# Biosecurity

#### Introduction

aintaining the highest possible animal health status is critical to the sustainability and profitability of producers of animal agricultural products. As consumers become more educated and have an ever-increasing demand for high quality, safe, humanely and often sustainablyproduced animal products, programs to monitor and certify the health and welfare of production animals are increasingly being implemented in all segments of animal agriculture to assure that these goals are being met. Access to premium markets will increasingly depend on the ability of producers to demonstrate freedom from serious animal diseases and pests. This assurance is made possible through the development of optimum biosecurity programs. Processor requirements, quality assurance programs, and retaining market access and competitiveness will demand that such biosecurity programs be implemented. In addition, on-farm biosecurity can control production limiting diseases that currently cost livestock producers millions of dollars each year.

Farm-Level Biosecurity Measures Due to Disease Outbreak





Most of the reasons for implementing a biosecurity program are self-evident and include maintenance of animal health, welfare, and productivity, as well as the reduction of disease transmission and negative economic impacts caused by disease incursions. Other reasons may not be as apparent, but are nonetheless critical to consider. A strong biosecurity program can protect the health of the people working with and consuming the products of the animals, allow for the continued movement of animals, provide for protection of ancillary agricultural industries (such as feed suppliers, veterinarians, nutritionists, and others), as well as assist in export and domestic marketing. Another reason for implementation of strict biosecurity



Creative Commons

practices is that such practices can help maintain healthy ecosystems and therefore help support agricultural sustainability.

Biosecurity is a holistic concept of direct relevance to food safety and the protection of the environment. Biosecurity refers to any activity taken to keep disease out of an area – whether that be cleaning your boots before entering a farm, building a new barn, repairing a fence, or developing a vaccination program – the goal always being to maintain the health of animals on a livestock facility.

#### Components of a Biosecurity Plan

One way to approach development of a biosecurity plan is to divide the plan into five major components: Assessment, Resistance, Isolation, Traffic control, and Sanitation. When managed properly, these five components will allow the biosecurity objectives of the livestock producer to be met. These components are discussed below:

<u>Assessment</u> The first step is to assess the potential for disease organisms to enter a livestock herd. A list of specific diseases which may affect the herd in question should be constructed. For each specific disease of concern, you should evaluate the likelihood of herd exposure, potential impact on the herd, and understand what options are



Gary Kramer, NRCS

available for control of the disease if it did occur. The assessment should also include a general evaluation of the potential for contamination of livestock from other/outside livestock, wild animals, contaminated feedstuffs, equipment, and other possible sources.



<u>Resistance</u> Resistance refers to the ability of an animal to respond to exposure to an infectious This includes both specific immune agent. mechanisms as well as general metabolic processes and both components must be properly maintained for an animal's resistance to be optimized. Specific disease conditions may be addressed by proper vaccination programs, however, effective vaccines do not exist for many of the infectious agents that can affect livestock. Therefore, it is critical that general resistance mechanisms are supported by proper nutrition. Stress can also impair such resistance mechanisms, so minimizing stress is also very important. Purchasing animals of known disease and vaccination status, as well as continual on-site testing and surveillance, can help to maximize resistance to infectious disease agents.

Cow Being Vaccinated



<u>Isolation</u> Isolation refers to the prevention of contact between animals as much as possible. The most important first step in disease control is to minimize commingling and movement of animals. This includes all new purchases as well as commingling between established groups present on the farm. Separating by age and production groups is an important biosecurity measure, even in operations with a high turnover rate. It is important to ensure that facilities, such as fences and isolation areas, are well maintained and cleaned or disinfected appropriately prior to adding new groups of animals.

<u>Traffic Control</u> Traffic Control includes traffic both onto and within the operation. It is important to understand that traffic includes more than vehicles. All animals, including dogs, cats, horses, wildlife, rodents and birds, as well as people must be considered. It also involves traffic within the production unit between different age groups (if present) on the facility. Generally speaking, farm workers who have contact with both younger less mature animals and older more mature animals should plan activities that cause contact with younger animals, before moving to older animals. Planning facilities so that traffic is minimized is an important part of an overall biosecurity plan.



Feeding Truck on Confined Dairy Operation

**Creative Commons** 

Sanitation Sanitation addresses the disinfection and cleanliness of materials, people and equipment entering and while on the production facility. One extremely important overarching goal of disease control is to prevent fecal - oral contamination. Equipment which may contact the oral cavity or animal feed should always receive special attention with regard to disinfection. Removal of organic matter, especially feces, is critical. Blood, saliva, and urine from sick or dead animals should also be targeted. Disinfectants do not work equally well on all types of materials. For example, in the presence of organic matter, some disinfectants are ineffective. This point helps illustrate why things that are hard to clean usually won't get adequately disinfected. All equipment used for manure or dead

Foot Bath at Entrance to Pasture



Colin Smith

animal handling must be cleaned thoroughly before being used with feeds, or ideally, completely different equipment should be used. Disinfection protocols should be established, written down, and followed.

