



Biosecurity Procedures for Visits to Swine Farms

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Introduction

Biosecurity practices are used to prevent or minimize the introduction of infectious disease-causing organisms onto a farm. Biosecurity also includes the steps taken to control the spread of pathogens within a farm. The procedures outlined in this document are intended to minimize the risk of disease transmission during swine farm visits in the state of Hawai'i. There are two categories of visits described, based on the risk and type of biosecurity needed for the visit. These procedures are recommended for all Hawai'i Department of Agriculture (HDOA) and University of Hawai'i at Mānoa employees and students who make visits to swine farms. For individuals who are working with swine in the Small Animal Facilities or other University of Hawai'i research facilities, these procedures will not apply.

Some farms may ask you to abide by different biosecurity procedures when visiting than those defined here. It is advisable to call beforehand to ask if any specific measures, such as not visiting another farm in the same day, need to be followed. Please follow all biosecurity procedures set by the farmer.



Definitions

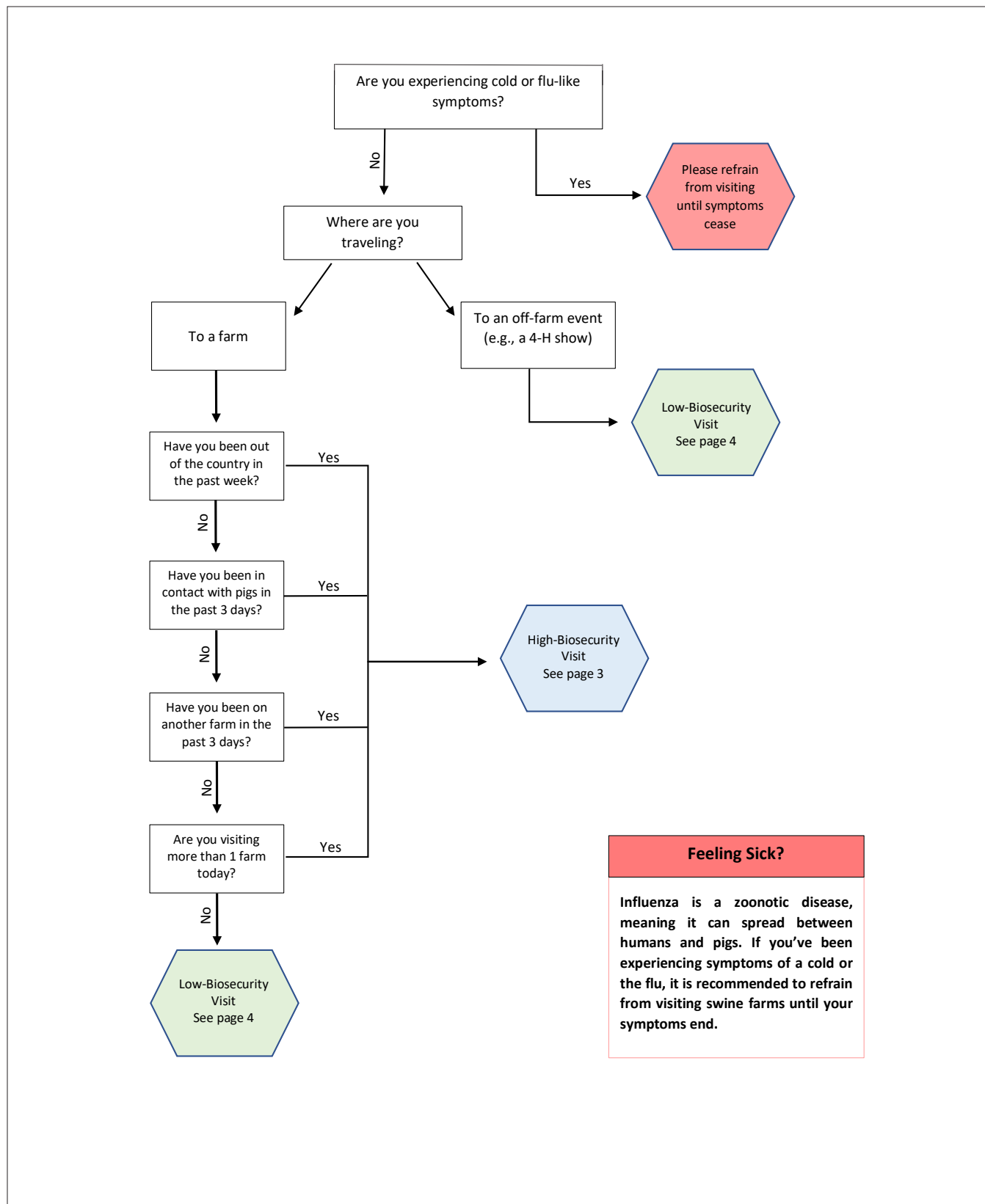
- **High-Biosecurity Visit:** visits to farms that are known or suspected disease risks and/or visits performed by high-risk individuals
- **High-Risk Individual:** individual who meets at least ONE of the following criteria: (1) routinely performs farm visits, (2) has regular contact with domestic or feral swine, (3) has recently returned from a foreign country where swine foreign animal diseases may be present, or (4) is visiting

multiple farms in one day.

