security and Public Health, Iowa State University

Page 5 **(Top)** Reusable outerwear should be washable and able to be used in wet and dry situations. Photo source: Tom Chavrolietti, Ohio Aquaculture Association
(Bottom) Photo of responders in PPE restraining and collecting samples from a goat. Photo source: FEMA Center for Domestic Preparedness

Page 6 These responders are putting on Tyvek® suits, boots and gloves prior to contacting animals. Photo source: Jane Galyon, Iowa State University

Page 7 **(Top)** This photo depicts a dirty bin to hold contaminated reusable coveralls. When done, the bin should be sealed to prevent cross-contamination of clean items. Photo source: Danelle Bickett-Weddle, Iowa State University
(Bottom) If you drive through animal production areas you must assure that the tires, wheel wells, and the undercarriage are cleaned and disinfected prior to leaving the premises. Photo source: Carla Huston, Mississippi State University

Page 8 Work zones shown over a farm with the various zones and decontamination corridor labeled. Graphic illustration by: Dani Ausen and Andrew Kingsbury, Iowa State University

Page 9 Work zones shown over a farm with the decontamination corridor and control access points marked. Graphic illustration by: Dani Ausen and Andrew Kingsbury, Iowa State University

Page 11 The Incident Command Structure with the Operations Section and Biosecurity Group Supervisor highlighted. Graphic illustration by: Andrew Kingsbury, Iowa State University

Page 14 A site-specific biosecurity plan for the response must be developed and approved. Photo source: USDA

Page 24 **(Top)** If visitors must enter areas housing animals or have animal contact, it is important that they wear appropriate PPE. Photo source: Danelle Bickett-Weddle, Iowa State University
(Bottom) These pigs are housed in a covered building. One end is closed in with straw bales as an insulator against the cold. However, it is not bird or rodent proof, increasing the chances of the pigs contacting pathogens. Photo source: Alex Ramirez, Iowa State University

Page 25 The beef cows in this photo are separated into two pastures with a road in between them. This prevents fence line contact with other animals. Photo source: Danelle Bickett-Weddle, Iowa State University

Page 26 This is an example sign that can be posted on a farm to help controlling people movement onto the premises in order to better maintain the biosecurity plan. Photo source: Center for Food Security and Public Health

Page 27 **(Top)** Animal identification is an important component of a biosecurity plan. Ear tags can be used to identify livestock. Photo source: Heather Sanchez, Iowa State University

Page 27 **(Middle)** This depicts one method of keeping accurate vaccination and treatment records. Accurate records are very important and can be helpful in the event of a disease outbreak. Photo source: Danelle Bickett-Weddle, Iowa State University

(Bottom) These cattle are raised in an outside lot and are exposed to wildlife, birds, rodents, and insects which have the potential to spread disease. Photo source: Danelle Bickett-Weddle, Iowa State University

Page 28 Low-risk visitors are from urban areas that have no livestock or poultry contact. Photo source: Danelle Bickett-Weddle, Iowa State University

Page 29 Visitors that have recently traveled to other countries also pose a risk. Photo source: iStockphoto.com

Page 30 For premises in close proximity to quarantined areas, policies must be developed and posted describing stricter biosecurity measures for those having animal contact. Graphic illustration by: Clint May, Iowa State University

Glossary

All-In/All-Out Housing
A routine infection-prevention practice in which all animals are removed from an animal housing facility and the building is cleaned and disinfected before new animals are placed in it.

Animal Emergency Response Organization (AERO)
A locally/state-based, nationally coordinated model for responding to animal health emergencies. Utilizes the Incident Command System.

Biocontainment
Measures taken to prevent the spread of disease agents from infected animals to uninfected animals within the same population.

Biosecurity
A series of management practices designed to prevent the introduction of disease agents onto an animal production facility.

Biosecurity Plan
A plan or protocol that reflects biosecurity principles and procedures concerning the movement of personnel, vehicles, and equipment; examination of animals (alive or at necropsy); mass depopulation; and the disposal of animal carcasses, animal products, feed, water, straw, hay, and other materials potentially carrying a disease agent.

Cleaning and Disinfection (C&D)
Practices involving a combination of physical and chemical processes that kill or remove pathogenic microorganisms – a combination that is vital for the eradication of disease.

Closed Flock/Herd
An operation that does not introduce new animals from outside sources. Growth occurs through the addition of offspring born and raised on the operation. This practice decreases the potential for the introduction of new disease agents onto the operation.

