

CATTLE HEALTH REPORT

A National Institute for Animal Agriculture Publication

Special Issue 2005

Biosecurity for Cattle

If you look for "biosecurity" in Webster's Dictionary, you may have a hard time finding a definition. But biosecurity is definitely a word that is in virtually every producer's or veterinarian's vocabulary. Since the outbreak of foot-and-mouth disease in the United Kingdom, a heightened awareness of biosecurity exists in our livestock and poultry industries. Add to that the increasing concerns over potential agroterrorism, and animal agriculture has more than enough incentive to make sure a biosecurity protocol is in place on every operation across the country. But are our biosecurity protocols sufficient, and do we follow them thoroughly? This issue takes a look at biosecurity in the beef and dairy industries.

Defining biosecurity

Biosecurity has been defined as

management practices implemented to prevent the introduction of infectious agents into a herd or flock. Biosecurity can also involve the prevention of an infectious agent from leaving a herd or flock.

Biosecurity encompasses a variety of activities on the farm. Visitors, vehicle traffic, employees, replacement animals, artificial insemination/embryo technicians, feedstuffs, rendering practices, manure management and health/vaccination programs all have implications when it comes to biosecurity. Obviously, any biosecurity program needs to be fully comprehensive relative to the size and type of an operation. It also needs to be tailored to fit the management practices of the operation.

Animal ID, an area of increased producer awareness, should also be considered as part of a biosecurity plan. The ability to track diseased or potentially diseased animals and link that animal to an owner/premises is a critical component of industry-wide biosecurity.

Overlooking an area of biosecurity might be easy to do, however much like a small section of broken fence, doing so can lead to a major problem for any operation.

Evaluating a Biosecurity Plan

According to the Bovine Alliance on Management and Nutrition (BAMN) factsheet, "Biosecurity on Dairies," a risk analysis scheme is the best tool for developing a biose-



curity plan. The three key components for a producer and their veterinarian to include are:

1. Risk assessment, which helps identify what problems exist, on what scale and the potential for these problems to occur;
2. Risk management, which includes the design and implementation of a designated plan; and
3. Risk communication, which is an understanding of the plan by everyone involved in an operation from employees to management, to suppliers and customers.

When doing a risk assessment, there are questions that need to be asked of an operation.

- *What products are sold?* This helps you identify what impacts your operation might have relative to your industry.
- *What are your risks of infection?* This will allow you to identify consequences to your operation based on a disease outbreak in your herd.
- *How could disease be introduced to your herd?* Knowing where you could potentially be exposed to a disease allows control of those entry

See *Biosecurity* | page 3

Inside This Issue...

PAGE 2
Addressing Ag Security in the United States

PAGE 3
Bovine Biosecurity Resources

PAGE 4-5
Disease Knowledge

PAGE 6
Factsheet: Livestock Site Security and Bioterrorism

PAGE 8
USDA, ATA Release Biosecurity Guidelines for Transporters

Addressing Ag Security in the United States

Americans enjoy one of the safest food supplies in the world, which can be attributed to the safeguards that are in place to help protect our producers from incursion of devastating diseases. The food and agriculture sector accounts for nearly one-fifth (19 percent) of the U.S. gross domestic product. Thus, the importance of protecting this industry is quite evident.

The Department of Homeland Security (DHS) has identified agriculture and food as one of 11 critical infrastructures for potential ter-

rorist targets. "The U.S. agricultural sector remains acutely vulnerable to attack," according to a Congressional commission's report, following the terrorist attacks on Sept. 11, 2001. The commission also highlighted the following factors of concern:

- The concentrated and intensive nature of contemporary U.S. farming practices;
- The increased disease susceptibility of livestock;
- A general lack of farm/food-related security and surveillance;
- An inefficient passive disease reporting system further hampered by a lack of trust between regulators and producers;
- Veterinarian training that tends not to emphasize foreign animal diseases or large-scale husbandry; and
- A prevalent focus on aggregate, rather than individual, animal statistics.

Agroterrorism is referred to as asymmetric warfare, or the induction of adverse effects that will undermine economic, social or political confidence.