- **Low-Biosecurity Visit:** visits to farms believed to be healthy by low-risk individuals. These visits also include on- and off-farm events where live animals will be present (e.g., 4-H events, livestock shows, etc.).
- **Low-Risk Individual:** a healthy individual who has not had or does not have routine contact with swine.

General Requirement

- Individuals performing the farm visit(s) must be generally healthy, with no symptoms of cold or flu.



Supplies Needed

- Clean clothes, coveralls, and boots/shoes
- Disposable coveralls (Tyvek®, DuPont™) and multiple sets of plastic boot covers (“booties”)
- Virkon™ S Disinfectant or other approved, farm-safe disinfectant
- Disposable gloves (e.g., nitrile, latex, or vinyl)
 - Note: If collecting semen or performing artificial insemination (AI), do not use latex gloves, as they are spermicidal.
- Water container(s) for potable water
- Pump sprayer or spray bottle, filled with premade disinfectant
- Bucket and long-handled scrub brush
- Trash bags – large and small
- Small, sealable plastic bags (e.g., Ziploc®)
- Disinfected container(s) for storage and transport
- Disinfectant wipes (e.g., Clorox® Disinfecting Wipes)
- Hand sanitizer and/or hand soap if the farm has a hand-washing area
- First aid kit

What Biosecurity Practices Should You Use?

High-Biosecurity Visit

Before the Farm Visit

- Create disinfectant solution using a farm-safe disinfectant according to manufacturer recommendations to the desired volume.
- Clean clothes and shoes should be worn underneath clean cloth coveralls. Remove all watches and jewelry. Long hair should be tied back and tucked into coveralls.
- In the cab of the vehicle, place plastic booties, small trash bags, disinfectant wipes, hand sanitizer/soap, and the first aid kit. All other supplies should be placed in the trunk. Place small plastic trash bags under or beside each seat, one for each person who is performing the farm visit.
- When farm gate is in sight, stop at a non-muddy area between the road and the farm gate. Place feet in plastic booties before stepping out of the vehicle (Figure 1). Spray vehicle tires with premade disinfectant with the pump sprayer (Figure 2). If possible, spray surface of pump sprayer that came into contact with the ground. To get back into the vehicle, remove one

foot from disposable bootie and place into vehicle. Sit in the vehicle. Remove the other foot from plastic bootie and place that foot into vehicle. Dispose of the booties in trash bag. Try to perform this when there is no traffic.

During the Farm Visit

- Vehicle should be parked outside farm gate when possible. If it is not possible, the vehicle should be parked away from pens and feed storage in a non-muddy area.
- If an item that cannot be disinfected is to be taken onto the farm (e.g., cell phone), place it inside a seal-



Figure 1. How to enter and exit a vehicle while putting on or taking off booties. Photo credit: Natasha Odegard



Figure 2. Disinfecting vehicle tires minimizes the risk of carrying pathogens onto or off a farm. Photo credit: Natasha Odegard

- able bag (e.g., Ziploc®) before leaving the vehicle.
- Open vehicle door. Without removing shoes, place feet into disposable plastic booties before stepping out of the vehicle. Remove clean boots from vehicle. In one motion, remove one foot from plastic bootie and footwear, step into Tyvek® coveralls, and place foot into the clean boot, never allowing the foot or Tyvek® coveralls to touch the ground. Repeat for other foot. Finish putting disposable coveralls on and zip the suit up fully. Double-glove hands.
- Disinfect boots and all applicable equipment (e.g., snares, sorting boards, etc.), allowing adequate contact time with the disinfectant.
- Perform farm visit.
- Place any paperwork from farm visit into a sealed plastic bag.
- Clean supplies to remove all visible manure and other debris, scrubbing with long-handled scrub brush if needed. Apply disinfectant to the items. Place the decontaminated item(s) in a clean container or clean location inside vehicle. If possible, spray the area of



Figure 3. Planning ahead when packing the vehicle will ensure all needed supplies are in easy reach. Also, lining a bucket with a plastic bag creates a trash can that is ideal for disposing of plastic booties and trash. Photo credit: Natasha Odegard

