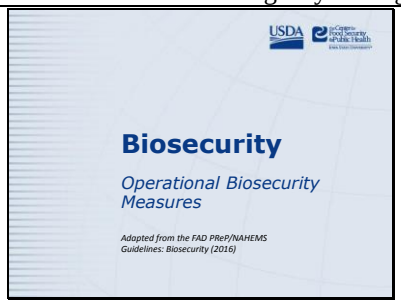
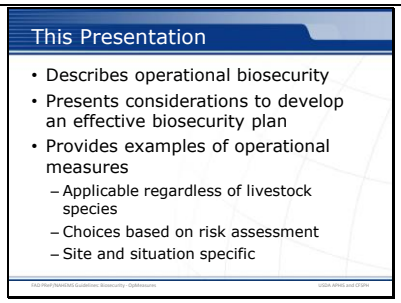
Slide 1



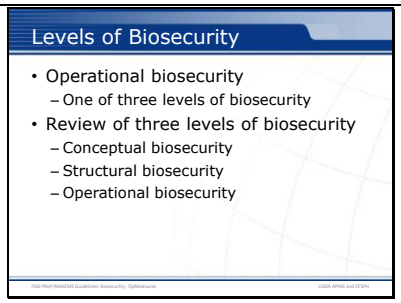
Biosecurity is a cornerstone of livestock production systems (including poultry production) to maintain food safety and security, protect the environment, and facilitate continuity of business by protecting animals and animal products. In addition to the daily protocols to protect the health of livestock populations, biosecurity is crucial in containing disease in a foreign animal disease (FAD) outbreak. Should the FAD also be zoonotic, biosecurity is necessary to protect public health. Understanding the risks of disease transmission and the necessary preventive procedures will be essential during the response. [This information was derived from the *Foreign Animal Disease Preparedness and Response (FAD PReP)/National Animal Health Emergency Management System (NAHEMS) Guidelines: Biosecurity (2016*)].

Slide 2



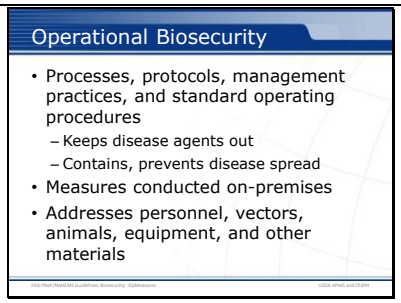
This presentation describes the operational level of biosecurity. It discusses several important concepts applicable to every biosecurity plan, such as the separation of clean and dirty areas, and how one transitions from one to the next. Then it provides examples of specific operational biosecurity measures adopted to mitigate risks common to many facilities. These examples may be applicable regardless of the species of livestock or type of housing. This presentation emphasizes that measures chosen are based on a risk assessment, plus the specific circumstances of the site and of the operation. Every livestock facility is different. This presentation provides examples commonly implemented in the livestock industry. Another presentation in this series "General Concepts of Biosecurity" provides guidance on the development of an effective biosecurity plan that utilizes effective biosecurity procedures.

Slide 3



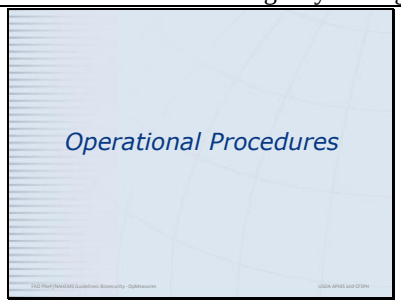
Operational biosecurity is one of the levels of biosecurity. As a review, the three levels of biosecurity are conceptual, structural and operational.
Conceptual biosecurity relates to the location, geospatial siting, and orientation of the facility. It also includes the scope and size of animal production units and complexes.
Structural biosecurity refers to the capital investment that enhances the ability to prevent disease spread. It includes the physical design, construction, and maintenance of a facility which help prevent the transfer or aid in the containment of disease.
Operational biosecurity refers to those processes and protocols, management practices, or standard operating procedures implemented to exclude or contain disease. Operational biosecurity pertains to procedures conducted on the premises, as well as the management of people, animals, supplies, equipment, vehicles, and other items related to disease control. This presentation will focus on the on-farm operational procedures.

