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Site Visits: Biosecurity Practices for Professionals Working in Animal Agriculture

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Biosecurity: The More You Know

Biosecurity practices prevent the introduction or spread of harmful pathogens into a healthy population of livestock or poultry. Biosecurity practices must become part of a routine to avoid such possibilities. Whether occasionally or daily, conducting site visits increases the risk of spreading pathogens from location to location, particularly when multiple livestock or poultry operations are visited.

Professionals work to protect and support the animal agriculture industry and communities. They include animal health professionals, Extension educators, first responders, agricultural sales representatives and any other professional who works with livestock or poultry.

When visiting livestock or poultry operations, practice proper biosecurity techniques to safeguard the public. This demonstrates an understanding of animal diseases and their threat to the industry while showing respect for public safety and personal livelihood. As a professional, whether delivering feed, collecting feed or specimen samples, responding to an animal emergency or simply visiting a client, it is your obligation and responsibility to lead by example.

This resource helps you, the professional, prepare for safe livestock and poultry site visits and engage in conversations about biosecurity.

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How Pathogens Spread

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During the pre-visit conversation, remind or educate your client about the ways pathogens can spread. Pathogen spread can be airborne or physically moved from direct contact with animals, their secretions (e.g., urine, manure) or surfaces. Direct contact also may include soil, water, tools, equipment and vehicles.

Some pathogens cause diseases that warrant biosecurity practices. These diseases include but are not limited to:

- Avian Influenza
- Bovine Viral Diarrhea (BVD)
- Brucellosis
- Diarrheal pathogens
- E. coli
- Infectious bovine rhinotracheitis (IBR)
- Johne's Disease
- Mastitis
- Mycoplasma pneumonia
- Arthritis
- Porcine epidemic diarrhea virus (PEDV)
- Pseudorabies virus
- Salmonella
- Scours
- Transmissible gastroenteritis (TGE)

Biosecurity: Before You Go to the Site

Plan Ahead

Plan ahead before preparing to enter a site with livestock or poultry.

- Think about how a pathogen (a bacterium, virus or other microorganism that can cause disease) could enter and spread at a site and how to reduce those threats.
 - For example, are you delivering feed to your next client when your feed truck has been exposed to feces from other livestock? If so, you may be carrying a pathogen load on your feed truck tires that could spread to the next client's animals.
- Have a discussion with the owner or site contact before scheduling a visit.
- Learn more about the business and determine what, if any, biosecurity practices are in place.
- If a site visit is warranted, preparation starts with considering your clothing, especially footwear, as well as having personal protective equipment (PPE) prepared for your site visit.
- If you are asked to view and identify causes of death in animals, direct the individual to contact their veterinarian.
 - Only qualified professionals should come in contact with dead animals. If you are not trained to respond to these situations, recommend the individual contact their veterinarian.

Communicating With Your Site Contact

When contacting a client to schedule a visit, ask if biosecurity protocols are in place. Biosecurity conversations can go well with consideration and preparation. The appropriate approach, tone and communication style show you care about the health of their livestock or poultry.

A pre-visit conversation with the site contact should prevent the unintentional spread of harmful pathogens from operation to operation, especially if more than one site is visited in a day. To prepare for the site visit, ask standard questions to learn health information, production history and other details for determining pathogen risk. Examples of questions to ask prior to making an on-site visit include:

- What type of animals do you have and how many?
 - What is your production model? Examples include seedstock, cow/calf, backgrounding, feedlot, exhibition, hobby, etc.
 - This question helps identify what is important to the producer. For example, a bull calf may be more important to a seedstock producer who sells yearling bulls versus a producer in a cow/calf setting.
- How long have you owned the animals?
- If you have purchased animals, where did they come from and were you able to quarantine them from your main herd or flock?
- How often do you see your animals?
 - This question addresses animals grazing on pasture.
- Have you noticed any problems or health-related issues with your animals?
 - If yes, ask for additional details to guide your decisionmaking.