What's being done

DHS has been charged with developing an infrastructure to secure our nation, agriculture included. According to DHS, through the Science and Technology division, the Department of Homeland Security is harnessing the nation's scientific knowledge to protect against agricultural terrorism. Key measures have been set to further our security. The Science and Technology division is collaborating on agroterrorism issues with other organizations in the Department of Homeland Security, such as Customs and Border Patrol. In

See *Security* | page 7



Cattle Health Report

Special Issue 2005

Publisher

National Institute for
Animal Agriculture
Glenn N. Slack, President & CEO

Benjamin Richey, Editor

Cattle Health Report provides the latest information on issues pertinent to cattle health initiatives, strategies, research and regulatory action. It is a communications initiative of the NIAA Cattle Health Committee and is produced in cooperation with USDA-APHIS. Reprinting is encouraged.

For a free subscription, send your name and mailing address to NIAA at:
1910 Lyda Avenue

Bowling Green, KY 42104-5809
ph.: 270-782-9798 fax: 270-782-0188
e-mail: NIAA@animalagriculture.org
Web site: www.animalagriculture.org

Economic Consequences

A Congressional Research Service report on agroterrorism highlights key economic consequences. Researchers concluded that the losses from an agroterrorist incident would be large and widespread.

- First, the losses would include the value of lost production, the cost of destroying diseased or potentially diseased products and the cost of containment (vaccines, drugs, diagnostics, pesticides and veterinary services).
- Second, export markets would be lost as importing countries place restrictions on U.S. products to prevent possibilities of the disease spreading.
- Third, multiplier effects would

ripple through the economy due to decreased sales by agriculturally dependent businesses (farm input suppliers, food manufacturing, transportation, retail grocery and food service) and tourism.

- Fourth, the government could bear significant costs, including eradication and containment costs, and compensation to producers for destroyed animals.

Depending on the erosion of consumer confidence and export sales, market prices of the affected commodities may drop. This would affect producers whose herds or crops were not directly infected, making the event national in scale even if it were contained to a small region.

Biosecurity | A Look at Biosecurity Plans

(continued from page 1)

points. Also, knowing how the diseases are transmitted can help eliminate those possibilities, whether it's Johne's, brucellosis or even foot-and-mouth disease (see *Disease Knowledge*, page 4). Risk management involves designing and implementing a plan.

- *How should you implement a biosecurity program?* Going through the risks will help match an operation's needs to the best way to implement biosecurity practices. The balance of cost and management is the key component for this.

A fact sheet from the University of Nebraska, by David Smith, DVM, highlights three necessary components of a biosecurity plan.

Increase the animal's ability to resist disease.

Do animals in the herd have strong immune systems, with the ability to resist disease agents? Whether it's resistance to infection, or resistance to the disease after infection, an animal's own ability to prevent disease is a valuable defense.

An effective vaccination and immunization program is a great supplement to a biosecurity plan. Making sure that a vaccination/

immunization program correlates with the risk assessment can bolster the health of a herd.

Minimize the number of contacts that can result in disease.

Not all animals exposed to a disease will become infected. However, understanding effective contact will allow a true understanding of disease transmission and what practices can be used to mitigate effective contact. Methods such as quarantine, segregation of animals by class or age and dilution of animals over a large area can be effective in reducing contact. Additionally, minimization of movement and foreign contact can be beneficial.

Eliminate sources of infectious agents.

A variety of animals or objects serve as reservoirs for infectious agents, such as other livestock, birds, rodents, people, manure, soil, surface water, water tanks, feed and feed equipment. Because disease can be transmitted directly or indirectly, reducing the survivability of disease and managing exposure to disease carriers will allow for healthier livestock.

Undoubtedly, heightened awareness of biosecurity across our livestock industry, particularly at the producer level, can ultimately benefit the animal agriculture industry by protecting the health of our beef and dairy herds. ●

Bovine Biosecurity Resources

USDA, Animal and Plant Health Inspection Service
www.aphis.usda.gov/lpa/issues/fmd/fmdbiose.html

American Association of Bovine Practitioners
www.aabp.org

National Biosecurity Resource Center for Animal Health Emergencies, Purdue University
www.biosecuritycenter.org

National Cattleman's Beef Association
www.beef.org

Bovine Alliance on Management and Nutrition (BAMN)
www.aphis.usda.gov/vs/ceah/ncahs/nahms/dairy/dairy.htm

Johne's Information Center, University of Wisconsin
www.johnes.org

5 Reasons to Have a Biosecurity Plan

Karen Jordan, DVM, a representative of Dairy Farmers of America and chair of the NIAA Cattle Health Committee, provides reasons to have a biosecurity plan.