## Visiting a Livestock Facility

Before visiting a farm, it is essential that you prepare yourself in order to prevent disease transmission. You may consider contacting the producer to discuss specific biosecurity requirements of the farm. Additionally, you may contact the State Veterinarian and/or Regional USDA-APHIS office to determine if special measures are required to control animal diseases. If the facility is known or suspected to be involved in a contagious animal disease outbreak, contact the Center for Veterinary Medicine and/or the Center for Food Safety and Applied Nutrition for additional precautions which may be necessary. APHIS and/or the State Veterinarian may also have special restrictions or precautions for you to follow.



Before arrival, ensure that your vehicle is clean and has been recently washed. Obtain equipment and supplies, such as laundered or disposable coveralls/smocks, disposable plastic gloves, rubber boots, reusable cloth or plastic laundry basket, soap, water, hand towels, sanitizing solutions and equipment. Make sure any equipment you take has been thoroughly cleaned and sanitized. Clipboards, briefcases, flashlights, coolers, and other objects should be cleaned between uses/farm visits as these can spread diseases between individuals and between farms.



The following procedures are applicable to virtually any farm that you visit. Some farms will have additional biosecurity measures so you should check with the owner or manager prior to your visit.

- 1. Wear rubber boots or other suitable footwear, which is disinfected upon arrival and again prior to departure. Disposable foot coverings are preferable. Use foot baths if available.
- 2. Wash your hands with soap and water. Wear disposable gloves as required by the protocol of the facility.
- 3. Wear disposable or freshly laundered coveralls. Shower-in and shower-out if requested to do so by the facility.
- 4. Wear appropriate head coverings as necessary.

Handwashing



UC Davis WIFSS,

- 5. Minimize materials carried with you, such as notebooks, flashlights, etc. to only those items that are necessary to complete your task.
- 6. If the farm has animals of various ages, try to work from the youngest to the oldest.
- 7. Avoid direct contact with livestock, wild animals, or pets, bodily fluids or animal by products when visiting facilities. Whenever possible, avoid stepping directly into manure piles.
- 8. Upon completing your visit, return to your vehicle, remove your personal protective equipment and place them in a disposable bag. Clean and sanitize boots/footwear.
- 9. Repeat these procedures for each separate location visited or inspected.

Further information on visiting a farm can be found in the FDA Investigations Operations Manual, 2014 (<u>http://www.fda.gov/downloads/ICECI/Inspections/IOM/UCM150576.pdf</u>).

#### Species Specific Biosecurity Procedures

The steps listed above can be universally applied to any livestock production facility; however, there may be certain unique situations encountered depending on the species of livestock involved. These are described below.

<u>Dairy Cattle</u> All dairies will have a milking parlor, as this is a requirement in the Pasteurized Milk Ordinance; however much variability will be encountered relative to other aspects of the dairy and its animals such as the amount of grazing, type of housing, and type of milking parlor. Biosecurity on dairies can be difficult to ensure, as there is much traffic on and off the farm, there can be many farm workers and generally few controls. If you visit a dairy, park in an area

**Dairy Operaation** 

**Creative Commons** 

well away from any animal housing area. It is usually best to park near the house or office to meet with the producer before proceeding to the animal area. Your vehicle may also transport infection if you drive through contaminated areas and may require frequent cleaning between sites. In general, entry to animal housing or feeding areas, corrals, pens or special treatment facilities should be avoided unless there are specific reasons to enter those areas. As much as possible, avoid stepping into fecal material, feed bunks, and feed storage areas. Do not handle any animals (including pets) unless official duties require such contact.

<u>Beef Cattle</u> There is tremendous variability in how beef cattle are raised. Cow-calf production is considered as an extensive production system, with some grazing, and feed provided seasonally as required. Similarly, stocker cattle are raised under extensive conditions and are maintained by grazing. In contrast, feedlots are usually an intensive production system, with all feed provided by farm workers to the animals. Most feedlots have dirt-floored pens, but some are in slotted floor barns.

#### **Beef Cow-Calf Operation**



Jeff Vanuga, NRCS



In extensive production systems, such as cow-calf and stocker, biosecurity can be a challenge, given that the animals are on pasture with many miles of fencing, and little direct animal control. Feedlots are somewhat more secure; however, often there is a lot of traffic on and off a facility. Feedlots may have visitor control areas and some form of security. The same precautions to be taken when visiting a dairy farm also apply to beef cattle facilities.

<u>Swine</u> The majority of pigs raised in the United States are raised under intensive production systems such as with finishing hogs on a large production unit. Vertical integration on some facilities has resulted in there being a separation of different phases of production. On such facilities you may find a gestating barn, a farrowing barn, a growing barn, and a finishing barn. These may be on the same or separate physical locations. All feed is provided to the animals, and all-in, all-out production is common. In all-in, all-out production, a group of animals all of a similar age group is moved into an area/pen/unit etc., and then all moved out at the same time prior to the area/pen/unit being disinfected advance of the in arrival of the next

Finishing Barn in an All-In, All-Out Swine Operation



Jeff Vanuga, USDA NRCS

group of animals. Some pigs are raised less intensively and sows may be on pasture for a portion of the year, farrow outdoors, and have no farrowing crates. Given the differences in how the pigs are raised, biosecurity will be highly variable as well. In general, there is lots of traffic and movement on and off all farms. On intensive production units, it is common for there to be visitor control, with limited access, and some degree of security. Large farms are likely to have a requirement that all visitors and personnel shower-in and shower-out when entering animal areas.