Cold Zone – Support Zone (SZ)
This is the "cleanest" work zone with the lowest relative risk of exposure to pathogens and other hazards such as decontamination chemicals. In this zone, personnel are not required to wear PPE; however, facilities for donning PPE before entering other zones are provided. Administrative, clerical, and other support functions are based here. Medical support is provided to personnel in this zone. Facilities for personal needs such as eating, drinking, and bathroom use are provided. Air and surface monitoring is conducted as needed to ensure that the area is free from contamination. Contaminated articles and equipment are prohibited in this area Decontamination activities are also prohibited.

Decontamination (Decon) Corridor
The area between the Hot Zone - Exclusion Zone (EZ) Control Line and the Warm Zone - Contamination Reduction Zone (CRZ) Control Line. Decontamination of personnel and equipment occurs along the corridor with stations for depositing tools, equipment, protective clothing, and other items. The level of contamination should decrease along this corridor from the Hot Zone - Exclusion Zone (EZ) to the Cold Zone - Support Zone (SZ). Emergency response teams enter and exit the Hot Zone - Exclusion Zone **(**EZ) through the access control points at each end of the corridor.

Fomite
An inanimate object or material on which disease-causing agents may be conveyed (e.g., feces, bedding, harness, clothes, vehicle tires).

Hot Zone – Exclusion Zone (EZ)
This high-risk area is where infected animals were housed and is potentially contaminated and considered unsafe. Examples include an area of a farm, local market, or roadside stand. PPE must be worn. Appraisal, depopulation, disposal, and facility cleaning and decontamination of the site and equipment occur in this area. Personnel and equipment enter and exit the Hot Zone through designated access points in the Warm Zone - Contamination Reduction Zone (CRZ).

Isolation
The complete physical separation of animals from those that may be carrying an infectious or contagious disease.

Personal Protective Equipment (PPE)
Equipment used as a barrier between an individual and a hazard that could result in an injury or occupational illness.

Premises
Includes a tract of land and all of its buildings, as well as a separate farm or facility that is maintained by a single set of services and personnel.

Quarantine
To place animals in strict isolation to prevent the spread of disease.

Quarantined Area
During an animal health emergency, areas around infected premises may be placed under quarantine. The geographical region around the infected premises is referred to as the Infected Zone and movement restrictions for susceptible species may be implemented.

Vector
Insects or arachnids capable of transmitting pathogens from an infected animal to another animal, usually through a bite.

Warm Zone – Contamination Reduction Zone (CRZ)
This is a high-risk area due to the potential of exposure to pathogens and chemical disinfectants. All personnel are required to wear full PPE. Entry from the Warm Zone - Contamination Reduction Zone **(**CRZ) to either the Cold Zone - Support Zone (SZ) or Hot Zone - Exclusion Zone (EZ) occurs through designated access points. For workers exiting the Hot Zone - Exclusion Zone (EZ), final decontamination and disinfection of PPE and equipment as well as final doffing of PPE occur in the Decontamination Corridor of the Warm Zone - Contamination Reduction Zone (CRZ). Site-specific protocols for PPE, decontamination and disinfection must be strictly followed.

Zoonotic Disease
Diseases that are transmissible from animals to humans under natural conditions.

Acronyms

AERO
Animal Emergency Response Organization

ASF
African Swine Fever

C & D
Cleaning and Disinfection

CDC
Centers for Disease Control and Prevention

CSF
Classical Swine Fever

END
Exotic Newcastle Disease

FADD
Foreign Animal Disease Diagnostician

FMD
Foot-and-Mouth Disease

HASP
Health and Safety Plan

HCD
Highly Contagious Disease

HPAI
High Pathogenicity Avian Influenza

IC
Incident Commander

ICP
Incident Command Post

ICS
Incident Command System

NAHEMS
National Animal Health Emergency Management System

NAHERC
National Animal Health Emergency Response Corps

OSHA
Occupational Safety and Health Administration

PPE
Personal Protective Equipment

SOP
Standard Operating Procedures

VS
Veterinary Services; a division of APHIS

APPENDIX A: BIOSECURITY DOS AND DON'TS*

Before ENTERING a premises

DO

- Park your vehicle away from site production facilities and/or ensure that your vehicle's tires, wheel wells, and undercarriage have been cleaned with soapy water so they are free of dirt and debris and/or that your vehicle has been taken through a pressure car wash.
- Designate separate "clean" and "dirty" areas in your vehicle. The "clean" area is usually the passenger compartment. The "dirty" area is usually the trunk or cargo area.
- Put on clean coveralls, boots, hat, gloves, and other required apparel. Use only clean equipment and supplies.
- Wash your hands with soap and water.
- Consult with the owner to establish an arbitrary line on the site to demarcate the "clean" side of the premises from the "dirty" side. This will usually be somewhere along the driveway on in the parking area.