- the truck that came into contact with materials used on the farm visit. Alternatively, use a large plastic bag or bin to prevent contact of the items with the vehicle.
- When removing boots and disposable coveralls, unzip coveralls to remove arms and torso. In one motion, remove one foot from boot, pull that leg out of the coveralls, and place foot into the disposable bootie containing the original footwear. Repeat with other leg. Dispose of coveralls in trash bag along with the outer layer of gloves. Boots should be scrubbed with the long-handled scrub brush with disinfectant before placing into the vehicle in the appropriate container or bag.
- Clean and disinfect any containers that came into contact with the ground or gloved hands before placing into the vehicle.
- To enter the vehicle, see the starred bullet point.
- If any personal object was taken onto the farm in a plastic bag, disinfect the outside of the bag. Remove the remaining gloves from hands and dispose in trash bag. Remove object from the bag and discard the plastic bag. Sanitize hands. Disinfect any watches or other items that were worn on the wrists or hands.
- Close vehicle door. When leaving farm, the vehicle tires should be sprayed with disinfectant. Repeat the starred bullet point.

Low-Biosecurity Visit

Before the Farm Visit

- A pig-free period of at least three days is required before the farm visit. This is not necessary for off-farm events.
- Clean clothes and shoes should be worn, preferably clothing that has never been around pigs. Long hair should be tied back and tucked into coveralls or cap. Coveralls are highly recommended but not required if the individual is low risk and minimal animal contact is expected.
- Place a small trash bag (if one person) or large trash bag (if multiple people) in the vehicle.
- When farm gate is in sight, stop at a non-muddy area between the road and the farm gate. Place feet into plastic booties before stepping out of the vehicle. Spray vehicle tires with disinfectant that was premade in the pump sprayer. If possible, spray

surface of pump sprayer that came into contact with the ground. To get back into the vehicle, remove one foot from disposable bootie and place into vehicle. Sit in the vehicle. Remove the other foot from plastic bootie and place that foot into vehicle. Dispose of the booties into trash bag. Try to perform this when there is no traffic.

During the Farm Visit

- If necessary: Create disinfectant solution using a farm-safe disinfectant and water. Disinfectant solution should be made as the manufacturer recommends to the desired volume. If no supplies will need disinfecting, skip this step.
- Before exiting the vehicle, remove all jewelry, watches, and phones and leave the items in the vehicle. If a phone or any other device must be taken onto the farm, either place it into a sealable plastic bag or disinfect it after the visit is complete.
- Open the vehicle door. Place feet still in their shoes in plastic booties before stepping on the ground.
- If necessary: Disinfect boots and all applicable equipment (e.g., snares, sorting boards, etc.). If no supplies need disinfecting, skip this step.
- Before beginning the farm visit, hands should either be washed/sanitized or gloves should be worn. In cases where gloves will hinder the farm work (e.g., during AI), hands should be thoroughly washed with soap before and after the procedure.
- Perform farm visit.
- If no gloves were worn, wash hands and forearms thoroughly with soap and water before leaving the farm. If no handwashing area is present, use hand sanitizer once in the vehicle. Wash hands and forearms at the first opportunity.
- To enter the vehicle, open door. Remove the plastic bootie from one foot and place foot in vehicle. Repeat with the other foot. Plastic booties should be placed in a trash bag and when possible, disposed of on the farm.
- Optional: If a phone or other device was taken onto the farm in a sealed plastic bag, disinfect the outside of the bag and sanitize hands before removing it. If an object was taken and not placed in a sealed plastic bag, disinfect the object with disinfecting wipes (e.g., Clorox® Disinfecting Wipes) and then sanitize hands.
- Optional: If coveralls were worn, remove coveralls before entering the vehicle. When removing cloth coveralls, unzip/unbutton coveralls to remove arms and torso. In one motion, remove one foot from boot, pull that leg out of the coveralls, and place foot into the disposable bootie containing the original footwear. Repeat with other leg. Coveralls should be turned inside out during the process. Place coveralls in trash bag or plastic bin.
- Close vehicle door. When leaving farm, the vehicle tires should be sprayed with disinfectant. Repeat the starred bullet point.

After Every Farm Visit

- Before cleaning the vehicle, park on concrete in a non-muddy area.
- Remove and disinfect any supplies in the vehicle that were used on the farm visit. Disinfect the floor mats. Contact time with disinfectant should follow manufacturer recommendations. Rinse materials with potable water after they have been disinfected, and allow to air-dry.
- If possible, spray down seats, dashboard, seatbelts, door handles, and other interior surfaces with disinfectant. If the vehicle has fabric upholstery, use disinfecting wipes and wipe down instead.
- Wash hands and forearms with soap and warm water.
- Using hot water, launder clothing, shoes, and coveralls (if applicable) worn during visit.

