



Biosecurity Principles

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TAKE HOME MESSAGES:

1. Biosecurity minimizes the introduction of pathogens into farms.
2. Simple biosecurity measures can be implemented but must be followed by all farm personnel for success.
3. A closed market and a decrease in trade could occur if improper biosecurity measures are used.

What is biosecurity?

Biosecurity is a combination of practices to prevent the introduction of pathogens to pig populations. Pathogens must be carried by a “pathogen-carrying agent,” any object, animal, or person. On a pig farm, this could include animals, trailers, trucks, people, and equipment.

Biosecurity is the sum of bioexclusion (external biosecurity), biomanagement (surveillance) and biocontainment (internal biosecurity). Bioexclusion is the process of preventing the disease from entering the barn or facility where the animals are located. Biomanagement controls the pathogen activity within the barn. Biocontainment is maintaining the pathogens inside a facility and preventing spread to other facilities (Levis et al., 2018).

How to Apply Biosecurity Principles?

Examples of biosecurity principles include “all in-all out” management, having internal replacement (closed herds), and testing incoming gilts in quarantine before introduction to the breeding herd. When a growing pig barn is filled with animals all at once, and then all the animals are marketed at once, this is an all in-all out-management practice. Once the barn is empty of animals, it should be cleaned with high-powered water and chemical disinfectant. Once the barn is cleaned and dried, a new set of pigs will enter and

remain in the barn until market. A closed herd is when all replacement animals are born on the premises and not brought in from outside sources, reducing the risk of pathogen entry into the farm. Finally, quarantine periods are important, especially in breeding herds, to decrease the risk of new animals introducing pathogens to the farm. The quarantine period involves a group of animals in an isolated room/barn that undergo routine testing to confirm negative to specific pathogens such as PRRSV or *Mycoplasma hyopneumoniae* prior to introduction to resident animals.

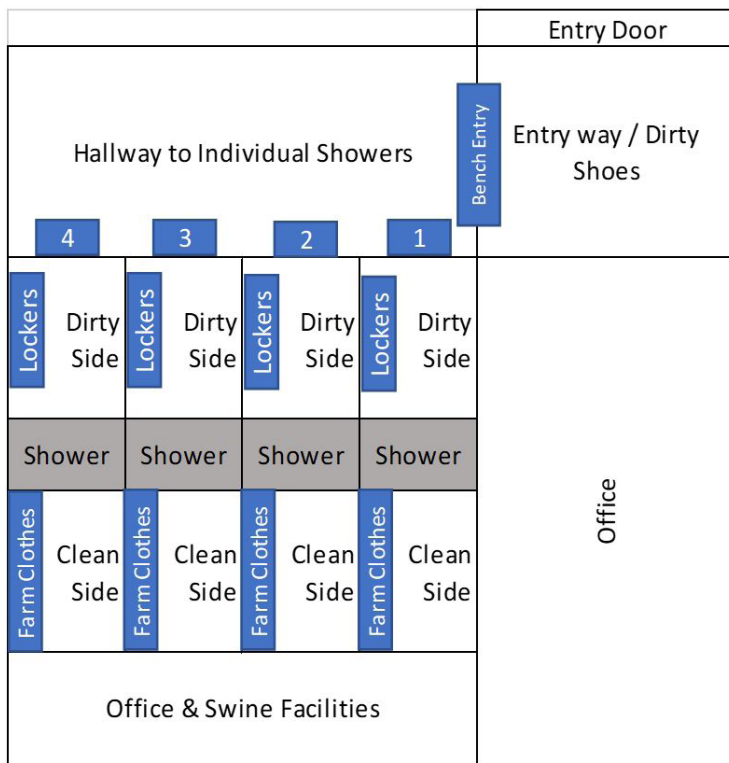
Visitor entry risk can be minimized by establishing protocols including different unidirectional areas of transition, for instance delineated by clean/dirty lines. This could include a line at the door entrance where people change shoes, another line of duct tape separating area of changing clothes and showering, and another line to enter the clean farm area. Following the line of separation creates an obstacle that visitors and farm personnel must cross to enter the farm. A typical bench entry is illustrated in Figure 1. A study by Amanda Anderson et al. compared contamination between a bench entry protocol and a non-bench entry protocol. The results revealed contamination after the showering process without the bench entry and no contamination after the showering process that included a bench entry (Anderson et al., 2018).