DON'T

- Enter a "clean" area on either a premises or vehicle unless you have disposed of or cleaned and disinfected all clothes, footwear, hats, gloves, equipment, supplies, and other sources of pathogen transmission.
- Attempt to disinfect a surface unless it first had been thoroughly cleaned (i.e. it is free of all visible organic material).
- Drive your vehicle onto premises any more than necessary. Use an on-site vehicle for on-site transportation whenever possible.

***Additional biosecurity and cleaning and disinfection procedures are required to address the risks posed by suspected and confirmed foreign animal diseases and serious zoonotic diseases. This includes the creation of work zones for proper entry and exit from a contaminated area.**

Before LEAVING a premises

DO

- Upon returning to the vehicle area, use a brush and an approved disinfectant to thoroughly clean and disinfect all reusable clothing and equipment, including personal items such as jewelry and eyewear. If these items may be harmed by the disinfectant, they may be washed thoroughly in soap and water or, if an acid-susceptible virus is present (e.g., foot and mouth disease virus) dipped in vinegar (acetic acid).
- Clean vehicle exteriors and trailers, including tires, wheel wells, and the undercarriage, with soapy water so they are free of dirt and debris and/or take them through a pressure car wash.
- Place disposable coveralls (turned inside out), boots, and other used items in a plastic bag to leave with the owner on the premises or to transport in the "dirty" area of your vehicle.
- Dispose of disinfectant solution according to label directions.
- Dispose of all plastic garbage bags containing used or contaminated supplies in a manner that prevents exposure to other people or animals.
- Wash your hands with soap and water.
- Clean and/or launder all reusable equipment and clothing.
- At the end of the day, take a shower. Personal hygiene should include shampooing your hair, cleaning under your fingernails, and clearing your respiratory passages by blowing your nose, clearing your throat, expectorating into a sink with running water, and washing your hands with soap and water.

DON'T

- Bring "dirty" paperwork into the clean area of your vehicle
- Visit a second premises before complying with appropriate biosecurity protocol. Follow the incident-specific Biosecurity Plan for guidance on waiting periods between visits to susceptible sites. The waiting period may vary based on the disease, the premises designation, the task assignment, and the level of biosecurity practiced.

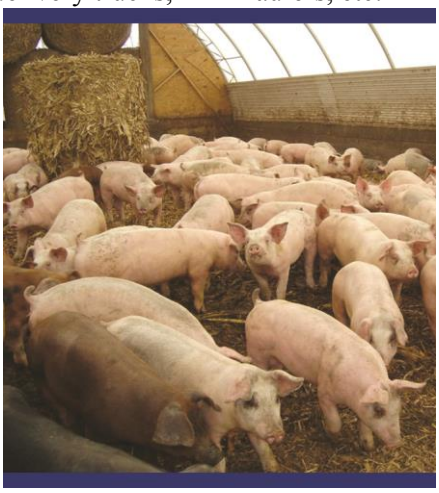
APPENDIX B: GENERAL ON-FARM BIOSECURITY MEASURES

The following is a list of general biosecurity measures applicable to all facilities. This list is provided as guidance on basic biosecurity procedures and can be used to aid in designing biosecurity plans for premises. Note that measures may be added or revised for a particular animal health emergency response or for different types of facilities. Always refer to the Site-Specific Biosecurity SOP developed for biosecurity protocols for a particular animal health response.

Animal Handling and Contact

Regardless of the type of housing, the owner or manager should do the following:

- Regularly inspect susceptible livestock and poultry for signs of disease and discuss any concerns with a veterinarian. If the presence of a highly contagious foreign animal disease is suspected, the veterinarian should report this to the State Animal Health Official or APHIS Area Veterinarian-in-Charge.
- Avoid moving animals off farm while ensuring that their welfare is not compromised.
- Minimize visitor contacts with animals. If visitors must have contact with animals, ensure they follow established biosecurity guidelines and understand the risk they pose to the health of the animals through the potential transmission of pathogens (e.g., via clothing, footwear, vehicles, and equipment or via non-susceptible animals, such as herding dogs).
- Provide a place where people entering animal areas of the facility (visitors, employees, salespeople, family, veterinarians, equipment service people, animal technicians, etc.) can put on and take off boots and coveralls and clean up before and after animal contact.
- When visiting a facility with various age groups of one species in one day, visit the youngest animal group first. Poultry is an exception. Poultry breeding stock should be visited before other commercial birds.
- If travel between premises is necessary, treat each site as a separate biosecurity group, observing biosecurity and disinfection procedures for personal hygiene, clothing, footwear, vehicles, and equipment—both upon arrival and departure.
- Prevent direct contact between groups of domesticated animals and other susceptible livestock.
- Account for the movements of potentially contaminated equipment and animal transport vehicles entering and leaving the premises. For example, renderers' trucks, delivery trucks, milk haulers, etc.
- Maintain a designated area for pick up of dead animals away from animal rearing areas and not in farm vehicle traffic patterns. Animal disposal trucks should be able to access the area without transiting the farm.