1. To prevent economic loss caused by production losses or premature culling.
2. To prevent theft of cattle, machinery, tools and equipment.
3. To protect the "wholesome" image of the milk or beef you are selling and protect "market access" of the products you are selling.
4. To prevent or minimize an interruption in cash flow or equity.
5. To change the attitude of farmers/owners/employees to be aware of suspicious activities, suspicious people and to "harden" their farming operation so that their farm would be a difficult target for a terrorist or irate employee or irate neighbor to hit.

Disease Knowledge

One of the most effective means of biosecurity is knowing how to prevent disease. Thus, knowing how a disease can be contracted is important to accomplish that. Here's a look at some of the key diseases affecting the beef and dairy industries today.

Brucellosis

Brucellosis is a contagious bacterial infection that can affect both ruminant and non-ruminants, including humans. Brucellosis typically manifests in the reproductive organs and udders in cattle and bison. The disease can cause decreased milk production, weight loss in animals, abortion/loss of young, infertility and lameness.

Brucellosis is typically spread through direct contact with infected animals, or through environments that have been contaminated. *Brucella* bacteria that are shed may spread through milk, aborted fetuses, afterbirth and other reproductive tract discharges. Signs of brucellosis can include: Reduced milk production; abortion, particularly during months five to seven of pregnancy; weak calves; lowered fertility and poor conception rates; retained placenta and related uterine infection; and swollen, arthritic joints.

Bovine Viral Diarrhea (BVD)

BVD is caused by a virus, which can affect all types of species. The disease typically affects the digestive and immune systems, but can also have respiratory and reproductive tract effects. BVD has been classified into Type 1 and Type 2, with the latter being more severe. BVD can cause diarrhea, general illness, abortion, oral ulcers and immunosuppression, as well as abortion.

The virus can be spread from infected animals through nasal and oral secretions, feces and urine. BVD is typically contracted orally or nasally, but the disease can also be spread through infected semen, biting insects and contaminated instruments.

Johne's Disease

Johne's disease, also known as paratuberculosis, is a chronic wasting disease that predominantly affects ruminant animals. The disease causes inflammation of the intestinal tract, causing weight loss and diarrhea. This results in lowered milk production and eventual death due to wasting.

Animals with Johne's disease typically do not exhibit symptoms until latter onset. Infection frequently occurs at a young age, however the animals often do not show clinical signs until years later. Johne's can present challenges in control and eradication, due to the long incubation periods and survivability of the disease. An effective means to control Johne's is to prevent it from entering the herd, and culling animals that have the disease. Testing for Johne's is an effective tool in a control program.

Foot-and-Mouth Disease (FMD)

A highly transmissible disease, foot-and-mouth disease has not been found in the U.S. since 1929, but is endemic in much of the world. FMD is caused by a virus, of which several subtypes exist. FMD affects cloven-hoofed animals. Signs of the disease can include fever and blister-like lesions followed by erosions on the tongue and lips, in the mouth, on the teats and between the hooves.

Animals can recover from FMD, however are severely debili-



tated with decreased performance. Animals are typically destroyed before recovery to prevent further spread of the disease. FMD can be spread in a variety of ways, primarily through direct animal contact or contact with contaminated animal products, feeds, materials or other objects. Immediate reporting of signs is very important to preventing the spread of FMD.

Bovine Spongiform Encephalopathy

BSE has become a household term in the livestock industry, particularly over the last year in the U.S. and Canada. BSE is thought to be caused by an aberrant protein, or a prion. This affects the central nervous system, causing nervousness or aggressive behavior, abnormal posture, lack of coordination and difficulty in rising.

Cattle can become infected with BSE through consumption of contaminated feeds. In 1997, the U.S. Food and Drug Administration prohibited the use of most mammalian protein in the manufacture of animal feed intended for cows and other ruminants to mitigate this risk. Signs of BSE may take from two to eight years to surface, and an animal will deteriorate over a period of two weeks to six months until death, or until that animal is destroyed.

