HPAI Response

Ventilation Shutdown Plus (+) Policy

January 2022

Note: This policy may be revised as the situation develops or more information becomes available.

Background & 24-48 Hour Depopulation Goal

During the U.S. 2014–2015 highly pathogenic avian influenza (HPAI) outbreak in commercial poultry, HPAI spread rapidly despite the response measures implemented. Federal, State, and industry stakeholders agreed that one of the most critical problems was the delay in depopulating infected poultry. As such, the HPAI stamping-out policy was revised, setting a goal for poultry to be depopulated within 24-48 hours of a presumptive positive classification, based on the current case definition. Contact Premises as well as cases meeting the suspect case definition may also be depopulated, based on a joint decision by APHIS and State/Tribal officials. This policy is further elaborated in the HPAI Response: *Response Goals & Depopulation Policy*, posted at www.aphis.usda.gov/fadprep.

Evidence-Based Practices in Constrained Circumstances

Rapid stamping-out is needed to prevent continued HPAI virus shedding and amplification. The amount of virus produced by infected birds is significant; the more virus that exists, the harder it is to control and contain an outbreak. In particular, environmental contamination becomes a significant challenge when depopulation is delayed and can result in further HPAI transmission.

As noted by the World Health Organization and the U.N. Food and Agriculture Organization, birds that are infected with avian influenza virus shed large quantities of virus, particularly in their feces[1,2] and respiratory secretions.[3] There is strong evidence that a delay in depopulation results in an exponential increase in the total amount of HPAI virus shed into the environment by infected poultry; highlighting the need for rapid depopulation to control and contain an outbreak.

A depopulation delay creates a serious biosecurity challenge for responders, who must consider sick birds, their feces, and everything in contact with those materials as infectious. Even with strict and well-enforced biosecurity measures, the raw amount of infectious material makes effective biosecurity in the midst of a response effort extremely challenging. Indeed, stringent biosecurity was one of the factors identified in the

[1] World Health Organization (WHO). (2007, October). *Review of latest available evidence on potential transmission of avian influenza (H5N1) through water and sewage and ways to reduce the risks to human health*. Retrieved from http://www.who.int/water_sanitation_health/emerging/h5n1background.pdf.

[2] Food and Agriculture Organization of the United Nations. (2020). *Q&A on Avian Influenza*. Retrieved from http://www.fao.org/avianflu/en/qanda.html#10 .

[3] Spickler, A. R., Trampel, D. W., & Roth, J. A. (2008). The onset of virus shedding and clinical signs in chickens infected with high-pathogenicity and low-pathogenicity avian influenza viruses. *Avian pathology*, *37*(6), 555-577.

2014–2015 HPAI APHIS Epidemiology Report[4] as critical to control and eradication of HPAI in future outbreaks.

Due to the economic and One Health impact of continued HPAI transmission, exponential virus production must be reduced at the source by preventing depopulation delays. As such, the decision was made to revise the stamping-out and depopulation policy by implementing the 24-48 hour goal. This will reduce the quantity of infectious material and eliminate further potential for HPAI transmission.

AVMA Recommendations for VSD Plus (+) under Constrained Circumstances for Poultry

The 2019 AVMA Guidelines for Depopulation of Animals provides that VSD Plus (+) is permitted in constrained circumstances for floor reared, confined poultry, including aviary style housing, and caged-housed poultry.

The AVMA defines VSD Plus (+) as the addition of CO_2 and/or an increase in the heat within the houses with a goal of 100% mortality rate in as short of time as possible. Because of the 100% mortality rate, VSD Plus (+) falls under the category of "permitted in constrained circumstances". Although VSD Plus (+) is permitted when there are limitations, it can also vary on its effectiveness depending on the environment and temperature of where the outbreak takes place.

USDA Recommendations for VSD Plus (+) under Constrained Circumstances for Poultry

The USDA notes the use of CO_2 in depopulation provides additional health and safety considerations for responders performing field operations. In the event VSD Plus (+) is used alone without CO_2, USDA recommends adding heat to achieve a minimum temperature of 104°F to 110°F as quickly as possible and preferably within 30 minutes, for a minimum of three hours.

Whenever VSD Plus (+) is used in constrained circumstances, the USDA also has the AVMA goal of achieving 100% mortality rate in as short of time as possible.

Constrained Circumstances for the Use of VSD Plus (+)

The USDA can grant the use of VSD Plus (+) in constrained circumstances; however, the following six (6) requirements must be met:

1. Other methods are not available or will not be available in a timely manner.
2. The amplification of the virus on the premises poses a significant threat for further transmission and ongoing spread of HPAI.

[4] Epidemiology reports for the 2014–2015 HPAI outbreak are located here: https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/avian/2014-2015-hpai-outbreak.

