

BIOSECURITY: RESEARCH HERDS



BASICS

OVERVIEW

- Biosecurity is a comprehensive set of plans, programs and procedures that will prevent or limit the introduction, multiplication and dissemination of harmful microorganisms, parasites and/or biological toxins or pests on pastures and farms.
- Biosecurity plans must address traffic and transport patterns (movement of people, new and returning animals and equipment), overall animal health (vaccinations, deworming, internal and external parasite control, nutrition, barn/shed ventilation and the possibility of wildlife contact), and the cleaning, and disinfection, and sterilization procedures utilized to reduce or eliminate pathogens, toxins or other injurious agents.

Facilities

- USDA, PHS and AAALAC facility guidelines need to be reviewed prior to housing any research animals. The physical plant should support all animal care activities, consider the behavior and ecology of the species involved, and assure the safety and well-being of the animals.
- Ruminants are social animals and group housing should be available.
- The facility should be comprised of materials that allow for effective and routine disinfection of housing areas as well as vehicles, instrumentation and equipment.
- Facility design should incorporate effective waste management systems.
- Temperature and air changes should be within the established ranges for the species and housing areas should be of adequate size so that over-crowding does not occur.
- Diurnal light cycles should be available to the animals.
- Facility design should allow for control of flies and minimize contact with wildlife.

Health Surveillance of Herds

- Surveillance of the health status of the herd at established frequencies allows for early recognition of introduced pathogens. Trained personnel should review health surveillance results on a routine basis.
- Policies for medical intervention in the event of a change in health status are important so that the progression of any disease process can be minimized.
- Trained personnel should carry out and record daily observations of all animals and communicate findings and concerns to veterinary staff before clinical problems develop.

Management of New Arrivals

- The most common source of introduced pathogens is incoming animals. Although a closed herd is ideal, replacement animals are generally required in any operation. New animals should only come from approved sources.
- Animals should be housed by source or by similar health status.
- Documentation of the herd health status of approved vendors and vaccination histories should be reviewed before animals arrive at the facility.

- Health records of newly arriving animals should include the medical history of the animals including vaccination and deworming dates and any medical problems with the individual or the herd.
- A 30 day documented quarantine (by source) should be established during which diagnostic testing and vaccination may be performed.
- Animal tissues including semen, embryos and milk can also be sources of infectious disease and should be screened as required.
- Animals should be purchased from suppliers who have preventative medicine programs in place to control infectious disease.
- Any routine animal procedures performed during or after quarantine should be performed using established sterile technique.
- Sheep should be routinely shorn especially if they are housed in densely populated housing areas.

Feed and Water

- Concentrates and forages may be contaminated with bacterial, fungal or environmental agents or toxins
- Approved feed vendors should have an established quality assurance program.
- Water should be tested for bacterial, chemical or nutrient contamination.
- Procedures should also be in place to assure that feed and water sources are not contaminated with feces or urine during storage.

Traffic Control

- A 24-hour security system is essential to ensure that un-authorized personnel do not gain access to the animal facility. Authorized personnel should carry identification at all times. Monitoring of the facility on a frequent basis is critical
- Vendors should identify themselves and check in with the appropriate person prior to entering the animal facility. It is also important that any vendor equipment including animal transports and vehicles are adequately disinfected before they enter the facility grounds.
- A current visitation order based on the age, reproductive status, and general health status of the animals should be established and posted so that all personnel know which housing areas they should enter first.
- Reproductive status and age may be factors in determining the visitation order as well.
- Personnel who have recently visited foreign countries should not be allowed to come in contact with the animals prior to being interviewed by staff.

Disinfection

- Disinfection schedules should be established for all housing areas. Footbaths should be placed at entryways and footwear should be cleaned of all organic debris prior to stepping into the footbath and changed in accordance with manufacturer recommendations.
- The disinfectant (quaternary ammonium compounds, phenols, hypochlorites and iodophors, etc) will be determined by the organisms that require control and the efficacy of the disinfectant in the environment.
- Personnel who are working with the animals should participate in an Occupational Health Program and be trained to use personal protective equipment (PPE) and to wash their hands frequently, and to only eat and drink in designated areas of the animal facility.
- Shower facilities should be available for personnel.

