

Recommendations to prevent the spread and/or introduction of Avian Influenza virus

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Sources and Transmission

1. Transmission between premises

Feces from infected birds are the most important source of avian influenza virus (AIV). Cloacal shedding for 7-14 days post infection is usual but may occur for up to 4 weeks after infection. High moisture and low temperatures increase virus survival in manure. Mechanical transmission by anything that can walk, crawl, or fly from farm to farm can and will occur. Mammals, like rats and mice, insects (including flies) and wild birds, especially waterfowl can transmit avian influenza. AIV can also be found on the outer surfaces and inside of shell eggs. Transfer of eggs is a potential means of AIV transmission. Airborne transmission of virus from farm to farm probably does not occur. The spread of avian influenza between poultry premises almost always follows the movement of people and equipment.

2. Transmission between birds

Contrary to the transmission of AIV between premises, transfer of virus between birds in a single house is commonly from airborne secretions. However, contact with infected fecal material remains the most important mode of bird-to-bird transmission.

Based on this understanding of AIV sources and transmission, the following recommendations have been designed to prevent the spread of avian influenza between poultry premises and the introduction of new infections to susceptible birds. We have outlined these recommendations based on the three key principles of Biosecurity, *isolation*, *traffic control*, and *sanitation*.

A. Isolation refers to the confinement of animals within a controlled environment. A fence keeps your birds in, but it also keeps other animals out.

Mechanical transmission of AIV by anything that can walk, crawl, or fly from farm to farm should be presumed.

1. Prevent the introduction of new birds to a previously infected facility for 2-3 weeks after cleanout.
2. Clean out vegetation around poultry houses to remove shelter and food for possible carriers.
3. Institute a vector control program for insect, mammal and avian vectors. These vectors are important because they can mechanically carry infected feces from one house or premise to another.
 - a. Improve barriers to prevent the access of wild birds to poultry houses.
 - b. Institute an insect control program. Flies of several species are important in the transfer of AIV.

- c. Rodents have been implicated in the transfer of AIV. Rodent control and preventing their traffic between houses on a single premise are essential.
4. Prevent the accumulation of standing water. This is a great attraction to migrating waterfowl and shorebirds, both of which have been implicated in AI outbreaks. All birds can transmit AIV mechanically, but waterfowl, and shorebirds, including gulls are important because they can bring AIV into a previously uninfected flock and begin an infection that rapidly spreads.
5. Limit sources of food for wild and free-flying birds. Clean up spills when they happen.
6. Educate your employees about the dangers of live bird markets and advise them not to raise their own poultry for any purpose. Advise them also, not to visit live bird markets or other poultry premises.
7. Advise your employees to avoid dead wild and free-flying birds they find. Any found on your premises must be treated as though they are highly infectious. Handle them with gloves, place in a plastic bag, and seal it, finally, a complete change of clothes including shoes and a shower should happen before entering poultry facilities.

B. Traffic Control includes both the traffic onto your farm and the traffic patterns within the farm.

The spread of avian influenza follows the movement of people and equipment.

1. Be a good neighbor. If you have or suspect AI, initiate a self-imposed quarantine.
2. Keep logbooks of visitors to your facilities.
3. Keep human farm-to-farm traffic to a minimum. Conduct business by phone when possible.
4. Find out where someone has been before inviting them onto your premises. Inspect visitors for evidence of cleanliness and contact with other birds before they come onto your premises.
5. Make no unnecessary visits to other farms.
6. Do not let truck drivers, repairmen, or delivery personnel step out onto your facility without clean or new protective foot covering and clean coveralls. It is best to provide plastic boots and coveralls for this purpose. Shoes and clothes are an excellent vehicle for the transmission of AIV.
7. If your company has several farms, establish zones to prevent one person from traveling to all farms.
8. Require employees and crews to wear freshly laundered clothing or clothing supplied at the farm each day. Do not allow persons employed at other poultry operations on your premises.
9. Isolate dead bird disposal outside the perimeter of the ranch. Control traffic to and from bird disposal. Carcasses can be a significant source of AIV.

C. Sanitation addresses the disinfection of materials, people and equipment entering the farm and the cleanliness of the personnel on the farm.

Organic material greatly increases the resistance of avian influenza viruses to disinfection.

Cleaning and disinfection

1. Influenza virus is extremely sensitive to most disinfectants and can be inactivated by heating and/or drying. A list of disinfectants effective in killing AIV follow.
2. Organic material must be removed before disinfection by any method can be effective. Cleaning protocols should include a fair amount of elbow grease and critical inspection.