Disease Knowledge | Understanding diseases for biosecurity

Bovine Respiratory Disease Complex (BRD)

BRD is a costly disease that has significant effects on the feedlot industry, but is also a concern of dairy producers. Onset of BRD commonly leads to further disease infection. Symptoms commonly associated with the disease are a rectal temperature of greater than 104 °F, decreased appetite, lethargy, increased respiratory rate, coughing and increased ocular and nasal discharge.

The cause of BRD is considered multifactorial, as a combination of stressors, animal susceptibility and respiratory pathogens. A variety of viruses and bacteria are commonly associated with BRD, shipping fever or pneumonia. The most common viral agents that play a role in this disease are infectious bovine rhinotracheitis (IBR), bovine viral diarrhea (BVD), parainfluenza type 3 (PI3) and bovine respiratory syncytial virus (BRSV). Minimizing stressors on cattle, particularly those entering the feedlot can help minimize onset of BRD.

Coccidiosis

Coccidiosis is caused by a single-cell parasite that manifests in the intestinal tract of animals. This parasite can cause diarrhea, rough

coat, loss of appetite, weight loss and emaciation. Blood in the feces can also be found in more severe cases. These signs may not occur in cattle until three to eight weeks following infection, and often there are no visible signs of infection. Coccidiosis is more common in younger calves or immunocompromised mature animals.

Infection occurs following ingestion of contaminated pasture grass.

Coccidia tend to thrive in moisture, thus management of moisture can control the parasites. Limiting overcrowding and overgrazing can help to minimize risks, in addition to feeding a coccidiostat.

Tuberculosis

Bovine tuberculosis (TB) is a disease primarily affecting the respiratory system, caused by *Mycobacterium bovis*. TB can affect all warm-blooded vertebrates. TB, much like Johne's can be delayed before clinical signs are evident. Cattle typically maintain good condition, even through infection.

M. bovis is ingested through the lungs, where the bacteria will attack the lymph nodes causing lesions in the lungs. TB-infected milk can also cause similar problems in the intestinal tract. TB has been eradicated in most areas of

the U.S., though it has re-emerged in cattle in several states and in both wildlife and cattle in Michigan in recent years.

Leptospirosis

Leptospirosis is a disease that affects cow herds, through chronic infection, by causing abortion, mastitis, low-grade uterine infections and sometimes systemic infection. Acute infection can also occur in calves, causing fever, jaundice and death. Acute Leptospirosis can also cause lowered milk production and thick, yellow, blood-tinged milk in older cows, yet it is usually not fatal.

There are five strains of *Leptospira*, of which *L. pomona*, *L. hardjo* and *L. grippityphosa* are most common in cattle.

Leptospirosis is usually transmitted through urine of infected animals, as the bacteria predominantly manifest in the kidneys. It can survive in stagnant water and wet soil for months at mild temperatures. Leptospirosis is commonly prevented by vaccine, and can be treated by antibiotics. ●

Editor's Note: The information is a compilation of multiple resources, combined to provide a brief overview of some key bovine diseases.

Suspect an FAD in Your Herd?

An outbreak of a foreign animal disease (FAD) in the United States could seriously damage the domestic livestock and poultry industries.

In order to effectively project against such outbreaks, IMMEDIATELY contact your veterinarian, Federal Area Veterinarian in Charge or your State Veterinarian if you notice any of the following symptoms:

- Rising temperatures (multiple animals with high fever);
- One animal with ruptured vesicles (either clear or cloudy fluid discharge);
- Sticky, foamy, stringy saliva
- Reduced feed consumption (perhaps because of painful tongue and mouth lesions);
- Lameness with reluctance to move;
- Abortions;
- Abrupt drop in milk flow; and
- Low conception rates.

Factsheet: Livestock Site Security and Bioterrorism

Risk

The possibility of bioterrorist attacks on the U.S. livestock industry, including introduction of highly contagious foreign animal diseases, is real. Anthrax, a primary animal pathogen, has already been used against our citizens. Our livestock industry is vulnerable, especially to several highly contagious foreign animal diseases that could be introduced into herds and flocks.

