

# **Biosecurity: Protecting Animal Agriculture**

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April 4, 2006

## **What is Biosecurity?**

Bio-security literally means -- life protection. Whether it is seen as protecting the life of your animals or as protecting your animals from biological diseases, the end result is the same: keeping your animals healthy. Biosecurity is specific operational steps to stop diseases from entering your farm or once animals are infected, stopping it from spreading to other barns on the farm or to other farms. Biosecurity is also an attitude, a state of mind that one is to do the right things every time. And lastly, biosecurity is the responsibility of every one involved in the industry and every one must play fairly or there could be a lot of losers.

A good biosecurity program will assist the grower in obtaining optimal production levels by minimizing the negative effects of routine diseases and can save a herd/flock from depopulation due to a foreign animal disease (FAD), such as Foot & Mouth Disease (FMD) or Avian Influenza (AI).

All too often we undervalue the importance of biosecurity. We either forget or get too lazy to follow the daily procedures and start to rely more on intense vaccination programs or antibiotics to stop diseases. In today's production world there is a push to reduce antibiotic usage. There are less FDA approved drugs available for use or customers have demanded a "drug-free" product. Once the drugs are gone, we are back to basic management and good biosecurity practices to keep our herds/flocks healthy from disease problems that vaccination programs don't touch. This is especially true for FAD, where there is no preventative vaccination program and the only protection your animals will have is keeping the diseases out.

## **Biosecurity Today**

Biosecurity practices have been around for a long time and cannot be ignored nowadays. The success of the industry has led to an increase in production and an increased risk of spreading disease. Acceptable practices in the past can produce higher levels of risk today that are no longer acceptable.

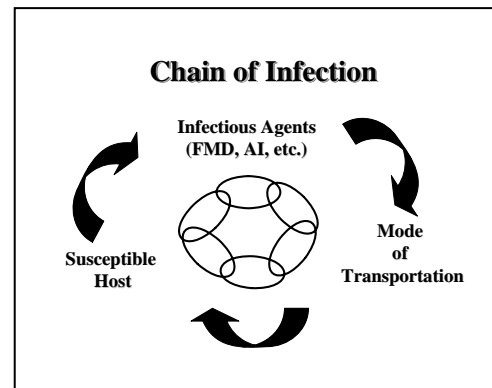
Bioterrorism or Agroterrorism, when agriculture is the target, is a real threat today. Foot & Mouth Disease in our herds or Avian Influenza in our flocks would shut down our industries and impact our state's economy. These diseases commonly found in other countries could easily be transported here and introduced onto our farms.

We believe that following stringent biosecurity practices could save the life of your herd/flock by reducing the risk of disease infection whether by accidental or intentional introduction.

## Chain of Infection

Diseases don't materialize out of thin air, well at least most do not. Disease producing agents (pathogens) need to follow a complete circle or "Chain of Infection" in order for them to get to the animals and then cause illness and death in the animals.

The Chain of Infection consists of Infectious Agents (pathogens) that cause disease, the Mode of Transportation that brings the pathogen to the animals, and the Susceptible Host in which the pathogen infects.



Infectious Agents – all pathogens have a reservoir where they normally thrive. These reservoirs can be the commercial animals or wild animals. In today's modern commercial industry with large animal densities, we have created larger populations of susceptible animals and larger populations of reservoir animals.

Mode of Transportation – pathogens can get into your herd or flock through multiple sources. People, vehicles and equipment are the worst culprits since they can transport pathogens great distances in a short period of time. Pathogens coming through pests, feed, water or air, are less common, but still do occur.

- People
- Vehicles
- Equipment
- New Animals
- Pests (rodents, insects, wildlife)
- Feed, Water, Air

Susceptible Host – these are animals that can get sick from the pathogen because of no protection from the disease. This is due to a young animal with an immature immune system or an older animal with an unprotected immune system.

Breaking any part of the Chain of Infection will reduce the risks to your herd or flock. The goal is to isolate the unit to keep any infectious disease from entering or leaving the premises. The Key Areas in Biosecurity include:

- Traffic Control
- New Animals
- Pest Control
- Dead Animal Disposal
- Cleaning & Disinfection
- Susceptible Animals

- Communication

## **Biosecurity Basics**

Customize a program for your farm – this will be determined by the type of unit you operate and the risk levels in your area (high density of commercial, wild or other types of animals near your unit, number of employees, location near a slaughter house or livestock auction, etc.).

