Biosecurity Assessments in Private Practice

Nathan M. Slovis, DVM, Diplomate ACVIM, CHT

The application of biosecurity and biocontainment procedures is important for equine breeding facilities, training facilities and other facilities that house horse populations. Veterinarians now have expanded roles when it comes to biosecurity and biocontainment. The community seeks our expertise for leadership and as educators and mentors. Our intellectual knowledge does not come for free and therefore we must feel comfortable charging for services that we once gave out for free. A biosecurity assessment should be approached in like manner as a physical exam. Author’s address: Hagyard Equine Medical Institute, 4250 Iron Works Pike, Lexington, KY 40511; nslovis@hagyard.com; e-mail: www.hagyard.com. © 2012 AAEP.

1. Introduction

Course objectives are:

1. List key components of an effective infection prevention program.
2. Identify components of an effective surveillance program for your setting.
3. Describe how to motivate people in using hand hygiene effectively.
4. Describe what is involved in isolation protocols for your setting.
5. Describe some important concepts to include when educating clients that have Salmonella, Strep-
tococcus equi, and Clostridium difficile/perfringens on their farms.
6. Describe how to inform the community that you offer biosecurity services for their farm/facilities.
7. Describe how to charge for your services.

2. Materials and Methods

The equine community has always recognized veterinarians as a resource for “spreading knowledge and preventing infection.” The community’s perception is that we are infection preventionists who have the knowledge about the pathophysiology of infectious disease, so we must also have the knowledge of infection prevention, control, and epidemiology. Right? Veterinarians now have expanded roles when it comes to biosecurity and biocontainment. The community seeks our expertise for leadership and as educators and mentors.

Our intellectual knowledge does not come for free and therefore we must feel comfortable charging for services that we once gave out for free. Therefore, we should adequately charge for travel, time spent performing the evaluation, and time spent writing a report. This paper will describe how our practice incorporates a biosecurity and biocontainment program into a practice builder and revenue.

The application of biosecurity and biocontainment procedures is important not only in healthcare facilities but also for equine breeding facilities, training facilities, and other facilities that house horse populations. A biosecurity assessment should be approached in like manner as a physical exam. The basic objective is to identify deficiencies in the facility design, standard operating procedures, training, and the animal housing/movement. Before you ar-
rives to the facility, you must have the owner(s)/employee(s) dedicated to the evaluation. Just going through the motions of having an evaluation performed to comply with the Occupational Safety and Health Administration (OSHA) may get you nowhere. During your visit, you would want to talk to managers and personnel to get a feel of how the standard operating procedures are followed. Ask questions such as: What happens to abortions? How are animals with diarrhea and new arrivals managed? Ask these questions to several of the personnel to determine if they are consistent with their answers. Emphasize before you visit the facility that they should change nothing before your arrival. Observe activities and take plenty of photographs. Take notes so that when you leave the facility you will be able to easily recall your findings. Unfortunately, most of the time, when we get called out for a biosecurity assessment, it is because of an outbreak situation. Ideally, an assessment should be performed under “normal circumstances.”

One of the targeted elements for disease prevention is to prevent the transmission of the infectious agent. We know from previous studies that >20% of foals by 6 months of age will have infectious diarrhea (The National Animal Health Monitoring System Equine 1998 Study). The goal of the biocontainment procedures is to prevent the transmission of that infectious agent to other foals. The transmission of infectious agents requires three elements: a source (or reservoir) of the infectious agent(s), a susceptible host with a portal of entry receptive to the agent, and a mode of transmission for the agent. Identification of areas or processes where transmission of pathogens is likely to occur (control points) and implementation of measures aimed at minimizing the possibility of such transmission, while allowing for reasonable flow and function within the veterinary hospital or animal facility, are important components of biosecurity. During the assessment and development of the prevention and control activities targeted to infectious diseases, the weakest link in the chain of infection (agent, transmission, host) must be considered for each specific pathogen. In some situations, control of the agent in a specific reservoir may be the best way to reduce disease occurrence. Chlorination of water is an example of destroying an agent in its reservoir or eliminating a possible mode of transmission (see Figs. 1 through 6).

