Biosecurity in Practice Series

# Dairy Herds

*A Guide to Biosecurity in Dairy Herds*

Biosecurity, the actions taken to prevent transmission of disease causing agents, is often overlooked on many dairies. Biosecurity becomes increasingly important with trends for dairies to introduce cattle that are not home-raised and to rely on commercial heifer growers to raise replacement cattle. Dairy producers can manage biosecurity risks so that they maintain cattle herds that are less likely to become exposed to, or transmit, disease.

The goal of a biosecurity plan is to prevent the transmission of infectious organisms within the dairy and the introduction of new infectious organisms onto the dairy. The general steps in developing a biosecurity program are:

**Risk Assessment**

**Prioritize the disease/ diseases to control.** There are many actions that can be done to improve biosecurity. However, if only a few practices are adopted they should be focused. To determine the focus of the biosecurity practices, many people assign costs to the transmission and/ or introduction on any particular disease, i.e. Johne's disease, bovine leukosis virus. Costs will vary for different farms. For example, exporters of semen may place a different cost on the introduction of bovine leukosis virus and bluetongue virus than producers of milk for domestic consumption. Assigning costs may be difficult, as many times the costs are intangible. Producers will need to discuss each disease with colleagues and veterinarians. You will find that for many diseases the practices that need to be changed to prevent introduction and transmission are the same, so one change can help prevent several diseases. For example, the introduction of many diseases can be prevented by not purchasing livestock.

**Determine how transmission or introduction is likely to occur into and within a location**. Look at your farm's practices and determine if the route of transmission could occur on your farm. Determine if the practices are routine or rare and assign a probability to those practices. This discussion needs to be disease, farm and market specific. Generally, the methods of transmission for most disease are reasonably well known however, particular practices on farms may increase disease transmission dramatically.

**Risk Management**

**Design a biosecurity program** that focuses on changing to practices that effectively prevent costly diseases. There are many biosecurity practices that can be implemented, however if all can not be done – concentrate on those likely to have the highest impact.

**Documentation**

**Communicate with others** what you are trying to accomplish through the biosecurity plan. Emphasize the importance of the process to the success of the operation. Make sure the process is clearly understood by everyone involved.

**Maintain records** of biosecurity actions (inputs) as well as records of health and productivity (outcomes). After a biosecurity program has been designed, these records should be reviewed periodically. At these times the biosecurity plan should be reevaluated for efficiency, effectiveness and that it reflects priorities of the farm system.

# SPECIFIC BIOSECURITY CONCERNS

The following examples illustrate how biosecurity management might prevent the transmission of a few specific diseases. These are generalizations; you should develop specific biosecurity management plans with your veterinarian.

## JOHNE'S DISEASE

**Risk Assessment** – Cattle with Johne's disease exhibit chronic, incurable diarrhea and weight loss. Infection with the agent *Mycobacterium paratuberculosis* occurs in young calves, but infected cattle do not become ill until years later. Diagnostic tests for *M. paratuberculosis* infection are not informative for screening individuals, but there are reliable testing strategies to determine the infection status of herds. The agent may survive in manure, water, or soil for many months.

**Biosecurity Management**

**Remove Reservoirs** – There is no way to know if calves entering your farm are infected with *M. paratuberculosis* unless they arrive directly from an infected herd. It is possible to accurately identify dairies unlikely to be infected. Many states are now considering how to implement such a plan.

**Improve host immunity** – You cannot reliably immunize calves against *M. paratuberculosis*. In some states a vaccine against *M. paratuberculosis* is available for use in calves less than 35 days of age; however, the vaccine will not prevent infection and its use is controversial and not widely recommended.

**Reduce effective contacts** – Because they are able to segregate heifers from exposure to the manure of infected adult cattle, some heifer–growers can supply a lower percentage of *M. paratuberculosis* infected heifers than some dairy farmers raise. This can be achieved if most calves arrive at the heifer-grower operation uninfected (early segregation from exposure sources) and effective contacts are prevented during heifer rearing. Effective contacts are reduced by:

- Segregating heifers less than 6 months of age from older animals;
- Preventing fecal–oral contact of calves with milk or manure from older animals; and
- Segregating young calves from surface water or pasture where older heifers or cattle have been.