Housed Animals

- Under most circumstances, housed susceptible animals are at reduced risk of disease. They should remain in their housing units, if possible.
- Institute biosecurity measures at building entrances.
- Prevent the entry of birds, rodents, and insects into the housing unit.
- Make sure ground water or run-off does not enter the buildings from outside sources.

- Do not move animals into barns or other facilities that have housed infected or potentially infected animals until these buildings have been thoroughly cleaned and disinfected. For more information, see *FAD PReP/NAHEMS Guidelines: Cleaning and Disinfection (2011).*

Animals Reared Outside

If susceptible animals are reared outside a barn or house, or if they must be turned out from a housed environment, the following guidelines may help reduce the risk of disease pathogen transmission:

- Regularly inspect susceptible animals for clinical signs of disease and discuss concerns with a veterinarian.
- Separate groups of animals at a distance adequate to prevent pathogen transmission: avoid nose-to-nose or fence-line contact. (e.g., at least one empty field away from any other stock).
- Do not permit close or direct contact between groups of animals. Consult with neighbors about the use of boundaries or adjoining fields as barriers and check that all fences are secure.
- Do not put animals in pastures that have been grazed by potentially infected animals.
- Make every effort to avoid moving animals off the premises.

Cleaning and Disinfection (C&D)

Cleaning and disinfection (C&D) refers to a combination of physical and chemical processes used to kill or remove pathogenic microorganisms. The combination of both cleaning and disinfection is vital for the protection of animal health and the eradication of disease. In an animal health emergency response, effective C&D minimizes pathogen transmission between premises.

Identification of the disease agent and a thorough understanding of its biological properties and route(s) of transmission are essential to developing an effective C&D plan. Beyond that, emphasis should be placed on adopting the basic microbiological principles of isolating the source of infection and C&D of personnel, supplies, equipment, vehicles, and sites.

Patience and persistent attention to detail are essential to implementing an effective C&D plan and cannot be overemphasized. For example, a key element of C&D is the preliminary cleaning of a surface to remove dirt, debris, and organic material before using disinfectants. Without preliminary cleaning, the effectiveness of the disinfectants in inactivating disease agents will be compromised. For further information, see *FAD PReP/NAHEMS Guidelines: Cleaning and Disinfection (2011).*

The following are some practices which may help reduce the risk of pathogen transmission:

- Clean and disinfect premises, vehicles, equipment, and other materials.
- Dispose of contaminated materials that cannot be adequately cleaned and disinfected.
- Avoid sharing equipment between operations or between functions in an operation (i.e., not using the same equipment to handle both feed and manure). If sharing equipment is unavoidable, clean and disinfect equipment between uses.

Movement Controls

Controlling movements of people, animals, vehicles, and equipment is critical to the maintenance of biosecurity. For day-to-day operations, practices involving movement controls include maintaining a closed herd or flock, identifying all animals, keeping accurate records, and protecting animals from contact with wildlife.

Movement of people on and off the property should be governed by strict biosecurity protocols. Ideally, the premises on which animals are housed should be fenced and have a single gated and locked entrance. Other means of controlling access to the premises include

- placing a guard at facility entrances;
- locking unguarded entrances; and
- patrolling and repairing boundary fences.

During an animal health emergency, quarantine and movement controls may be established as part of the response. Other means of controlling movement include:

Maintain a Closed Herd/Flock

A "closed" herd or flock is an operation that does not introduce new animals from outside sources. Growth occurs through the addition of offspring born and raised on the operation. This practice decreases the potential for the introduction of new disease agents onto the operation. Semen and embryos used on the operation should be from healthy animals and healthy herds.

Isolation of New and Returning Animals

Introducing new animals onto an operation or bringing animals back onto an operation poses the risk of introducing new infectious agents into the flock or herd. Reduce the risk of disease introduction by purchasing animals from high health status herds or flocks and quarantining new or returning animals prior to introducing them into the flock or herd. Where possible, operations should consider using all-in/all-out housing to avoid mixing animals of different age groups and disease susceptibility.