<u>Goats and Sheep</u> In many ways, small ruminant production mirrors cattle production. Meat goats and sheep are usually extensively reared, utilizing grazing as the primary source of nutrition with seasonal supplementation. Feedlots for finishing kids and lambs are not common. Dairy animals are treated like dairy cattle, with a milking parlor, and variable amounts of grazing. Biosecurity measures also mirror those intended for cattle.

**Goat Operation** 



Jeff Vanuga, USDA NRCS



#### Developing Biosecurity Plans for Livestock Production

It may be useful to have basic knowledge of specific approaches to a biosecurity plan for livestock production. One useful approach has been to create a 10-step approach that involves creation of tailor-made working instructions for the producer and farm-workers. The main objective is to reduce the effects of risk factors or control these risks so that the probability of disease will be as low as reasonably feasible on that particular production facility.

<u>Step 1.</u> Make the farm more closed, which means making it less likely that animals that have not been raised on-site or that have been purchased from the outside are allowed into the herd as replacements/additions. It is usually difficult to have a completely "closed" herd, but the more closed it is, the better.

<u>Step 2.</u> Design a People Entrance Protocol. There needs to be a written plan that is enforced related to hygiene of workers and visitors entering onto the facility.

<u>Step 3.</u> Similarly, a protocol needs to be established for all animals that enter and exit the premises. This includes the health and vaccination status of the animals, as well as the disinfection/cleaning protocol of all vehicles used for transporting those animals.



<u>Step 4.</u> It is highly recommended that every unit on a farm have a separate set of protocols specific to that unit. For example, the farrowing barn and the gestation barn would each be considered separately. This will assist with employee training and adherence to Hazard Analysis and Critical Control Points (HACCP) documents.

<u>Step 5.</u> Protocols for day-to-day activities need to be formally established. This would include items such as health care, feeding management, hygiene and disinfection.

<u>Step 6.</u> Monitoring protocols are essential. There is a saying that "if you cannot measure it, you cannot manage it". Having results that can be measured are vital if improvement in the process is going to be a tangible goal.

<u>Step 7</u>. The importance of a well-trained staff cannot be over-emphasized. If the workers are assigned responsibilities within the biosecurity plan and are rewarded for achievements, they will embrace the concept thereby greatly increasing the probability of success.

<u>Step 8</u>. Given that we have divided the facility into separate units, it should be apparent that training programs specific for each unit need to be in place and training efforts should be directed to the individuals working in those specific units. It makes no sense to teach the person in charge of a calf unit about mastitis control in the milking string, if they only ever work in the calf unit.

<u>Step 9.</u> Each unit of a farm will have its own separate set of risk factors to consider. Therefore a separate Standard Operating Procedure (SOP) should be established for each unit. While there may be overlap (e.g. the whole farm may have the same water supply), having separate documents will aid in compliance.

<u>Step 10.</u> Another critical factor to realize is that any Biosecurity Plan will not be a static document. Having regular meetings among all those involved, and then adapting the plan to become more functional, will allow it to develop and improve over time. Remember, too, that the workers are the people that will have the most intimate knowledge of conditions in their unit, so their input is essential and should be carefully considered when making improvements to the plan.

### Summary

We have discussed the importance of biosecurity for disease control on various livestock operations. It takes a true commitment to a Biosecurity Plan for it to be successful, however, this commitment is worthwhile as it will fundamentally help to improve animal health and well-being, maintain public health, ecosystem health, food safety, food defense and the economic well-being of the production unit. There are many ways by which diseases can be introduced or spread. While disease risk cannot be completely eliminated, risk can be managed. Everyone can play a critical role in minimizing infectious disease introduction and spread.



UC Davis, WIFSS

## Acknowledgements

#### Authors and Contributors:

Bruce Hoar, DVM, MPVM, PhD John Angelos, MS, DVM, PhD, DACVIM

#### <u>Editors:</u>

Amanda Arens, DVM, MPVM, PhD Juanita Humphrey

Publication Design:

Amanda Arens, DVM, MPVM, PhD Jeff Hall

Graphic Design:

Jeff Hall

<u>References:</u>

National Animal Health Emergency Response Corps Training Site <u>http://naherc.sws.iastate.edu/</u>

Canadian Food Inspection Agency Animal Biosecurity http://www.inspection.gc.ca/animals/terrestrial-animals/biosecurity/eng/1299868055616/1320534707863

Biosecurity for Pork Producers https://webadmin.pork.org/filelibrary/Biosecurity/final%20biosecurity%20book.pdf

Farm and Ranch Biosecurity <u>http://www.farmandranchbiosecurity.com/</u>