When scheduling a site visit, be honest by sharing if you have your own livestock or poultry or have been in contact with other animals. This indicates you recognize the potential for unintentional pathogens and disease transmission. Sharing this information may reduce anxiety and presents a positive intent to prioritize the health and safety of the operation. Figure 2 is an example of a conversation flowchart you can use to guide your pre-visit conversation.

Only qualified professionals should come in contact with dead animals. If you are not trained to respond to these situations, recommend the individual contact their veterinarian.



Biosecurity limits the risk of spreading a pathogen where one currently does not exist.

Plan Your Visit: Risk Assessment

Determine whether to visit based on the operation's situation and the level of need for your profession to be there. As part of the planning process, list the places you intend to visit each day and the objective for each (e.g., collecting feed samples, water samples, hay samples, etc.). Knowing why you are going determines what PPE will be needed, what protocols to follow and if the visit is even warranted.

Let the site contact know if you have been to other livestock or poultry operations. If you will be visiting additional locations that day, there may be a restricted entry interval at the next site.

For example:

- A swine producer may say no contact with their herd within a certain number of hours or days after a visit to another swine operation.
- Poultry producers may not want individuals on their site if they have been to another poultry operation that day or a certain number of days before.

The ideal situation is visiting no more than one site per day. Realistically, this may not be possible, making strong biosecurity guidelines necessary. If multiple site visits are necessary, sort the sites, including pastures and rangeland, from low risk to high risk. However, a planned order may change based on conversations with site contacts.

- Learn the layout of the operation and if there is a specific entrance or route for conducting a site visit.
- Some sites provide PPE to visitors. Always have PPE ready for occasions where PPE is not provided by the site contact. Let the site contact know what PPE you will be wearing so they are not offended or surprised when you arrive to the site wearing PPE.
- Have PPE organized and prepared before traveling to the site. See Table 1 for suggestions.
- After the pre-visit conversation, if you have concerns about visiting the site, ask the site contact if they will meet off-site.

Pack Your PPE and Field Supplies Before Heading Out

Not suspecting pathogens does not mean none are present, therefore some PPE should be worn at every site. For example, wear a new pair of boot covers at each visit.

Selecting Personal Protective Equipment (PPE)

Table 1 is a checklist of items to consider carrying in a PPE travel kit. The PPE needed will depend on the purpose of the visit and site conditions. Some of the PPE listed, such as Tyvek suits, masks and respirators, will only be used if required at the operation or when responding to a disease outbreak. PPE should not be porous or textured, as such items can carry organic material, such as manure or soil, which can harbor pathogens that cannot be removed or disinfected. Also, have cleaning supplies and disinfectant available for boots and other reusable items, such as tools.

Donning and Doffing PPE

Donning is the act of putting on PPE. A series of steps to properly put on PPE ensures the equipment is worn to provide the best protection before entering livestock or poultry sites.

Doffing refers to taking off used PPE. If PPE is not correctly doffed, the risk of passing pathogens from manure, blood, fluids and other potentially infectious material increases, as it could be transferred to others and/or the next site visited.

If you are visiting a site with a known animal disease outbreak, refer to "Select Animal Disease Personal Protective Equipment Chart," (NDSU Extension V2129). For more information about donning and doffing refer to "Personal Protective Equipment (PPE) Donning and Doffing Guidelines for On-Site Animal Disease Outbreaks," (NDSU Extension V2242).

PPE is the last line of defense for keeping the site, the animals and you protected from harmful pathogens. Taking care to properly select, don, doff, dispose of and clean PPE can prevent the spread of disease and protect the farms and ranches of those you serve.

Table 1. Suggested PPE Travel Kit Supply Items HEAD

Hood / hair covering

Earplugs

Protective eyewear

* If using a disposable face shield, goggles may be unnecessary.