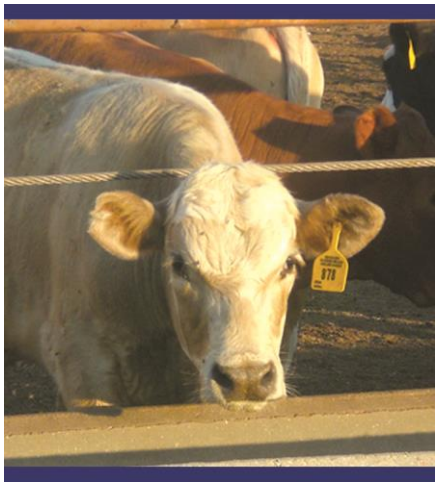
Isolate newly purchased animals or returning animals for at least 30 days. This can be accomplished by confining the new animals to pens that do not allow contact with other animals, their excretions, or secretions. If possible, dedicate specific employees to work only with these animals. If that is not possible, employees working with animals in isolation should, at a minimum, use separate coveralls and boots while caring for the animals. Individuals should care for animals in isolation last and should not work with the main herd until after showering and donning clean clothing and boots.

In designing on-farm isolation areas, be sure that runoff does not come into contact with other animals and their feed and water supplies. Do not share feed, water, or equipment between animals in isolation and the resident animals.

Vaccinate all animals to match the herd vaccination pattern. Vaccinate newly purchased animals within the first week of the 30-day isolation period to begin the process of matching their vaccination status to the home herd. This will allow at least 21 days for the new animal(s) to develop adequate protective antibodies before joining the main herd.

During the isolation period, the animals can be tested for diseases of concern. New animals should not be allowed contact with the herd until negative test results are received.

Identify Animals



Identification of domesticated poultry and livestock is essential to the effective implementation of biosecurity measures. Animal identification programs:

- Enable producers to keep track of individual animals or groups of animals and their movements on and off the premises;
- Can be used to identify animals which may have been exposed to disease agents or infected animals;
- Help producers maintain accurate and complete health, vaccination, and production records; and
- Can be used in trace-forward or trace-back epidemiology efforts to demonstrate lack of contact between infected animals and particular premises or facilities wishing to maintain continuity of business and a return to business as soon as possible.

Keep Records

During a disease outbreak, access to complete and accurate records can facilitate tracing of individual animals or groups of animals to determine the possible source and spread of a disease. Newly purchased domesticated animals and other livestock should be accompanied with health records that include a vaccination history. Information from records can be useful during an outbreak to trace domesticated animals and livestock to determine the likelihood of exposure to disease agents. Other aspects of a recordkeeping system can help producers to keep track of feed, equipment, and other supplies brought onto the premises. It is also important to record the arrival and departure of authorized personnel such as employees and responders.

Protect Animals from Wildlife

Wildlife, rodents, birds, and insects are very mobile and can spread disease agents on a premises. A pest control plan is an essential element of a good biosecurity plan. Owners can protect their animals from contact with wildlife, rodents, and birds by repairing animal housing facilities and cleaning up grain spills and debris on the premises. In many instances, producers may also need a wildlife management control plan. Wildlife management control plans must take into account local, State and Federal laws and regulations.

Visitors

In the event of an animal health emergency, the risk posed by visitors increases, especially if the premises is within or near the Control Area. A log of all personnel entering and leaving the premises is kept as part of the complete record. In developing the site-specific biosecurity plan, the Biosecurity Group Supervisor should consult with the Quarantine and Movement Control Group to establish policies for identifying and controlling access to quarantined areas and premises.

The following is a general discussion of risks posed by visitors to animal production facilities:

- Social visitors, veterinarians, equipment service technicians, salespeople, and delivery people are an example of the visitors a facility may have on a regular basis. The degree of risk can be classified as low, medium, or high, depending on the type of visitor and amount of animal contact.
- In the event of an animal health emergency, visits to the premises should be limited to essential personnel only; all visitors should be considered high risk.
- Producers should develop biosecurity protocols for all visitors and strictly enforce them.
- Producers should restrict visitor contact with animals as much as possible.

Visitor Risk Levels – Normal Conditions

This section describes low-, medium-, and high-risk visitors under normal conditions. In a highly contagious foreign animal disease outbreak, consider all visitors high. If the premises is quarantined, only essential personnel will be allowed to entry the premises. For specific biosecurity measures for each category of visitors, refer to the *FAD PReP SOP: Biosecurity*.