Examples include foot-and-mouth disease, hog cholera, African swine fever, Rinderpest, and several others.

Introduction at key locations and natural spread through the U.S. livestock industry would have a major impact on the livestock economy of the nation. The vast amount of movement of livestock in the United States greatly enhances this risk. Livestock producers and all others associated with the livestock industry should be alert to unusual activities and take all possible precautions, including physical security of their operations whenever possible.

Implement Physical Security

Mathematically, the risk to individual producers is much higher from spread of infectious diseases than it is from direct physical attack, use of a toxic agent, or chemical contamination of a herd or flock. Nonetheless, producers should limit access to their operations to responsible individuals they know well.

- Make sure all people entering any livestock operation or agribusinesses that serve livestock operations are identified.
- Post a sign forbidding entrance without permission.

- Have a sign-in sheet for all individuals entering a livestock operation or agribusiness firm if visitors must be allowed.
- Secure all feed and other supplies used in livestock production as much as possible.
- Keep a record of all livestock, feed, and supply purchases.
- Call local law enforcement if unusual activity is encountered or suspected.

Implement Fundamental Biosecurity to Prevent Disease Spread

- Purchase feed and all other supplies from known, reputable firms and individuals.
- Maintain a closed herd if possible or practical.
- When purchasing any livestock, insist that health papers signed by the veterinarian that serves the herd of origin be provided.
- Quarantine (isolate) all herd additions for 30 days, 45 days if possible.
- Beef feedlot operators and purchasers of feeder pigs should observe replacements closely for at least 30 days.
- Observe all livestock at least once daily for signs of disease, including lameness, loss of appetite, salivation, lethargy, or sudden death.
- Have individual animals and the entire herd examined carefully by a veterinarian if signs of disease are noted.
- It is especially important that a post-mortem examination be performed if unexplained livestock death occurs.
- Biological specimens should be submitted to a diagnostic laboratory if the cause of disease problems is not obvious.
- Imitate, as much as possible, the

biosecurity procedures that are routinely practiced by confinement poultry operations.

- People entering livestock operations should wear clean clothing, ideally provided by the operator. They should wear rubber footwear and walk through a disinfectant before and after visiting the operation.
- All vehicles coming on the farm should be clean, as should all equipment and utensils that are used in or near the operation.
- Special attention should be paid to equipment such as livestock trucks and trailers, manure loaders and spreaders, tractors, portable livestock chutes, and other fomites that could easily spread disease from one operation to another.
- Rodents and birds should be controlled.
- Immediately dispose of all dead livestock after examination. Provide a secure place where pick-up vehicles do not have to enter or come near livestock units.
- Livestock exhibitions, other than terminal shows, should be avoided if possible.
- Don't allow anyone who has been on a farm in a foreign country to enter livestock units for seven days after return to the United States.
- Biological materials, including animal health products, should only be used if approved by the herd veterinarian.
- Don't allow any human food products to be brought onto the livestock, dairy, or poultry production premises. ●

*Nolan Hartwig, DVM, MS
Iowa State University
Veterinary Extension*

Security | DHS, USDA Programs Address Agroterrorism

(continued from page 2)

In addition, the division is working with the Department of Agriculture's Agricultural Research Service and Animal and Plant Health Inspection Service and the Department of Health and Human Service's Food and Drug Administration to further develop national plans for mitigation and response to high consequence threats.

The Plum Island Animal Disease Center (PIADC) is a major part of the United States' animal disease activities. Plum Island is the center for animal disease research, particularly for diseases of high consequence such as foot-and-mouth disease. Formerly under USDA's jurisdiction, PIADC is now operated under Homeland Security. The center operates an educational initiative for veterinarians on foreign animal disease issues.

DHS also operates the National Biodefense Analysis Countermeasures Center. According to DHS, the center has three main charges dealing with agroterrorism: providing scientific assessment of emerging biological threats both to people and to agriculture; in partnership with the Federal Bureau of Investigation it establishes a new national capability for performing forensic analysis on bioterror events; and works with the Plum Island Animal Disease Center to conduct research to help defend against agroterrorism.