Slide 4



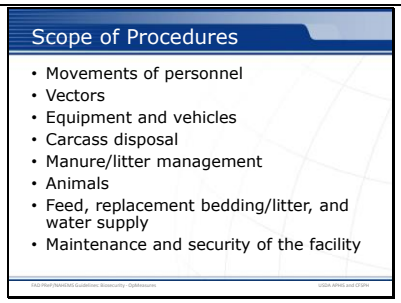
Operational biosecurity, when combined with structural and conceptual levels of biosecurity as described in the presentation "General Biosecurity Concepts" in this series, prevent the introduction and spread of pathogenic agents onto or off of an animal production or housing premises. Operational biosecurity refers to those processes and protocols, management practices, or standard operating procedures conducted on the premises to exclude or contain disease. This includes keeping disease agents out of uninfected animal populations, as well as containing and preventing the further spread of disease agents to other groups or locations. When properly implemented, operational biosecurity measures will help reduce the risk of disease spread by the movement of animals, personnel, equipment, and other materials.

Slide 5



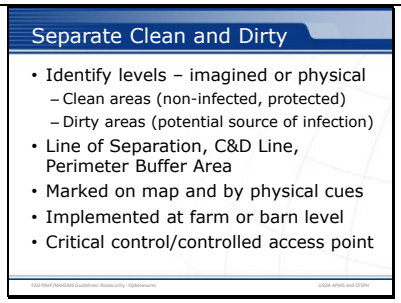
Operational procedures are those detailed in a written biosecurity plan, or in a written Standard Operating Procedures document. The procedures may include steps for the proper use and utilization of structural biosecurity measures, such as anterooms, Danish Entry Systems, wash stations, and directional barriers. Procedures should be chosen based on risk assessments of the individual situation, which may involve mitigating risks and gaps in the structural or conceptual biosecurity of the premises, as well as known disease in the area. A specific combination of measures should be chosen based on the specific circumstances of the site and of the operation. The following discussion provides examples of operational biosecurity measures to mitigate risk.

Slide 6



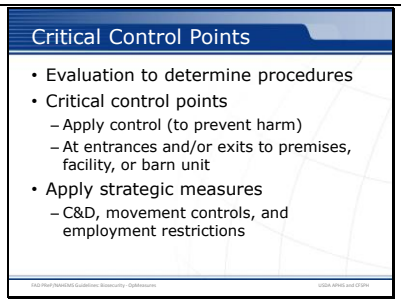
The development of a biosecurity plan focused on bioexclusion in routine livestock management, or biocontainment in a population of infected animals, involves similar concepts and considerations. A specific combination of measures should be chosen based on the specific circumstances of the site and of the operation. Operational biosecurity measures are commonly perceived as procedures related to personnel movement, but they also include processes to mitigate risks from:
-vectors;
-equipment and vehicles;
-carcass disposal;
-manure/litter management;
-animals;
-feed, replacement bedding/litter, and water supply; and
-maintenance and security of the facility.

Slide 7



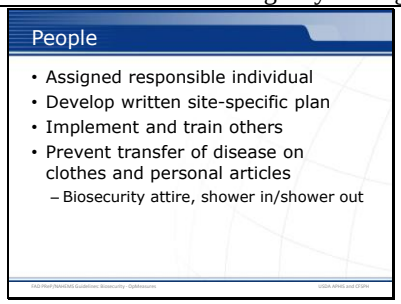
It is necessary to clearly identify levels of separation - imagined or physical - between the area considered clean (non-infected, protected) and the area considered dirty (potential source of infection). Physical separation of areas may be identified by a Line of Separation, a Clean/Dirty Line, or a cleaning and disinfection (C&D) line. The Line of Separation clearly demarcates non-contaminated from contaminated areas. On some livestock production operations, a Perimeter Buffer Area, as a transition space, places additional separation between the non-contaminated and contaminated space, to reduce pathogen load in the buffer environment and reduce the risk of disease transmission. Identification is made visually on a map, and is physically marked for all present at the facility. Separation may be implemented at the farm or barn level. A point where movements cross the Line is a critical control point, and can be referred to as a controlled access point. Limiting the number of access points across the Line of Separation, enhance compliance with biosecurity protocols that defend that control point.