Standard Operating Procedures (SOP's)

- SOP's should be developed that describe in detail all the operational activities of the animal facility. SOP's should be approved by the IACUC and reviewed annually.
- Key documents would include descriptions of rules for entrance to the facility, animal husbandry procedures, animal ordering and receipt, quarantine processes, equipment operation and maintenance, and a copy of the emergency management plan.
- Personnel should be required to review the documents prior to working in the research facility and their training should be documented.
- The SOP's provide a mechanism that supports consistency of animal care, protects the health of the animals and helps to assure humane treatment.

Emergency Management Plan

- Facilities should have an IACUC-approved plan and written SOPs to follow in the event of an emergency.
- The safety of personnel as well as animals needs to be addressed. The plan should include evacuation for personnel as well as directions for relocation of animals and a protocol for emergency euthanasia.
- Contact information for responsible parties and community based response groups such as the fire and police department should be posted and remain current. First responders to any emergency will assume command and control with support and advice from senior ranking staff members of the animal facility.
- Training for personnel and coordination with local authorities should be documented and reviewed regularly. A risk analysis of various emergencies including natural and man-made threats should be carried out with the most probable events given the most planning and resources.
- Testing of portable or back up generators should be routinely performed. Flashlights or other portable lighting items should be available at all times. PPE should be stockpiled and inventoried routinely.



MISCELLANEOUS

SEE ALSO

- Biosecurity: Beef Cow/Calf (www.fiveminutevet.com/ruminant)
- Biosecurity: Cervidae (www.fiveminutevet.com/ruminant)
- Biosecurity: Dairy (www.fiveminutevet.com/ruminant)
- Biosecurity: Goats (www.fiveminutevet.com/ruminant)
- Biosecurity: Sheep (www.fiveminutevet.com/ruminant)

ABBREVIATIONS

- USDA= United States Department of Agriculture
- PHS= Public Health Service
- AAALAC= Association for the Assessment and Accreditation of Laboratory Animal Care
- PPE= personal protective equipment
- SOP= standard operating procedure
- IACUC= institutional animal care and use committee

SUGGESTED READING

National Institutes of Health, Office of Laboratory Animal Welfare – Public Health Service
Policy on Humane Care and Use of Laboratory Animals. Revised 2015

<https://grants.nih.gov/grants/olaw/references/phspol.htm>

<http://grants.nih.gov/grants/olaw/references/phspolicylabanimals.pdf>

Biosafety in Microbiological and Biomedical Laboratories, 5th Edition. 2009. US Department of Health and Human Services. HHS Publication No, (CDC) 21-1112

<http://www.aaalac.org/accreditation/RefResources/BMBL.pdf>

National Research Council, Committee on Considerations for the Future of Animal Science Research. Critical Role of Animal Science Research in Food Security and Sustainability. 2015. The National Academies Press. National Academy of the Sciences, Washington DC

http://www.ncbi.nlm.nih.gov/books/NBK285722/pdf/Bookshelf_NBK285722.pdf

Federation of Animal Science Societies. Guide for the Care and Use of Agricultural Animals in Research and Teaching, 3rd Edition, pp 25-30 January 2010.

Federation of Animal Science Societies. Savoy, Illinois

<http://www.fass.org/agguide3rd.asp>

http://www.aaalac.org/about/Ag_Guide_3rd_ed.pdf

National Agricultural Biosecurity Center

<http://nabc.ksu.edu/>

National Animal Health Laboratory Network

<http://nabc.ksu.edu/projects/14/national-animal-health-laboratory-network-nahln>

Manuja BK, Manuja A and Singh, K. Globalization and Livestock Biosecurity. Agricultural Research 2014 March 3(1): 22-31

<http://link.springer.com/article/10.1007%2Fs40003-014-0097-7>

Waage JK, Mumford JD. Agricultural Biosecurity. Philosophical Transactions of the Royal Society 2008 363: 863-876

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2610114/>

The National Agricultural Law Center: Agricultural Biosecurity

<http://nationalaglawcenter.org/research-by-topic/biosecurity/>

Author James F. Koterski

Consulting Editor Erica McKenzie