Masks / respirator(s)

Disposable face shields

TORSO

Tyvek suits

LIMBS/EXTREMETIES

Nonpermeable gloves (e.g., nitrile)

Rubber boots (easily washed and disinfected)

Disposable boot covers

ACCESSORIES

Soap

Water

Scrub brush

Disinfectant – "Select Animal Diseases Disinfectant Chart" (NDSU Extension V2128) lists types, concentrations and contact time. *Avoid home remedies.*

Isopropyl alcohol

Bucket(s) – stainless steel recommended (not porous)

Garbage bags

Demorstoweld

Paper towels

Tape (painters, masking or duct) for tapinggloves, zippers and boots to Tyvek or clothing

Sharpie or other permanent marker

Clipboard(s)

Paper

Pencil or pen

Always wear disposable boot covers on site visits.

Biosecurity: At the Site

You may be directed to park in a designated clean zone for donning your PPE. If not directed, take the conservative approach and park on the road or down a driveway assuming your vehicle is "dirty" contaminated with a pathogen load. Next, take the PPE with you and walk to the site. At that location, establish a line of demarcation that designates an uncontaminated clean side and a contaminated dirty side for donning and doffing your PPE. At your destination, point out that PPE is part of your job to keep their operation safe, as well as others. If you arrive and are met with the unexpected, such as a requested animal visit during an agronomy or horticulture consultation, return to your vehicle for appropriate PPE before accommodating that request.

Biosecurity: Leaving the Site

Before leaving the site, doff the PPE at your line of demarcation. Assume PPE and equipment are contaminated. Discard disposable PPE in a trash bag or bin. Clean and sanitize reusable PPE and equipment to avoid possibly spreading pathogens to your next site.

To doff PPE, remove all PPE items inside-out by rolling them into a bundle as you remove it.

- Remove disposable boot covers or reusable boots first (while wearing gloves).
- Remove gloves, one at a time, only touching the inside of the gloves with your bare hands.
- Place the disposable items in a trash bag and dispose in a trash bin. If reusable, carefully take items home in a trash bag to thoroughly wash them.
- After doffing, wash your hands with warm, soapy water. If washing isn't possible, wipe with alcohol wipes or use hand sanitizer.

For more details see "Personal Protective Equipment (PPE) Donning and Doffing Guidelines for On-Site Animal Disease Outbreaks," (NDSU Extension V2242).

For professionals who drive onto a site, the vehicle must be free of debris, such as manure and mud, before arriving at your next site visit to prevent the vehicle from transferring pathogens from one site to another.

Thank your site contact and ask where you may leave your bag of discarded PPE on their property or confirm the predetermined on-site disposal location. Be prepared if the site contact does not want dirty PPE left at their site. In this case, bag it, place it in your vehicle and dispose in a trash bin.









Cleaning, Sanitizing and Disinfecting

Clean, sanitize and disinfect reusable PPE and equipment. Different cleaning processes vary in their degree of pathogen destruction. The images in Figure 3 compare the soles of footwear and the effectiveness of three cleaning methods. Choose the most effective method and product. Figure 4 describes the level of effectiveness from cleaning to sterilizing.

> For effective sanitizing and disinfecting results, clean all surfaces first.

Figure 3. Demonstration of bacteria cultured from boots with smooth and patterned soles. 1 = dirty, 2 = washed with water, 3 = disinfected. Note that patterned-soled boots are more difficult to disinfect effectively and may still harbor bacteria. Photo courtesy of ILVO-UGent.



CLEANING

Figure 4. Levels of destruction. Adapted from "Disinfection 101" from The Center for Food Security and Public Health, Iowa State University College of Veterinary Medicine.

Cleaning involves the physical removal of visible contamination from surfaces. Soaps and detergents bind to oils, soil and organic material so it can be rinsed away. Some cleaners can disrupt the lipid components (e.g., cell membrane or viral envelope) of certain pathogens.