Slide 8



The evaluation to determine the most effective operational biosecurity procedures is based on identifying critical control points, focusing on inputs and outputs. A critical control point is a point, step, or procedure where control can be applied to prevent the transfer of a disease agent (or in a more broad interpretation, to prevent harm). Points where the pathogen can be prevented from entering (or leaving) a premises, facility, or a barn unit (or perhaps all three) are identified as critical control points. They may be entrances to/exits from the clean area of the premises (movements of inputs/outputs), work pathways, or related processes where strategic measures, such as cleaning and disinfection, movement controls, and employment restrictions help to mitigate disease exposure. The next few slides will present examples of operational biosecurity measures.

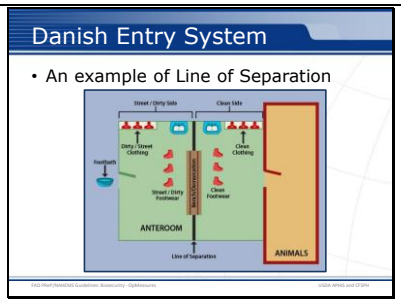
Slide 9



The movement and behavior of people, including caretakers and emergency response personnel, can pose a risk of transferring disease agents. The following are examples of operational measures pertaining to people.

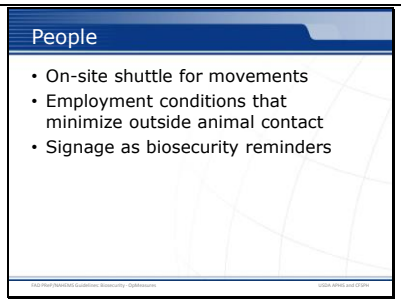
- An individual who is assigned to develop a written, effective, and site-specific biosecurity plan, and is also responsible for implementation, documented training, consistent enforcement, and compliance.
- A standard to prevent the transfer of contamination on clothing and personal articles. For all who enter/leave the facility or cross the Line of Separation, the Clean/Dirty Line, and/or enter the Perimeter Buffer Area, the methods to achieve the standard may include donning freshly laundered or disposable site-specific outerwear, including boots, provided by the facility (biosecurity attire); prohibiting drivers of delivery/pick up vehicles from exiting the vehicle, unless disposable boot covers provided by the facility are worn; shower in/shower out facilities; and protecting cell phones in clear waterproof cases so they can be submerged in disinfectant when leaving the contaminated area.

Slide 10



This illustration shows an example of a Danish Entry System, utilizing a bench dividing the anteroom and providing a visual and physical Line of Separation between clean and dirty areas. Personnel, who are potentially contaminated, enter the anteroom from the left and are prompted to perform the appropriate biosecurity protocols prior to crossing the Line of Separation (centered brown bench) to enter the animal building on the right. Common procedures involve leaving street clothes on the 'dirty' side (left), washing hands, crossing over the bench to don clean site-specific outerwear including footwear, and washing hands again before entering the animal area. The same protocols are followed in reverse as personnel leave the animal housing on the right, cross back across the Line of Separation to leave. This anteroom, a structural biosecurity measure, encourages compliance with appropriate operational protocols. [*This example of a Danish Entry System is adapted from http://www.inspection.gc.ca/animals/terrestrial-animals/biosecurity/standards-and-principles/general-producer-guide/eng/1398640321596/1398640379048?chap=9. Illustration by Sydney Heppner, Iowa State University*]

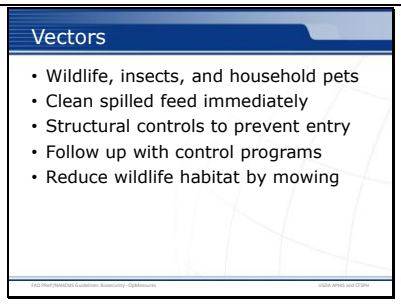
Slide 11



Additional examples of operational measures pertaining to people include:

- An on-site shuttle to transport people from an entrance where biosecurity measures are implemented to an internal facility location, avoiding contamination in route.
- Employment conditions that minimize contact with outside animals through interactions that may pose a disease risk.
- Signs posted to remind people of biosecurity procedures. Required biosecurity procedures may include observing restricted areas, maintaining the Line of Separation, donning appropriate outerwear, washing hands, cleaning and disinfecting boots, and escort requirements for visitors.