Prevent the spread of AIV on equipment

1. Make sure that service persons' vehicles are not contaminated with litter or feces. Wash and disinfect the tires and wheel wells of all vehicles coming onto your premises.
2. Wash with detergent and disinfect bird hauling equipment and vehicles.
3. Wash and disinfect manure clean-out equipment taken from farm to farm.
4. Enclose all dead birds to be taken to the laboratory in plastic bags. Confine live birds in boxes that will not return to your farm. Disinfect any vehicles returning from the laboratory including the floor mats. Do not let personnel who have been to the laboratory return to your facility without a shower and a change of clothes.
5. Do not allow vehicles in areas grossly contaminated with manure.
6. Wash and disinfect all egg trays, carts, and racks. Remove all feathers, feces, and egg material.
7. AIV can be transmitted at egg breaking facilities. Equipment must be cleaned and disinfected at these facilities to prevent the spread of AIV to producers bringing their eggs to the plant.

The specifics of cleaning and disinfecting any facility will depend on a large number of factors that differ between farms. Hence, it is not possible to address each individual concern. However, these are some guidelines that generally address cleaning and disinfection and some facts that should be considered when developing a strategy for cleaning and disinfection following a flock pushout. In all situations, it is highly recommended that a professional advisor be consulted to help develop and implement any plans.

General comments

1. Heating can be used to inactivate AIV. Heating the building to 90°F or higher has been used in other outbreaks as an effective method of sanitation.
2. Spraying the house with a viricide after depopulation is another method. At the same time a vector control program should be instituted, followed by removal of manure, cleaning of all surfaces followed by a second application of viricidal spray. All manure should be removed and all surfaces thoroughly dry cleaned prior to applying disinfectants. Next, apply the disinfectant to all surfaces twice, allowing the disinfectant

to dry between applications. The house should be left empty for 2-3 weeks before repopulation.

Manure handling

1. Remove all manure completely. Scrape the sides of the buildings to remove all residual organic material that might harbor virus. Manure from infected flocks should be handled in one or more of the following ways:
 - a. Spread manure on fields and plow under the same day.
 - b. Compost.
 - c. Bury.
 - d. Remove all manure from the house, cover with a tarp. Virus will be inactivated once daily temperatures have consistently risen to 90°F for one week. After inactivation, the manure can be handled normally.
2. For manure removed more than 4 months after initial infection, handle normally. Special precautions are not required.

Cleaning a multi-age facility

1. Managing a multi-age flock in a clean out situation requires persistence and dedication to the goal of preventing a new infection in clean birds.
2. The premise can be divided into sectors that are managed as separate facilities. Buffers must be established between buildings in order to isolate them from each other and to stop traffic flow between them.
3. Once barriers between houses have been established an individual house can then be depopulated, cleaned, and repopulated with uninfected birds.
4. It must be remembered that infectious virus may remain in manure for up to 4 months after initial infection of the flocks.

Cleaning a single age facility

1. Follow a complete clean out and disinfection protocol. Include a vector control program. Leave buildings empty 2-3 weeks after depopulation.

The influenza virus is extremely sensitive to almost any disinfectant. However, it is very difficult to inactivate the virus if it is in organic material, such as feces.

Disinfectants that will kill avian influenza virus

1. One-Stroke Environ^R
2. Any detergent
3. Formaldehyde
4. Bleach
5. Ammonia
6. Acids

7. Heating to 90°F for 3 hours, 100°F for 30 min.
8. Drying
9. Iodine containing solutions

Sources of equipment to use in this and other biosecurity programs

1. Portable high-pressure sprayers can be purchased from hardware stores at a cost of \$100-\$500. These sprayers are useful in washing and disinfecting equipment and poultry houses.
2. Hand-held sprayers can be purchased from hardware stores for \$30-70. These items are helpful for spraying disinfectants on the floor mats of cars, disinfecting wheel wells, etc. In addition, the same type of sprayer can be used to distribute insecticides in a vector control program.
3. Disposable coveralls, boots, and caps can be purchased from several places including the Nasco catalog (1-800-558-9595) and Cal Olympic Glove & Safety in Corona (909) 340-2229. Costs: Tyvek disposable coveralls are \$75.66/case of 25, bouffant caps are \$19.33/case of 500. These items are useful to provide for visitors.
4. Other materials important in a biosecurity program including signs, gates, pylons, and other indications of barriers can be purchased for minimal cost. These items are important in preventing unwanted human traffic and are well worth their cost.

If you have further questions please contact the California Department of Food and Agriculture (CDFA)—Ontario District office (909) 947-4462.