Strategies aimed at the level of transmission must be tailored to the type of transmission involved. An example of a control activity targeted to airborne transmission is the isolation of the animal to a facility where there is no shared airspace or is located on the premises where no other animals are currently housed. The control of vector-borne transmission can be targeted toward destroying the vector and toward the use of repellents such as in the case of vesicular stomatitis outbreaks. In many instances, the best mechanism to prevent disease occurrence is through modification of the host, such as developing or boosting immunity through active immunization. Other control activities targeted to the host may include improving the nutritional status of a neglected animal or providing chemoprophylaxis (antibiotics) against a variety of agents. Every effort should be made to minimize the contact between animals with a history or clinical signs suggestive of infectious contagious disease or those with confirmed contagious disease and the remainder of the patients or animals at a boarding facility.

In developing control programs, the feasibility of a policy also must be assessed. Feasibility or practicality of the policy is dependent not only on the sociodemographic factors but also the operating needs of the facility. For instance, there may be equine facilities that buy and sell horses on a routine basis and will accept the risk of contagious disease outbreaks, such as Streptococcus equi, as the norm, instead of isolating newly arrived horses for a period of time required.

Cost and the availability of resources also must be considered when developing control strategies. Implementing and maintaining even the most basic biosecurity program requires trained personnel and an adequately staffed facility with appropriate supervision. Outbreak investigations have indicated an association between infections and understaffing; the association was consistently linked with poor adherence to hand hygiene. The understaffing of human nurses can facilitate the spread of methicillin-resistant Staphylococcus aureus in intensive-care settings through relaxed attention to basic control measures.

A surveillance component to your infection control program is essential to gauge the effectiveness of your biosecurity policies. Data collected through the surveillance process will provide information regarding your current protocols and will provide early warning regarding potential contagious disease threats. The type of surveillance program that your facility will use must be determined on the basis of several factors, including cost, efficiency, and the number of high-risk cases routinely housed in your facility.

Passive Surveillance
One type of surveillance method used in most veterinary teaching hospitals is passive surveillance. Using this method, data regarding infection rates is collected through medical records or obtained from diagnostic lab results from samples that were submitted for other purposes (eg, fecal flotation or cultures from patient sources). This approach takes very little effort because one employee can be in charge of compiling data as it is received from the lab, but it is not necessarily an effective way of detecting potential problems regarding nosocomial spread of disease.
Active Surveillance: Laboratory Diagnosis

One type of surveillance used by veterinary hospitals that can be easily used at the farm is active surveillance. This can take several forms, but most commonly involves collecting a sample or samples (nasal swabs or feces) from sick patients at the farm for the express purpose of detecting an agent or agents of concern. It is not reasonable to collect samples from every horse at the farm to detect every possible infectious agent. For active surveillance to be used effectively in a farm setting, you must target the high-risk population of interest and determine what agent or agents are of greatest concern. For example, fecal shedding of *Salmonella* spp. in recently discharged patients from the hospital can lead to outbreaks of salmonellosis. If your client routinely hospitalizes equine patients (i.e., large farms that send numerous animals to surgery for orthopedic corrections or embryo transfer mares), taking fecal samples from these horses at the time of

---

**Fig. 1.** Hagyard Equine Medical Institute farm assessment worksheet.

---

### Biosecurity Program
**Farm Assessment Worksheet**  
**Facilities Layout**

<table>
<thead>
<tr>
<th>Barn # / Name</th>
<th>Total # Stalls</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Note following locations/items where applicable with appropriate code**

- Feed Room  
- Treatment/Tack Room  
- Wash Rack  
- Rest Room  
- Hose  
- Water Hydrant  
- Stocks  
- Other

---

For example, if your client routinely hospitalizes equine patients (i.e., large farms that send numerous animals to surgery for orthopedic corrections or embryo transfer mares), taking fecal samples from these horses at the time of discharge can help identify patients who are shedding *Salmonella* spp. These samples can then be used to monitor the prevalence of salmonellosis in the population and guide future surveillance efforts.