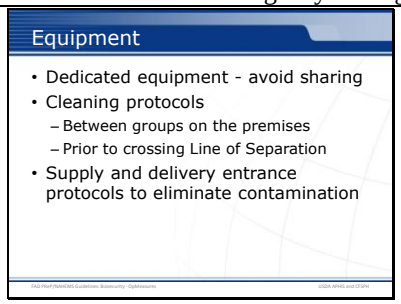
Slide 12



Living creatures such as wildlife, insects, and even household pets can spread disease as mechanical vectors and/or biological vectors. Examples of operational measures pertaining to vectors include:

- The immediate cleaning of any spilled feed or material that may attract vectors.
- Excluding wildlife and household pets from entering restricted animal areas.
- Control programs that eliminate vectors that may have entered the facility despite structural controls. This may include services of an outside pest control contractor, who also abides by all biosecurity protocols.
- Scheduled frequent mowing of grounds surrounding animal areas to reduce habitat.

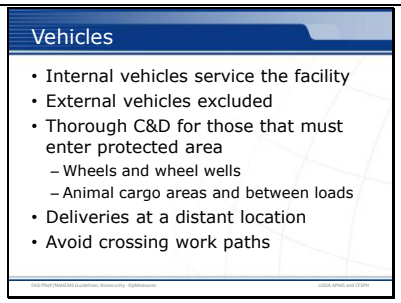
Slide 13



Supplies and equipment, especially shared equipment, can harbor and transfer pathogens. Exposure of livestock to disease can occur through contact with the contaminated equipment, or through the environment contaminated by equipment. Examples of measures to mitigate risk include:

- Equipment dedicated to a population of animals to avoid the necessity of sharing between groups or between facilities. This would include tools for maintenance of the facility.
- Effective cleaning and sanitizing protocols for all equipment and tools between groups of animals and prior to crossing the critical control point or Line of Separation.
- Supply and delivery entrances that have associated strict biosecurity protocols to eliminate contamination. This may involve removing unnecessary packaging and decontaminating supplies with solutions, heat, or UV light prior to entry.

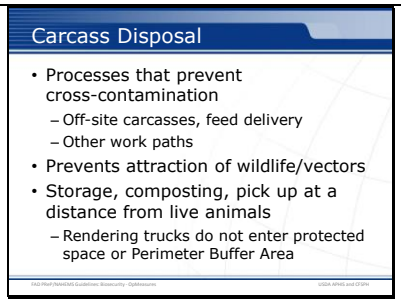
Slide 14



Vehicles, especially vehicles travelling between livestock facilities, may transport and introduce pathogens. These biosecurity examples vary in their ease of implementation. The risk needs to be weighed against the effort to implement.

- Internal vehicles utilized to service the facility. These vehicles do not leave the facility (the Perimeter Buffer Area) and are frequently and thoroughly cleaned and disinfected. Internal vehicles may assist in moving people, equipment, and supplies within the facility.
- Exclusion of outside vehicles from crossing the Line of Separation, but are directed to park in designated lots outside the protected area.
- Cleaning and disinfection protocols at controlled access points for vehicles that must enter the Perimeter Buffer Area or cross the Line of Separation. Pay particular attention to wheels, wheel wells, and animal cargo areas. Cleaning and disinfection protocols for animal transport carriers between loads (exterior and cargo area of the carrier).
- Deliveries received at a location at some distance from animals, and on-site shuttles move materials to permanent locations.
- Routes to keep necessary service vehicles (feed, milk, animal delivery/load-out trucks) from crossing other work paths.