Do it **RIGHT** the first time and every time – “Every Day is Biosecurity Day!” Everyone tends to become lax in their biosecurity practices when there are no disease outbreaks. Then after an outbreak begins, everybody suddenly remembers the importance and starts getting strict again.....until the outbreak is over. But if you are one of those first infections in an outbreak because you were lax, the strict practices afterwards won't help your herd/flock or your bottom line.

Biosecurity is a process – it requires objectives, procedures and a way to check it to ensure the objectives are met. The procedures should be written down and everyone informed who is involved with the unit.

## **Traffic Control**

Traffic Control is the most beneficial of all of the steps and can be the least costly to perform. In essence, control the movement of people and machinery in and out of your facilities. Remember people are the greatest risk of spreading disease – we are our own worst enemy.

Take a look at all the people, vehicles and equipment that move on and off a farm: farmers, employees, veterinarians, other producers, feed deliveries, live-haul crew, loading crew, dead animal pickup, utility personnel, meter readers, general public, etc.

Take a look at all the vehicles that may move from farm to farm: veterinarian, company personnel, live-haul trucks, feed trucks, dead animal pickup, trash trucks, utility trucks, etc.

No person should enter your farm without a good reason and without your permission. Restrict easy access to your unit with gates and fences or locked doors. Place signs that state: “Restricted Area, No Admittance”.

**Visitors** – which include about everyone on the people list other than yourself and your employees, should only enter after following the proper biosecurity measures. If your rules are to “shower-in / shower-out” or to wear clean coveralls and boots, then everyone going into the animal areas does so from the veterinarians to company CEO's to contractor & utility workers. Keep a Visitor's Log of their name, phone number and the last time they had contact with animals. The log can help to pin point the movement of disease spread during an outbreak.

**Farm Employees** – should at least wear clean work clothes and footwear everyday to work in. It is better to supply your employees with “farm” clothes/coveralls and footwear that they only

wear on the farm and change out of when leaving. It is best to have shower-in facilities with farm clothing and footwear for everyone entering your farm. Employees should have no other contact with other animals outside of their work.

**Feet** – “Beware of the Evil that Lurks on the Soles of Men”. Our feet are the worse spreaders of disease agents. We casually walk from barn to barn and from farm to farm – and with no protection, we can casually walk pathogens around as well. Provide disinfectant foot pans at the entrance of animal areas or provide footwear (galoshes) that are only worn in that barn and left outside the door when leaving to the next barn. Foot pans must be maintained properly in order for the disinfectant to actually kill any pathogens on the footwear. It must be changed routinely (at least daily depending on use) and the organic material may need to be removed first with water or a brush before using the foot pan.

**Vehicles** – should be parked away from the animals unless they are needed to load or unload the animals. We have become lazy and routinely park our vehicle right next to the entrance door. It is easy to spread pathogens from farm to farm on contaminated tires or wheel wells. Tires and wheel wells should be sprayed with disinfectant when leaving the farm and all vehicles and trucks in use in the operation should be routinely cleaned, such as an once a week car wash.

**Other Farmers** – should not visit your farm, share equipment or employees with you. This can be hard to follow, because this business is a family business and families help each other. The risk is that helping your cousin or brother can help spread disease. If you must share between farms, clean and disinfect (C&D) vehicles and equipment in between farms. You and any employees shared, should change out of their “home farm” clothes, footwear and hats. Separating equipment, vehicles, clothing and employees is also true moving between different units – even if the farmers are the same person. Moving pathogens from older to younger animals with an immature immune system is a perfect way to infect the young animals.

**International Travel & Products** -- If you travel to another country you may not know what types of exotic diseases their animals may have and mistakenly bring back home to your own herd or flock. If you have any contact with foreign animals, you should not even go near any types of animals back home for at least 5 days. Thoroughly clean all travel clothing, shoes and equipment after returning home, since these items can carry the FMD virus into our herds.

Clothes washed immediately after unpacking with detergent and drying (140°F) will kill the FMD virus. Footwear must be cleaned with soap and water and disinfected with bleach (5 Tblsp/gallon), citric acid or Virkon S. Imported animal products should be prohibited at all livestock facilities.