Low-Risk Visitors
Low-risk visitors include visitors from urban areas with no livestock or poultry contacts prior to visit and other individuals with no recent livestock or poultry contacts prior to the visit.

Biosecurity measures

1. Park vehicles on gravel or paved areas a minimum of 500 feet away from animal production areas. Close vehicle windows.
2. Do not allow visitors' vehicles on premises without being cleaned (tires, wheel wells, and undercarriage) prior to entry and immediately after leaving premises.
3. All visitors entering animal areas should wear clean disposable or reusable protective clothing (e.g., coveralls, hats, gloves) and clean disposable or reusable boots. Soiled footwear must be cleaned and disinfected before entry onto premises. See *FAD PReP SOP: Cleaning and Disinfection*.
4. Visitors should wash their hands with soap and water before entering and after leaving animal areas.

Medium-Risk Visitors
Medium-risk visitors include salespeople, equipment repairpersons, and delivery people. They may have limited animal contact due to the location of worksites on premises.

Biosecurity measures
In addition to measures 1-4:

5. Clean and disinfect equipment after each use.
6. After use, place disposable coveralls and boots into a clean plastic garbage bag and leave at premises for disposal.
7. After use, place reusable coveralls and boots into a clean plastic garbage bag or other container for cleaning and disinfection.

High-Risk Visitors
High-risk visitors include veterinarians, artificial insemination technicians, animal haulers, and anyone with close contact to animals. These individuals generally have regular close contact with animals, their excretions, and secretions.

Biosecurity Measures

In addition to measures 1-7:

8. Vehicle exteriors and trailers (including tires, wheel wells, and undercarriages) should be clean and free from any visible organic debris before entering premises.
9. Keep vehicle interiors clean (use rubber or plastic floor mats and other easily cleaned items).
10. Identify and maintain separate "clean" and "dirty" areas in vehicles.
11. Upon exiting the vehicle onto the premises, put on clean disposable or reusable outerwear (coveralls, boots, and jackets) and clean disposable or reusable boots.
12. Wear clean disposable plastic sleeves or gloves whenever you may come in contact with animals' bodily fluids, tissues, or excrement (during necropsy, births, etc.).
13. Make sure instruments are clean and disinfected prior to use. Use disposable needles and syringes wherever possible.
14. Plan ahead to bring all necessary items to the animals to avoid repeated trips to the vehicle for supplies.
15. Do not return to the "clean" area of the vehicle until all dirty outerwear, gloves, and boots have been removed and hands have been washed.

Exit Procedures for all visitors – when leaving the premises and before entering another premises.

1. Check drainage routes to ensure that water used for cleaning and disinfection does not run off the premises, creating a potential source of contamination.
2. Follow the two-step cleaning and disinfection protocols as described in the *FAD PReP SOP: Cleaning and Disinfection*. Clean first and then disinfect.
3. Remove dirt, debris, and organic material from the vehicle, tires, undercarriage, and wheel wells using warm soapy water or an automatic car wash. Apply an approved disinfectant and allow appropriate contact time.
4. Remove all dirty disposable clothing items, place them in a plastic garbage bag, and leave them on premises with the owner or double bag the items, place them in the "dirty" area of the vehicle, and dispose of them according to incident procedures.
5. Scrub the bottoms of boots (disposable or reusable) to remove all dirt and debris. Then disinfect the boots with an approved disinfectant. Discard disposable items appropriately.
6. Wash hands with soap and warm water before entering vehicle.
7. Follow vector control procedures as indicated by the Vector Control Officer for the incident.

At the end of the day

1. Dispose of all plastic garbage bags containing soiled/contaminated items in the manner approved for such items.
2. Clean and/or launder all reusable clothing and equipment.
3. Take a shower. Shampoo hair, clean under fingernails, clear respiratory passages by blowing one's nose and clearing one's throat and expectorating into a sink with running water. Finish by washing hands with soap and warm water again.

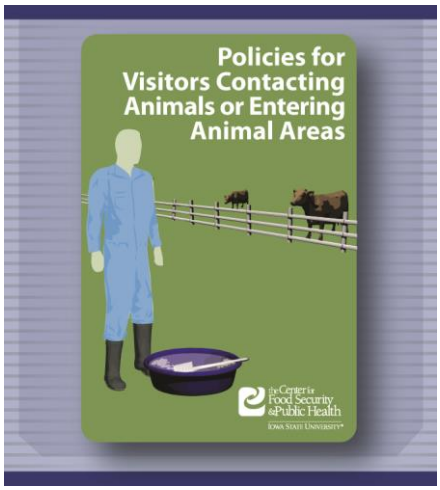
Visitors with History of Foreign Travel

Restrict access by individuals who have recently been to a country known to have highly contagious foreign animal diseases. Contact with susceptible species should only be allowed when the visitor no longer presents a risk for disease transmission.