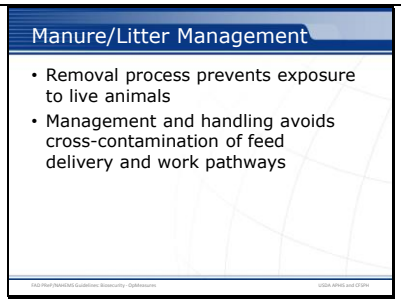
Slide 15



Livestock deaths may or may not be due to disease but are still a biosecurity risk for the rest of the herd/flock. The handling and disposal procedures for carcasses should avoid exposing the rest of the livestock population. Examples of general protocols include:

- Disposal processes that prevent cross-contamination with carcasses from off-site, or other processes, such as feed delivery, or work pathways.
- Disposal in a manner that prevents attraction of wildlife, scavengers, and pets.
- Storage of carcasses prior to pick up (both short term and long term), and composting located at a distance from live animals.
- Carcass pick up by renderers at a distance from live animals, so that rendering trucks do not enter the perimeter barrier or Perimeter Buffer Area of the facility.

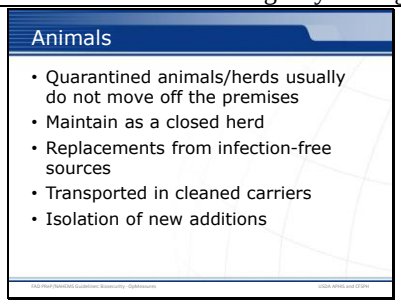
Slide 16



As with carcasses, the intention is to prevent reintroduction of any pathogen that may be present in manure or litter back into the herd/flock or into other herds or flocks.

- Removal of manure and spent litter that prevents exposure to live animals and avoids cross-contamination of other processes, such as feed delivery or work pathways.

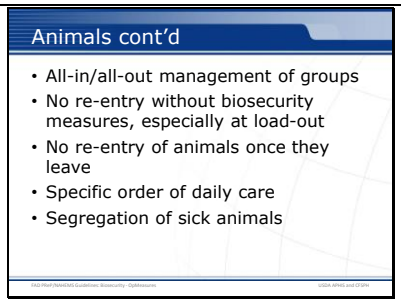
Slide 17



Animals, whether showing signs of disease or not, may be the most recognizable entity to move disease between populations. Animals and herds quarantined for disease are not usually allowed to move off the premises. Examples of sound animal management practices for healthy herds/flock include:

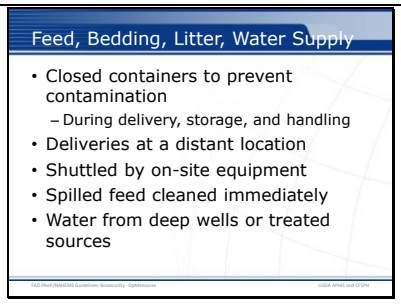
- Maintenance of a closed herd, where all new animals are offspring born and raised on the operation.
- Replacement livestock from sources with documented biosecurity practices and a history of freedom from infection, preferably based on diagnostic testing. This also applies to embryos and semen from outside sources.
- Transportation of arriving animals in freshly cleaned and disinfected carriers to limit disease exposure from previously transported loads.
- Isolation of new additions. In some cases, a 30 day isolation before co-mingling with the established animal population is recommended.

Slide 18



- All-in/all-out management of groups of animals. Groups stay together from the time of arrival, through growth, and until they leave for processing.
- Load-out area with the Line of Separation clearly marked so that animals, people or equipment that cross the Line to leave the facility do not return, unless full cleaning and disinfection procedures are used. Employees move animals to the trailer for load-out, but do not cross the Line. Truck drivers prevent the animals from escaping the trailer back into the facility.
- Animals that leave the premises do not return.
- Daily care provided in order of disease susceptibility. Contact is made with young, more susceptible animals before moving to older, less susceptible animals on the premises.
- Segregation of sick animals for treatment to limit exposure to naïve animals. Care is provided to sick animals last, after care has been provided to healthy animals.

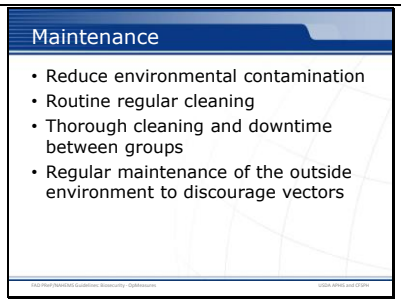
Slide 19



As other inputs can introduce contamination into a herd/flock, the feed, bedding and water should not be overlooked in contributing to risk of disease. Some examples pertaining to these inputs include:

- Grain, feed, and fresh bedding/litter delivered, stored, and handled in closed containers to prevent contamination by wildlife and/or disease agents.
- Outside deliveries accepted at a location remote from animal areas, and then shuttled by on-site equipment to internal locations.
- Grain spills immediately cleaned so as not to attract wildlife.
- Water from deep wells or sources treated to eliminate disease contamination.