---

**DATE**

**FARM**

**Veterinarian**

**Consult**

**Project**

**Coordinator**
discharge may be of benefit to your client’s farm. This would allow you to take additional precautions with your client’s animals that are known or sub-clinical to be shedding Salmonella as well as rapidly detect nosocomial transmission of Salmonella.

Environmental Surveillance

Environmental surveillance is another detection method used in most veterinary teaching hospitals and can easily be implemented at the farm. It has been documented that environmental contamination with contagious agents has contributed to nosocomial outbreaks in veterinary hospitals. As such, culturing the hospital environment regularly
may help to ensure a minimum amount of environmental contamination is present. Veterinary teaching hospitals generally take environmental samples for the detection of Salmonella monthly. An alternative to taking environmental samples for one specific agent is to count the total number of bacteria present on hospital surfaces by using either swabs or contact plates. For this to be an effective form of surveillance, it would need to be done routinely because bacteria can be found on most surfaces, and a baseline normal number of bacteria would need to be determined for each hospital surface cultured. At farms that are having problems, for example, with Clostridium difficile, environmental cultures will be performed with the use of real-time polymerase chain reaction (PCR).

Writing the Infection Control Plan

Before writing an infection control plan, a staff member at the farm should be designated as the head of infection control. This individual works closely with the veterinarian and is responsible for implementing the infection control program (written by the veterinarian), updating the protocols on at least an annual basis, handling incident reporting, collecting and disseminating data, keeping records, and monitoring compliance.

As outlined by the National Association of Public Health Veterinarians’ Compendium of Veterinary Standard Precautions (NASPHV), an effective infection control plan should meet the following criteria:

- Reflect the principles of infection control as previously discussed.
- Be specific to the facility and practice type.
- Be flexible so that new issues can be addressed easily and new knowledge incorporated.
- Provide explicit and well-organized guidance.
- Clearly describe the infection control responsibilities of all staff members.
- Include a process for the evaluation of infection control practices.
- Provide contact information, resources, and references, specifically reportable disease list, public health contacts, local rabies codes and environmental health regulations, OSHA requirements, websites, and client education materials (NASPHV, 2008).

An essential component of infection control is the need for continual updating of the documented policies. Emerging and re-emerging diseases, such as the influenza virus and antibiotic resistant bacteria, require that the infection control policies be updated on at least an annual basis to take into account new information about transmission, prevention, and control of those agents. The infection control procedures should also include specific instructions for data collection of those agents relevant to the facility type, such as antimicrobial resistance, zoonotic diseases, or nosocomial infections.

Education, Training, and Enforcement

Without staff education, training, and enforcement, a written infection control policy will not be effective. Education and training help to ensure consistency in the use of the procedures and allows for a thorough review process of all decided policies. In addition, documented policies demonstrate due diligence on the part of the practice and can be useful from a legal liability standpoint, should there be an occurrence of nosocomial or zoonotic infection.

Employees

Employee health is an essential component of an infection control protocol and should be included in written infection control documents. The employee health section of the infection control protocol should include vaccination recommendations, exposure incident policies, and guidelines for reporting changes in health status. It is important to discuss the critical nature of staff health with all employees because collection of employee health information is on a voluntary basis.

Employees should be assured that any disclosure of health information is confidential and will only be used to help protect their health. For example, pregnancy changes the immune system in such a way that the individual is more susceptible to infection from a variety of agents, including Toxoplasma species. If any staff member declines to disclose their health status or to take recommendations, it is recommended to have a signed waiver on file. Employee health records should always be kept confidential.

Vaccination for rabies and tetanus should be recommended to all employees who come into any contact with animals or biological specimens. For employees who come in contact with birds or swine, it is also recommended that employees are vaccinated for influenza every year. While the OSHA has no specific requirement for veterinary or animal facility employers to offer rabies or tetanus vaccin-
tion, OSHA’s General Duty Clause states that employers “shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees” (OSH ACT 1970). This clause is broad enough to cover vaccination for disease with a known risk for the veterinary and certain animal contact professions (wildlife rehabilitation), such as rabies.