Owners should maintain a visitor log book, requiring all visitors to sign in

and indicate the purpose of the visit as well as any history of foreign travel. In the event the disease agent of concern is zoonotic, stricter biosecurity measures and additional cleaning and disinfection procedures, including the use of PPE, may be necessary to address the risks posed by zoonotic diseases.

Visitor Risk During an Outbreak



In an outbreak situation, consider all visitors as high-risk visitors, especially if the premises is located in a quarantined area. As a general rule, the closer a premises is to the infected premises, the greater the risk and the greater the need for strict biosecurity and C&D procedures.

When an animal health emergency is related to the outbreak of an infectious disease, officials will establish quarantined areas around the infected premises or "hot spots" within a geographic area. Owners of premises with livestock will be informed whether their premises are included in a quarantined zone or restricted area. Premises located within the emergency quarantined area are subject to movement controls. Only essential personnel will be allowed to enter quarantined premises. Once the quarantine status of the premises is determined, premises personnel can implement the appropriate measures.

Visitor Biosecurity Outside a Quarantined Area

If a disease outbreak constituting an animal health emergency occurs within the United States, and the premises is located *outside* the quarantined area, the individuals responsible for the premises should ensure that visitors observe biosecurity and C&D measures commensurate with the level of perceived risk.

In many situations, premises adjacent to the border of the quarantined area will have a greater perceived risk than those located further from the quarantined area. Therefore, premises nearer to the quarantined area would probably institute stricter biosecurity measures than operations hundreds or thousands of miles away.

As a general rule, many individuals responsible for premises outside a quarantined area during an outbreak may choose to ensure that visitors adhere to either the medium- or high-risk categories (or a combination thereof) of visitor biosecurity. Additionally, many veterinary practitioners are more comfortable making multiple farm visits outside the quarantined area as long as they faithfully observe the measures specified for high-risk visitors.

Visitor Biosecurity Within a Quarantined Area

If a premises is located within the animal health emergency quarantined area, all visitors should be considered high-risk. Premises visits must be kept to a minimum. Only essential personnel will be allowed to enter a quarantined premises, including a limited number of authorized response personnel. Veterinary practitioners should limit their visits to one premises per day. For specific biosecurity measures, refer to the *FAD PReP SOP: Biosecurity*.

The Biosecurity Group Supervisor, Team Leader, and Team Members will work with any personnel allowed on the premises to ensure that highly rigorous biosecurity and C&D measures are observed. These procedures include the following:

- C&D the interior and exterior of all vehicles and trailers immediately prior to arrival and immediately after departure. Vehicle interiors must be clean and equipped with easily removable rubber floor mats. At a minimum, vehicle and trailer exteriors – including tires, wheel wells, and undercarriages – should be cleaned with soapy water immediately prior to arrival and immediately after departure.
- Check the drainage of the premises to ensure that used disinfectant and water used for C&D do not flow off the premises or into water sources such as lakes, creeks, or rivers.

- Only vehicles that are clean and free of dirt, debris, and organic material should be allowed on the premises.
- Park vehicles on graveled, paved, or concrete areas a minimum of 500 feet from the animal production area to minimize contact with soil, mud, or manure. Keep vehicle windows closed.
- Identify and maintain a "clean" area in the vehicle (usually the passenger area or compartment). The "clean" area must be separate from a "dirty" area of the vehicle, usually the cargo area of a truck, the trunk of a car, or the back of a station wagon.
- Visiting personnel should bring the necessary clothing, equipment, and supplies for visits and arrange to have a supply of water to be used for cleaning available near the vehicle parking area.
- Before arriving for a premises visit, personnel should place the clean clothing, equipment, and supplies in the designated "clean" area of the vehicle.
- Immediately upon exiting the vehicle at each premises, put on clean disposable or reusable outerwear (e.g., coveralls, coats, and jackets) and clean disposable or rubber boots.
- All visitors entering the premises must wear clean disposable or reusable protective clothing (e.g., coveralls, hats, gloves, and boots) and clean disposable or reusable footwear. If footwear is soiled, it will need to be cleaned and disinfected. *See FAD PReP SOP: Cleaning and Disinfection* before entry onto the premises.
- After the visitor exits the vehicle, biosecurity personnel should immediately consult with him or her to designate an arbitrary line demarcating a "clean" side (on the vehicular side of the line) and a "dirty" side (on the premises side of the line).
- Visitors should wash their hands with soap and water before entering and after leaving the premises to avoid transmitting disease agents from person to person or to animals.
- Clean, disposable plastic sleeves and/or gloves must be worn whenever direct contact with animals' bodily fluids, tissues, or excrement will occur (e.g., births, inseminations, postmortems, or butchering). Ensure that instruments and equipment such as dehorners, castrators, and syringes are sterile before use. Disposable needles and syringes should be used whenever possible and left at the site.
- Clean and disinfect all equipment after each use.
- Once entering the premises, a visitor should be considered "dirty" and should not go into the "clean" area of the vehicle (e.g., to replace equipment or supplies) unless he or she has disposed of or cleaned and disinfected exposed clothes, footwear, hats, gloves, equipment, supplies, and any other potential sources of pathogen transmission.