Figure 1. Swine Medicine Education Center, Bench Entry.



Finally, an additional layer of biosecurity for visitor introduction following the line of separation and bench entry is a shower-in, shower-out process. During this process, outside clothes will be removed on the “dirty” side of the shower, followed by taking a thorough shower, drying off, and putting on clothing provided by the farm on the “clean” side (Anderson et al., 2018). An example of what the showering process looks like is provided in Figure 2.

Figure 2. Diagram of the Shower-in/Shower-out Process in Swine Facilities.



Many pathogens can be carried by fomites such as rats, mice, flies, and birds. To decrease the introduction of these pathogens to the herd, a pest control protocol must be in place. A common pest control protocol for rats and mice are bait stations around the inside and outside of the barn that contain poison and are refreshed monthly, along with maintaining the facility to keep rodents and pests out.

Importance of Biosecurity

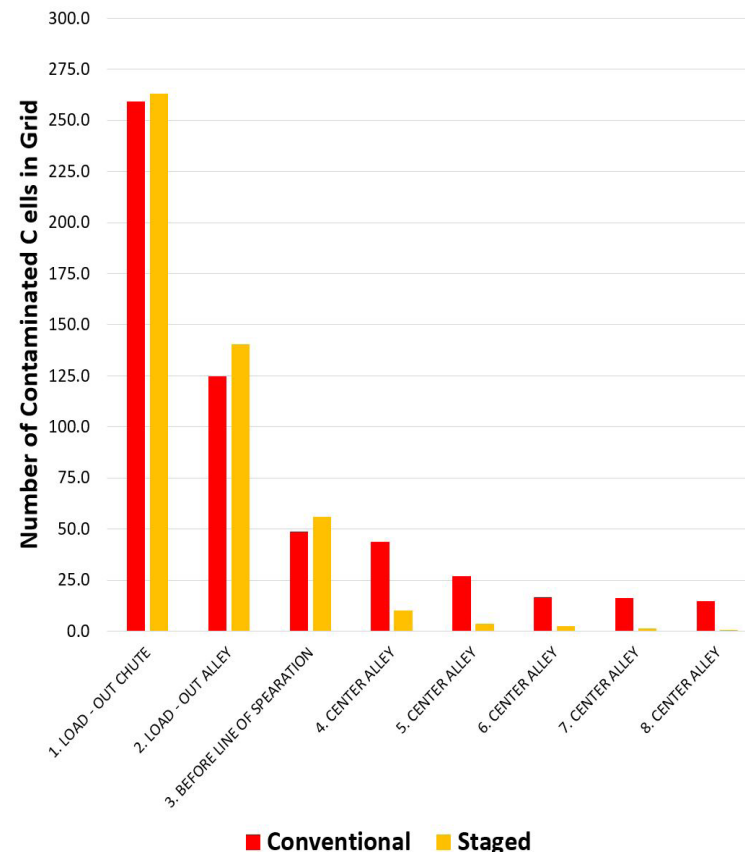
Biosecurity can affect performance, economic results and even the trade market during a foreign animal disease outbreak. Once a pathogen enters a farm and infects a population of pigs, it will affect performance, and clinical effects will be seen. Once clinical signs are

evaluated, if it is not controlled or eradicated, the pathogen will cause economic impact. (Gillespie, 2018) In the case of a foreign animal disease, if the pathogen enters the United States, it will cause trade

Biosecurity Study

A pilot study executed by doctors Chelsea Ruston and Derald Holtkamp, called “Evaluation of a staged loading procedure for load out to reduce the transfer of contamination from livestock trailers to the barn,” determined a fluorescent powder could be used to detect the transfer of contamination from livestock trailers into the alleyways and pens of the barn during marketing events. This study reiterated the importance of not entering the livestock trailer and re-entering the barn due to the risk of transferring disease. Using a staged loading procedure or adding a second line of separation for marketing events greatly decreased the amount of contamination entering the barn, as seen in (Table 1).

Table 1. Combination Chart created from the data behind the “Staged Load Out” Procedure. (Ruston et al., 2021)



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Ruston CR, Linhares D, Blay E, Nickel M, Skoland K, Kittrell H, Brown J, Karriker L, Breuer M, McKeen L, Holtkamp DJ. Evaluation of a staged loadout procedure for market swine to prevent transfer of pathogen contaminated particles from livestock trailers to the barn. *J Swine Health Prod.* 2021;29(5):234-243.

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