Marketing
Marketing your biosecurity assessment program requires you to identify your customers and their needs. For our practice, our customers were identified as “outside” referring veterinarians and the farms that our clinic’s ambulatory department services. Once you have identified your customers, then you want to create an informational brochure that communicates the predominant reason why they should invest in a biosecurity assessment. An example of the brochure that our clinic uses to explain our biosecurity assessment program can be found at http://hagyard.com/custdocs/4x9%20brochure.pdf. One of the important concepts in designing your brochure is: never assume that your customers know what biosecurity entails. As can be noted in our brochure, we first introduced why our firm is qualified to perform these assessments and then explained what biosecurity involves. We chose not to discuss prices in our brochure. Instead, customers can call our clinic for information about our services. Once the brochure was produced, we mailed them to our “identified” customers. We continue to identify new customers at our clinic, which had the unfortunate incident of having their animal(s) admitted to our hospital with an infectious disease. When patients with an infectious disease are discharged from the hospital, we introduce them to our biosecurity program and explain how they may benefit from a biosecurity assessment. With all of our clients, we make sure that we work closely with their veterinarian(s) by getting them involved (if they are interested) with our final biosecurity assessment. Since inception of this program in 2006, we have provided biosecurity assessments to more than 30 local farms as well as farms in Europe and Africa. Remember, a biosecurity assessment is usually not just a one-time investment. We routinely perform yearly evaluations on our clients’ farms (or more often when necessary).

Price Structure
Table 1 is an example of how Hagyard’s Equine Medical Institute would charge for a typical biosecurity assessment for a local farm.

<table>
<thead>
<tr>
<th>Biosecurity Program Fees</th>
<th>Small ≤20-Stall Facility</th>
<th>Medium Up to 20-Stall Barn</th>
<th>Large Second Barn, Initial Project</th>
<th>3+ Barns/Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial assessment consultation</td>
<td>$500.00</td>
<td>$500.00</td>
<td>Included</td>
<td>$1,000.00</td>
</tr>
<tr>
<td>Includes consult with veterinarian and project coordinator to review facilities layout and work flow, current farm protocol, and discuss current issues (if any). Initial sampling may or may not be tested at this time.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sampling follow-up visit: project coordinator</td>
<td>$1,950.00</td>
<td>$1,950.00</td>
<td>$1,950.00</td>
<td>$6,600.00</td>
</tr>
<tr>
<td>Average for 20-stall barn testing each stall and high-traffic use areas; average 30 samples @ $65 includes up to 120 samples @ $55</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final results and plan and implementation review</td>
<td>$500.00</td>
<td>$1,000.00</td>
<td>$1,000.00</td>
<td>$1,500.00</td>
</tr>
<tr>
<td>Includes compilation, interpretation, plan development, and implementation presentation consultation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated project expense</td>
<td>$2,950.00</td>
<td>$3,450.00</td>
<td>$2,950.00</td>
<td>$9,100.00</td>
</tr>
<tr>
<td>Includes farm assessment, sampling, plan review, implementation, and first surveillance visit</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional sampling (per sample) &gt;30 samples per barn</td>
<td>$55.00</td>
<td>$55.00</td>
<td>$55.00</td>
<td>$60.00</td>
</tr>
<tr>
<td>Follow-up surveillance visit(s) (minimum)</td>
<td>$85.00</td>
<td>$85.00</td>
<td>$85.00</td>
<td>Per visit</td>
</tr>
<tr>
<td>Follow-up sampling</td>
<td>$65.00</td>
<td>$65.00</td>
<td>$65.00</td>
<td>Each sample</td>
</tr>
<tr>
<td>Sample refers to one sample site: ie, stall floor, water hydrant, etc</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

References and Footnote
1. Traub Dargatz JL, Morley PS, Acteo HW, et al. Criteria for determination of infectious contagious disease risk level of...
large animal patients and on-farm new arrivals. 2009 American College of Veterinary Internal Medicine Convention Round Table Discussion, Montreal, Canada.


"Idexx® Equine Diarrhea Panel. IDEXX Laboratories, Inc., Molecular Diagnostics, West Sacramento, CA 95605."