Visitors should observe the following exit procedures before leaving the premises:

- Using soapy water, remove dirt, debris, and organic material from the vehicle and trailer tires, wheel wells, and undercarriage. In addition, the vehicle should be taken through a car wash with pressure washers soon after leaving the premises if at all possible.
- Use a brush and approved disinfectant solution to clean and disinfect all equipment thoroughly—including personal items such as eyewear and jewelry. If these items are harmed by disinfectant, they may be washed thoroughly with soap and water or—if an acid-susceptible virus such as foot-and-mouth disease is involved—dipped in vinegar (acetic acid). See *FAD PReP SOP: Cleaning and Disinfection*.
- Follow guidance provided by the Vector Control Group Leader regarding pest control measures related to vehicle biosecurity.
- Remove soiled reusable coveralls so that they are inside out, place them in plastic garbage bags or another suitable sealed container, and put them in a "dirty" area of the vehicle along with other soiled reusable clothing for cleaning and disinfection.

- Place all disposable "dirty" items (e.g., disposable coveralls, boots, and supplies) in a plastic garbage bag to be left on the premises with the owner for disposal. If this is impossible, place the plastic bag in the "dirty" area of the vehicle and dispose of it in a manner that prevents animal exposure to the items.
- Scrub the bottoms of soiled rubber boots with a brush to remove all dirt or debris. Clean and disinfect the boots with an approved disinfectant.
- Dispose of the disinfectant solution according to the label instructions.

At the end of the last visit of the day, visitors should do the following:

- Dispose of all plastic garbage bags containing soiled supplies in a manner that prevents exposure to other people or animals.
- Clean and/or launder all reusable clothing and equipment.
- Take a shower. Personal hygiene should include shampooing one's hair, cleaning under one's fingernails, and "clearing" respiratory passages by blowing one's nose and clearing one's throat, followed by expectorating into a sink with running water. Hands should be washed with soap and water.

APPENDIX C: DEVELOPING A BIOSECURITY PLAN FOR PRODUCERS

One of the roles of a Biosecurity Team Member is to assist producers and owners in establishing or upgrading biosecurity plans on their premises. The previous section provided a brief overview of the process involved in developing a basic biosecurity plan. More detailed information can be found in the References included at the end of these Guidelines.

A good biosecurity plan is important both for the maintenance of livestock health and for the control and eradication of disease during an animal health emergency. In either case, biosecurity measures are aimed at keeping new disease agents out of livestock and poultry populations and keeping these populations disease free.

Risk Assessment

Development of a biosecurity plan begins by assessing biosecurity risks. Begin by identifying and prioritizing the pathogenic agents of greatest concern to the facility.

Once the disease agents of concern for the facility are identified, become familiar with their pathogenesis, ecology, and epidemiology, paying special attention to factors such as routes of transmission, susceptible species and age groups, and environmental factors favoring transmission. Conduct an assessment of the facility to understand how facility features such as the layout, traffic patterns, geography, and staffing can increase the risk of disease transmission.

Managing Biosecurity Risks

The potential risk of exposure to pathogenic agents can be managed through the use of biosecurity measures to reduce the risk of disease introduction and transmission. By understanding the routes of disease transmission and targeting biosecurity measures to those particular routes of transmission, a biosecurity plan effective against multiple disease agents can be developed. A number of general biosecurity measures were described in Appendix B: General On-Farm Biosecurity Measures.

Risk Communication

In order for a biosecurity plan to be effective, the plan must be communicated to everyone involved in the operation. The owner, producer, managers, employees, and family members must all be informed of the plan and how to implement biosecurity measures in their daily operations. A biosecurity plan's effectiveness at preventing disease is only as good as the efforts of the people using it.