## BOVINE LEUKOSIS

**Risk Assessment** – Many dairy cattle in the United States are infected with bovine leukosis virus (BLV). However, few of the cattle infected with BLV ever exhibit clinical signs. Unfortunately, a positive test often prevents the sale or movement of cattle because of regulatory or condition–of–sale requirements. The virus is transmitted to other cattle through the transfer of virus–infected white blood cells. The virus may be transmitted to other cattle through contaminated injection needles; dehorning, tattooing, or surgical instruments; or other methods that may transfer blood cells between animals.

**Biosecurity Management**

**Remove reservoirs** – The dairy or heifer grower cannot prevent the introduction of BLV–infected calves unless the calves come from herds that have demonstrated that they do not have positive testing adult cattle. Milk from infected animals is a potential reservoir: feed colostrum from dam to calf and use milk replacers.

**Improve host immunity** – No vaccine against BLV is available.

**Reduce effective contacts** –The transfer of white blood cells between animals can be prevented by using syringe needles and palpation sleeves on only one animal, using non–bloody dehorning methods, and sterilizing tattoo and surgical instruments between animals. Whether or not biting insects transmit bovine leukosis is controversial, but insect control seems prudent.

## BOVINE VIRUS DIARRHEA (BVD)

**Risk Assessment** – Acute infection with bovine virus diarrhea virus (BVDV) damages the immune system and causes reproductive losses. An important source of BVDV to many herds is the introduction of animals that were exposed to the virus as a fetus and born persistently-infected (PI). Cattle that are PI with BVDV may appear healthy but expose herdmates to lots of virus. A single PI animal can expose many animals in a herd under the intensive management of typical dairies and heifer grower businesses. The greatest risk for losses due to acute infection and creation of new PI fetuses is by exposing pregnant cattle to BVDV.

**Biosecurity Management**

- **Remove reservoirs** –A hope for controlling BVDV transmission lies in removing all PI calves before they can expose breeding age heifers to the virus. PI calves can be accurately identified by staining a skin tissue sample for the virus (ear-notch test).
- **Improve host immunity** –Vaccines administered after maternal antibodies have waned (usually by 3-4 months of age) may reduce disease due to acute BVDV infection, but may not prevent all fetal infections.
- **Reduce effective contacts** –Segregation of pregnant and breeding stage cattle from other age groups may help prevent fetal infections unless a PI animal is already among those animals.

## CONTAGIOUS MASTITIS

**Risk Assessment** – Contagious mastitis is spread through contact with infected cattle rather than from the environment. The agents of contagious mastitis often enter the herd with purchased replacements. *Streptococcus agalactia* is an agent of contagious mastitis that survives only in the udder. The reservoir of other contagious mastitis agents such as *Staphylococcus aureus* and *Mycoplasma* spp. is usually the udder, but the source of these agents may also be other infected tissues.

**Biosecurity Management**

- **Remove reservoirs** – Dry cow therapy is an important tool for eliminating *Strep. ag*. infections. Routine testing of cattle with high somatic cell counts helps identify infected cattle for treatment (*Strep. ag*.), segregated milking (*Staph. aureus*), or culling (*Staph. aureus, Mycoplasma* spp). Because these agents are often first introduced to a dairy through replacements, it is advisable to culture the milk of all new additions and thoroughly investigate the mastitis history of the farm of origin. Bulk milk cultures may lack sensitivity to assure that a dairy is free of these pathogens.
- **Improve host immunity** – Healthy teat ends and mammary gland tissue are important barriers to infection. Vaccination against contagious mastitis pathogens has largely been unrewarding.
- **Reduce effective contacts** – Post-milking teat dipping protects the teat end after milking and helps prevent colonization of mastitis agents on skin. A segregated milking string for high somatic cell cattle milked at the end of each rotation may reduce new exposures. Properly functioning milking equipment can minimize the rate of intramammary exposure.

## Summary

The biosecurity principles are simple and few, its how they are applied that makes the difference between success and failure. If dairy farmers are concerned about disease transmission in their herds, then biosecurity management can pay dividends. Effective biosecurity management requires an assessment of what diseases are of concern, what the effective control points are, and knowledge that the resulting increase in heifer value outweighs the costs. For many dairies, biosecurity remains a management niche yet to be filled.

## Herd Biosecurity Plan

### Disease Concerns

### Risk Factors

### Management Actions

### Monitoring Results

Veterinarian:_____

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