## **Introducing New Animals**

Breeding stock should be inspected and loaded onto a cleaned and disinfected trailer prior to movement from the source farm. The receiving breeding farm should verify breeding animals or semen prior to unloading. Breeding stock will then be unloaded onto a cleaned and disinfected loading chute.

Each site should designate an on-farm and off-farm line or security line at the barns where animals are loaded or unloaded. Farm personnel should not cross the line out of the barn and truck drivers should not cross the line into the barn. The truck driver should wear clean clothes and boots each time. An emptied trailer and off-farm ramp can then be cleaned and disinfected by the driver. The on-farm loading and sorting areas can be cleaned and disinfected by farm personnel.

New animals introduced to a herd should be isolated for a minimum of 30 days and 200 yards from the existing herd or flock. This time allows for detection of diseases that may have been early in the incubation phase at the source farm.

## **Pest Control**

Pests include rodents, insects, wildlife and even pets. Pest control is more than just placing out bait. If in your normal pest control routine, you are still racing the rats to the end of the barn, something's not working. You need to establish a formal program and monitor it regularly....and then change when needed.

Rodents (mice, rats) – can carry diseases like *Salmonella* and *E. coli*. Use proper baiting chemicals and techniques depend on the type of unit you have. Rodents hate to be exposed to the open, keep the grass around the barns mowed and clean up the garbage piles that they love to live in.

Insects (flies, darkling beetles, mosquitoes) – can be mechanical carriers of disease like *Salmonella*. Ponds are breeding grounds for mosquitoes and other biting insects, which can carry Eastern Equine Encephalitis, West Nile Virus and Fowl Pox.

Wildlife (wild birds, waterfowl, raccoons, possums, skunks, feral swine) – wild birds can carry diseases like *Salmonella* and avian influenza. Don't allow wild birds to build nests in or around your barns. Ponds and lagoons also attract wild waterfowl, which are natural reservoirs for avian influenza viruses. Hunters need to keep their hunting clothes and dead game away from their resident animals. Raccoons, possums and skunks can become infected with avian influenza as they share the waterfowl's habitat. Wild or feral swine can be infected with pseudorabies.

Pets (cats, dogs) – cats and dogs can spread diseases that can infect poultry and swine.

## **Feed & Water**

Feed – use good quality feed and keep it dry to avoid mold growth. Clean up feed spills to not attract wild birds or rodents. Feed truck drivers should wear clean coveralls and boots and not enter animal facilities.

Water – Test well water for metals and bacteria levels to see what your baseline is and what kind of well treatment may be needed. Wash and disinfect open drinkers daily to prevent bacterial build-up. Avoid using pond water as your bird or swine water source, because of the wild waterfowl and avian influenza risk.

## **Dead Animal Disposal**

Remove dead stock daily as they may act as disease reservoirs. If the carcass is stored until disposal, be sure the container prevents access by dogs, cats or wildlife. Farm equipment used to haul carcasses should be cleaned and disinfected after each use. Personnel should wear coveralls and boots designated only for dead removal and not returned to the farm until they have washed their hands, arms (or showered) and are wearing cleaning coveralls and boots; or done at the end of the day and not return to the barns.

On-Site Disposal (burial, composting, incineration) – is preferred to removing dead animals off of the premises for disease management. What ever method used for daily mortality, large commercial type farms need to get their on-site Mass Animal Burial Site approved by SC DHEC or another near-by site approved. This is required for SC DHEC permitted animal facilities (poultry, swine, dairy). It is a good idea for other large non-permitted farms (beef) to get their site approved to be prepared. If your entire farm has to be depopulated at once, where would the carcasses go?

Off-Site Disposal (landfills, rendering) – is not preferred due to the increased risks of taking infected animals off of the premises or your risk of contamination from a disposal site used by multiple producers. If you must use a landfill or central disposal location used by other producers, deliver your animals at the end of the day after you are done seeing your animals and C&D your vehicle's tires and wheel wells after leaving the disposal site. If you use a rendering service to pick up your mortality, place the pick-up containers away from the barns and away from the main farm entrance. The rendering service truck should use another side driveway so that they don't track pathogens onto the driveway you use to service your animals. Report any leaky rendering trucks.