The Importance of Biosecurity

Several swine diseases have been shown to be mechanically transmitted through fomites, or infected objects. One such disease is porcine epidemic diarrhea virus (PEDv). A 2017 study (Yonghyan et al.) monitored PEDv transmission between groups of 3-week-old piglets using varying levels of biosecurity. Ten piglets were inoculated with a PEDv strain and housed in the same room with 2 sentinel pigs (INF group). Ten piglets each were assigned to the low-biosecurity (LB), medium-biosecurity (MB), and high-biosecurity (HB) groups. A negative control group consisting of six pigs was housed separately.

Movement between groups was initiated 44 hours after inoculation of the INF pigs. Three groups of researchers interacted with the INF group for 45 minutes before moving to interact with either the LB, MB, or HB pigs for an additional 45 minutes. Between the INF

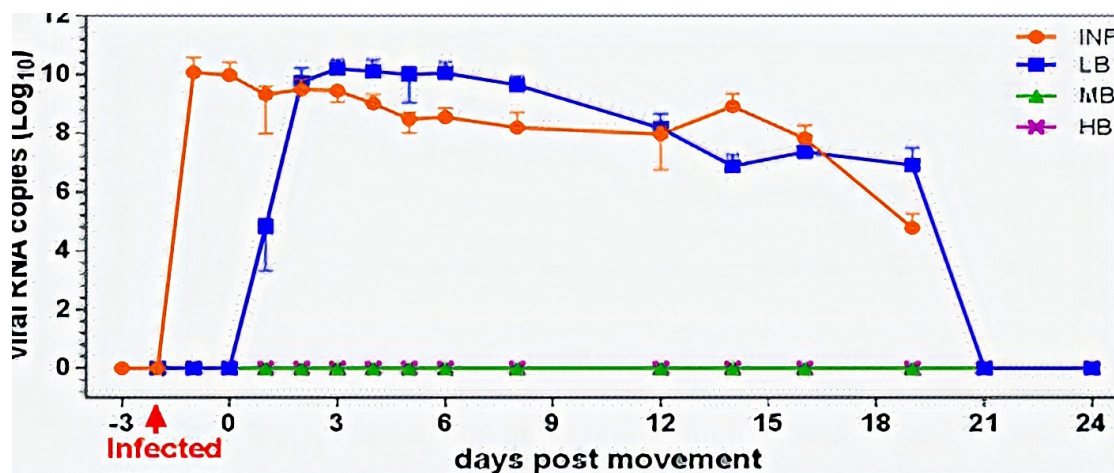


Figure 4. INF pigs were considered positive for PEDv 1 day post-infection. LB pigs began shedding viral RNA in their feces 1 day after movement occurred, which was detected by rRT-PCR. The MB, HB, and control groups remained negative for viral shedding throughout the study (Yonghyang et al. 2017).

and LB rooms, clothing and boots were not cleaned, nor did the researchers wash their hands. Researchers who went from INF to MB pigs changed their clothes and boots. Additionally, the researchers washed their hands and faces. Finally, movement between the INF and HB groups only occurred after showering, changing clothes and boots, and washing their hands and faces.

This study illustrates that basic biosecurity procedures can lower the risk of transmitting PEDv between pens of pigs. This knowledge can be extrapolated to movement between farms. Changing clothing, changing gloves or washing hands, and either wearing different shoes or boot covers can lower the risk of disease transmission between farms.

References

- Levis, D.G., and R.B. Baker. 2011. Biosecurity of pigs and farm security. University of Nebraska-Lincoln Extension EC289. Lincoln, Nebraska, U.S.
- Morley, P., B. Burgess, D. Van Metre, and B. Ouyang. 2015. Infection control and biosecurity standard operating procedures (SOP). James L. Voxx Veterinary Teaching Hospital, Colorado, U.S. <http://csu-cvmb.colostate.edu/vth/diagnostic-and-support/biosecurity-and-infection-control/Pages/default.aspx>. (Accessed 1 June 2017)
- Yonghyang, K., M. Yang, S.M. Goyal, M.C-J. Cheeran, and M. Torremorell. 2017. Evaluation of biosecurity measures to prevent indirect transmission of porcine epidemic diarrhea virus. *BMC Vet. Res.* 13(89), DOI 10.1186/s12917-017-1017-4.
- Zimmerman, J.F., L.A. Karriker, A. Ramirez, K.J. Schwartz, and G.W. Stevenson. 2012. Diseases of Swine 10 ed. Wiley-Blackwell, West Sussex, UK.