SANITIZING

Sanitizing significantly reduces bacterial contamination on surfaces to levels considered safe from a public health standpoint. It does not eliminate all microorganisms. Sanitizers are most commonly used for food contact surfaces.

DISINFECTION

Disinfection destroys or irreversibly inactivates most pathogens (e.g., bacteria, viruses and fungi) on surfaces (i.e., inanimate objects). It is generally not effective against bacterial spores. Efficacy will vary with disinfectant product or method.

STERILIZATION

Sterilization destroys or eliminates all forms of microbial life, including bacterial spores. This involves the use of higher levels of physical (e.g., extreme heat) or chemical (liquid or gas sterilants) processes and is generally used for medical devices/equipment. Between site visits, clean then disinfect reusable equipment using a guideline in Figure 5. Make these solutions daily with fresh water. You can buy premixed products with the active ingredient sodium hypochlorite (bleach) or hydrogen peroxide. Always read the manufacturers label for proper use.

This information is based on site visits where there is no known pathogen risk. An outbreak would require more rigorous cleaning and disinfecting. For disinfecting information for various pathogens, visit "Select Animal Diseases Disinfectant Chart" (NDSU V2128) or the USDA APHIS website for comprehensive information.

Figure 5. Simple bleach and hydrogen peroxide dilutions. Adapted from "Disinfection 101: Key Principles of Cleaning and Disinfection for Animal Settings." The Center for Food Security and Public Health, Iowa State University College of Veterinary Medicine, 2023

Bleach Solution

USE	MEASUREMENT (bleach concentrate/ water)	CONTACT TIME REQUIRED
Sanitizing	1 qt / 1 gallon	5 minutes
Disinfecting	1 qt / 1 gallon	15 minutes

Hydrogen Peroxide

USE	MEASUREMENT (hydrogen peroxide concentrate/ water)	CONTACT TIME REQUIRED	
Sanitizing	1 oz / 1 gallon	3 minutes	
Disinfecting	2 oz / 1 gallon	5 minutes	

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Select Animal Disease Disinfectant Chart

Heidi Pecoraro, Director and Veterinary Pathologist, NDSU Veterinary Diagnostic Laboratory

Disease	Animal	Disinfectant*	Contact Time
African/Classical Swine Fever	Domestic and feral pigs	10% Bleach**	15 minutes non-porous/30 minutes porous surfaces
		6% Hydrogen Peroxide	5 minutes
		1% Virkon-S	10 minutes
Anthrax	Most mammals	10% Bleach ONLY	10 minutes minimum – soak tools overnight prior to sterilizing
Avian/Swine Influenza Virus	Birds and mammals	10% Bleach	5 minutes
		6% Hydrogen Peroxide	1 minute
		1% Virkon-S	10 minutes
Foot and Mouth Disease Virus	Cattle, pigs, sheep, goats	10% Bleach	15 minutes non-porous/30 minutes porous surfaces
		6% Hydrogen Peroxide	10 minutes
		1% Virkon-S	10 minutes
Newcastle Disease Virus	Birds	10% Bleach	5 minutes
		6% Hydrogen Peroxide	1 minute
		1% Virkon-S	10 minutes
Vesicular Stomatitis Virus	Horses, donkeys, mules, cattle, pigs, humans	10% Bleach	5 minutes
		6% Hydrogen Peroxide	1 minute
		1% Virkon-S	10 minutes

Surfaces need to be cleaned of organic matter (e.g., soil, feces, blood, tissue) prior to disinfection

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** 10% bleach solution must be made fresh daily and kept out of direct sunlight

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Wrapping Up

Biosecurity looks different for each species and each producer's operation. As a professional in agriculture, it is the responsibility of each individual to follow best practices and procedures when making farm site visits.

Your advance conversations allow you to determine the safety or necessity of the site visit as you plan where you will be throughout the day and week. When people perceive they are being addressed with dignity and respect, the site visit will be more engaging, productive and safe.



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