## **Cleaning & Disinfection**

Cleaning & Disinfection (C&D) – any organic material left inside or outside the barn, can be a reservoir of infection for your next herd or flock, including dust, hair, feathers, eggs, manure particles, feed, dead animals, etc.

C + D = 2.....C&D is a 2 step process. Cleaning is 90% of the process, the actual removal of the material from the surface. Disinfection is only 10% of the process to sterilize the clean surface. You cannot disinfect poop or dirt.

Cleaning – begins with the removal of debris, manure, bedding and dead animals far away from the barns. The inside and outside of the barn itself should be thoroughly cleaned: curtains, vents, fans, feed lines, augers, tanks, water lines, etc...plus any other equipment or vehicles that were used during the last group of animals.

Power washing the surface alone without a cleaning detergent is not complete and can still leave organic material with pathogens behind. Make sure your cleaning detergents are compatible with the type of disinfectant you will use afterwards. Clean from ceilings to walls to floors. It is also best to have the cleaned surface completely dried before applying the disinfectant as a wet surface can dilute the chemical and the process of drying itself will help to reduce the pathogen numbers on the surface.

Disinfection – since some chemicals can be damaging to your equipment or harmful to yourself, find out the best type of disinfectant you can use on which type of equipment or housing from your equipment supplier and integrator. Higher temperatures enhance the activity for some of the disinfectants, whereas chlorine and iodine are not active above 110°F.

Common types of disinfectants and their uses include:

- Chlorine - water sanitizing, processing plants, boot washing
- Iodine – minor surgery procedures, water sanitizing, equipment & surfaces
- Quaternary ammonium – meat-packing & food-handling equipment, feed bins, waterers, feed pans (not effective against viruses or fungi)
- Phenol - floors, walls, foot baths
- Cresols - floors, walls, soil
- Formaldehyde - floors, environmental fumigation

Comparison of activity of different types of disinfectants:

Type	Irritating	Corrosive	Active in Organic Material	Prefers pH
Chlorine	Yes	Yes	No	Acidic/Low
Iodine	Yes	Yes	No	Acidic/Low
Quats	No	No	Reduced	Basic/High
Phenol	Yes	Slight	Yes	Acidic/Low
Cresols	Yes	Yes	Yes	
Formaldehyde	Yes**	Yes**	No	

## Susceptible Animals

Susceptible Animals – have an inadequate immune protection against a disease. These animals get infected, get sick and contribute to the spread of the disease as a reservoir.

Vaccination – programs work to prevent disease if used properly, using the correct type and dose determined by the risk of that disease in the area.

Zone Raising – is growing the same ages or types of animals on several farms throughout an area. This lessens the risk of spreading disease between different types of production (breeders vs. production) or reduces the risk of spreading disease from older animals to younger animals.

All-In / All-Out Systems – has its advantages over multi-age farms due to the complete absence of animals that can serve as reservoirs of disease to other animals. Some diseases that may cause no clinical signs in one group may be fatal to another group (young animals). Animals even on a multi-age premise can still be housed separating and moved in an all-in/all-out manner as a group during each stage of production. Once the group is removed, that facility is cleaned and disinfected and ready for the next group.

Downtime – is the time between when the last herd or flock has left and a new one enters, and on average is about 2 weeks. This is a time-out for the farm to properly C&D the facilities and equipment and to get on top of rodent/insect control. It is more important **WHAT** you do during this time, than the actual time period itself. You want to create hazardous living conditions for pathogens.

## **Communication**

Communication – is the most important key to a biosecurity program, because without proper communication between farmers, employees, veterinarians, company, state and federal personnel, etc. the wall of protection can break down.

At the Top Level – Management needs to work with Industry through Associations, Universities and Publications to determine the best procedures to use as a complete biosecurity program.

At the Regional Level – be informed of the disease problems in your area and learn how to fight them with new developments that are always evolving in animal health.

At the Farm Level – know what's going on in your area. Follow your biosecurity rules and report rule breakers.

## **References**

The majority of this chapter was taken from the U.S. Poultry & Egg Association's Poultry Disease Risk Management: Practical Biosecurity Resources CD.



Free CD's are available at [www.poultryegg.org](http://www.poultryegg.org)

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