Homeland Security has also taken an initiative to develop Centers of Excellence. Specifically, DHS designated two universities this year to serve in that capacity. Texas A&M has been designated as a center to study high consequence foreign animal disease and zoonot-

ic diseases. The University of Minnesota has been tapped to address agrosecurity issues related to post-harvest food protection. The two universities serve as a central network, working with other universities nationwide. Announced earlier this year, the initiatives will operate on DHS funding for the next three years.

The Science and Technology division within DHS is currently conducting systems research to better understand agroterrorism. Three purposes of this research are to:

- Explore the epidemiological and economic consequences of an agroterrorism event;
- Analyze the research and development requirements for foreign animal disease and food security scenarios; and
- Develop key enabling technologies and tools to prevent, detect, respond, and recover from the intentional or unintentional introduction of biological agents into the national agricultural and food systems.

More recently, DHS – along with USDA and the Food and Drug Administration – have signed a cooperative agreement with the National Association of State Departments of Agriculture to "further develop integrated federal-state response plans for food and agricultural emergencies," according to USDA. The cooperative agreement will occur in three phases with the first phase starting immediately and phase three concluding by June 2005. During the first phase, a workgroup, comprised of federal, state and local officials, will gather



information about existing state emergency response systems and how food/agricultural safety and security emergencies will be handled within the various states. The workgroup, during the second phase, will

then develop an interagency response plan, which includes state and local participation, conduct tabletop exercises and pilots to test functionality of the emergency response plan and refine it based on lessons-learned and other input. Phase three will involve the development of guidelines for federal food and agricultural regulatory agencies to cooperate with state and local emergency response efforts, thus facilitating federal assistance to be made available more quickly and appropriately to assist the local response and recovery efforts.

In addition to the DHS programs, USDA's ongoing surveillance programs, such as the National Animal Health Monitoring System, which encompasses numerous species, provide further understanding for biosecurity and disease patterns in the U.S. The National Animal Identification System, of which pilot programs are currently being implemented in states and tribes nationwide, will ideally be able to provide a traceability network for identifying and stopping disease transmission in our livestock herds.

These initiatives are very important to the protection of the U.S. food supply, addressing the need for on-farm security and understanding of disease threats, whether incidental or intentional. ●

USDA, American Trucking Association Release Biosecurity Guidelines for Transporters

The U.S. Department of Agriculture (USDA) has announced the release of voluntary security guidance for over-the-road transporters of agricultural and food commodities to bolster national security and safeguard public health. The guidance was developed in partnership with the Agricultural and Food Transporters Conference (AFTC) of the American Trucking Association (ATA).

The Guide for Security Practices in Transporting Agricultural and Food Commodities is designed to enhance security measures practiced by the nation's approximately 27,000 commercial transporters of agricultural and food-related products across the nation each year. Although issued by USDA, the recommendations apply to agricultural commodities and food products



of all types, whether regulated by USDA or the Food and Drug Administration (FDA).

"These guidelines are practical, flexible and proactive," said Agriculture Deputy Secretary Jim Moseley.

Fletcher Hall, executive director of ATA's Agricultural and Food Conference, said the fact that the voluntary guidelines were a partnership between the private sector and government is significant.

In February 2003, the White House Office of Homeland Security identified food and agriculture as one of 11 critical infrastructures in the U.S. that terrorists may seek to target. Agricultural and food commodities in transport are thought to be significant target for terrorists.

The guidelines provide a basic blueprint for planning for and implementing risk-based security management practices to ensure the continued safety and security of these products, the people who transport them and the communications systems that enable their movement.

The guidelines emphasize a

four-part approach of awareness of potential terrorist behavior and emergency response plans, recognition of terrorist activity in progress, communication of potential threats within companies and to proper authorities, and action to be taken if and when these situations occur. ●

National Institute for Animal Agriculture
1910 Lyda Avenue
Bowling Green, KY 42104

Cattle
Health Report

Non-Profit Organization
U.S. POSTAGE
PAID
Permit No. 82
Bowling Green, KY
42104

For more information...

The guideline document is available on the Internet at www.usda.gov/homelandsecurity/aftcsecguidfinal19.pdf.

Additionally, the ATA/AFTC web site offers information for acquiring the guide at www.truckline.com/cc/conferences/atc.