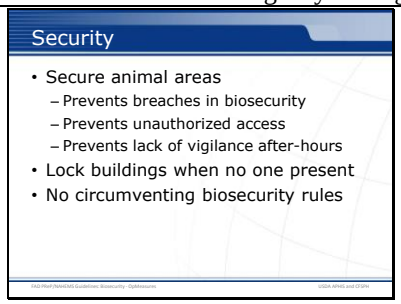
Slide 20



Reducing environmental contamination that may unavoidably occur is part of any biosecurity plan and is as important as the equipment maintenance plan. Maintenance tasks in the biosecurity plan may include:

- Routine regular cleaning and disinfection of all working parts of the facility to reduce environmental contamination. Some parts/items may be cleaned after use, when an item is moved from one location to another, or cleaned on a routine schedule.
- Thorough cleaning, disinfection, and downtime of housing areas between groups of animals.
- Regular maintenance of the outside area to discourage vectors, for example, mowing tall grass.

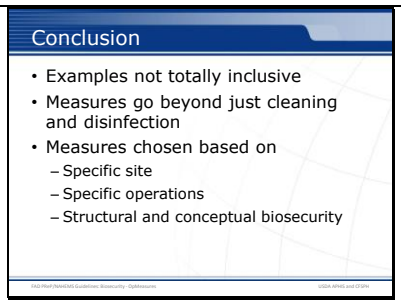
Slide 21



Securing animal areas prevents breaches in the biosecurity protocol due to unauthorized access or a lack of vigilance after hours. Security considerations include:

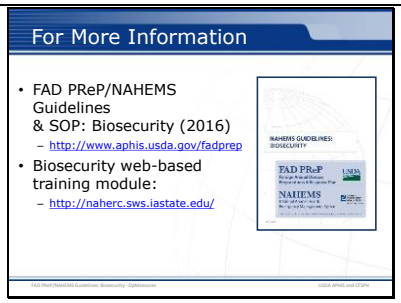
- Buildings are locked when no one is present, preventing unauthorized access.
- Entry gates circumventing biosecurity procedures are locked at all times.

Slide 22



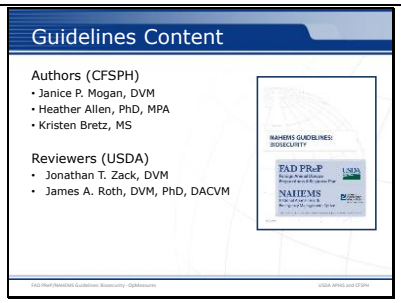
Livestock owners and producers need to choose wisely from these as well as other biosecurity examples. This list is not totally inclusive, but note that measures go beyond just cleaning and disinfection. All operational biosecurity measures should be chosen as best suited to the site and its operations, and to its structural and conceptual biosecurity, to isolate animals as much as possible and protect them from exposure to disease. See the *FAD PReP/NAHEMS Guidelines: Biosecurity* document for more information and resources.

Slide 23



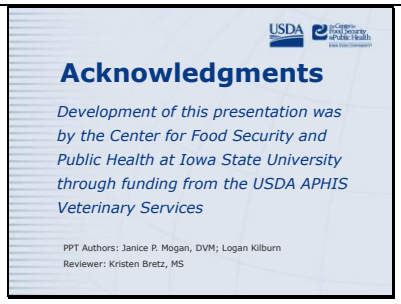
More details can be obtained from the sources listed on the slide, available on the USDA website (*http://www.aphis.usda.gov/fadprep*) and the National Animal Health Emergency Response Corps (NAHERC) Training Site (*http://naherc.sws.iastate.edu/*).

Slide 24



The print version of the Guidelines document is an excellent source for more detailed information. This slide acknowledges the authors and reviewers of the Guidelines document. It can be accessed at *http://www.aphis.usda.gov/fadprep*.

Slide 25



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