3. The questions in this Ventilation Shutdown Plus (+) Policy document have been reviewed and discussed by APHIS officials, State or tribal officials, and the incident management team.
4. Incident management team approval.
5. State officials' approval.
6. National Incident Coordinator approval.

When these criteria are met, VSD Plus (+) may be implemented. Depending on the premises or State, written or electronic documentation of these criteria may be required.

OPERATIONAL ASSESSMENT OF THE 24-48 HOUR DEPOPULATION GOAL

There may be situations in which Incident Command estimate that depopulation with carbon dioxide (CO_2), water-based foam or other AVMA approved depopulation methods can occur within 48-72 hours, but not within 48 hours. State and APHIS officials will need to carefully evaluate the risk of virus amplification and further transmission, and the likelihood that depopulation can be realistically completed in the timeframe estimated.

If depopulation cannot occur to achieve the 24-48 hour depopulation goal, alternative methods should be *immediately* considered by Incident Command, State, and APHIS officials.

Multiple methods and "Plan B" should also be discussed by Incident Command, State, and APHIS officials when a presumptive positive case occurs; for example, if water-based foam is to be used as the depopulation method, 12 hours have already elapsed since detection, and suddenly there are insufficient personnel or broken equipment, alternative methods may need to be revisited.

OPERATIONAL FACTORS CONSIDERED TO IMPLEMENT THE USE OF VSD PLUS (+)

The need to implement alternative depopulation methods to meet the depopulation goal, and the use of VSD Plus (+), will be handled on a premises-by-premises basis, with close coordination and collaboration by State and APHIS officials. Three sets of issues will be considered: resources, epidemiology, and State/APHIS concurrence on the decision.

In selecting the depopulation method, and considering VSD Plus (+), the following interrelated questions can help guide the decision:

- Which depopulation methods can be executed safely and effectively on the premises within 24-48 hours?
- What are the potential epidemiological consequences of virus amplification on the premises should the 24–48-hour goal not be met on the premises?
- Are there large densities of poultry in the surrounding area that would be at risk from virus amplification on the premises?
- Are there high-value or breeder flocks in the surrounding area that would be at risk from virus amplification on the premises?

- Could a depopulation time of greater than 24-48 hours be feasible if lateral spread can be mitigated through biosecurity measures, particularly in a facility without large densities of poultry or high value flocks in the surrounding area?
- Is there strong opposition from the State Animal Health Official, or designee, on any given method given the answers to the previous questions?
- Is there strong opposition from the producer/owner on any given method, given the answers to the previous questions?
- What resources are required for either CO_2 or water-based foam or other methods?
- For either CO_2 or water-based foam or other depopulation methods, how quickly (in hours) can resources and personnel deploy and complete the depopulation safely and effectively?
- Are sufficient resources available to conduct either CO_2 or water-based foam or other depopulation methods within 24-48 hours?
- How many personnel are required for the completion of either CO_2 or water-based foam depopulation?
- Are sufficiently trained personnel available to conduct the preferred depopulation method identified within 24-48 hours?
- Is ventilation shutdown plus (+) possible on the premises, given house construction and environmental factors?
- Is ventilation shutdown plus (+) the only option that will achieve rapid depopulation meeting the 24–48-hour goal, given personnel and resource constraints?
- What is the added risk of increased numbers of personnel on (and off) the premises from traditional depopulation methods such as CO_2 and water-based foam, in terms of biosecurity?

AVMA Guidelines for Ventilation Shutdown Alone (without +)

The 2019 AVMA Guidelines for the Depopulation of Animals Section 6.9.7[5], provides that VSD alone (without +) as a depopulation method is a last resort and must only be considered when all other options have been thoughtfully considered and ruled out. All other preferred options **must be** evaluated for viability prior to any consideration towards implementing VSD alone (without plus).

Depopulation is evaluated depending on the scope and urgency of the situation. AVMA's current list of preferred depopulation methods (see Appendix A) were assessed using a criteria to ensure that the methods minimize distress for birds and meets the capacity to

[5] The American Veterinary Medical Association. (2019). AVMA guidelines for the Depopulation of Animals. Section (pp. 51). Retrieved from https://www.avma.org/sites/default/files/resources/AVMA-Guidelines-for-the-Depopulation-of-Animals.pdf.

depopulate a dense population. Through a herd plan, producers are encouraged to discuss the options with State or Tribal officials and APHIS.

The methods laid out in Appendix A by the AVMA are the most humane, effective options for mass depopulation with consideration to minimizing stress on the birds. VSD alone (without +) is not recommended and if implemented, should only be used in extenuating circumstances with additional heat sources or CO2.

VENTILATION SHUTDOWN ALONE (WITHOUT +) AS A "LAST RESORT"

USDA and State Animal Health Officials will evaluate on a case-by-case basis the use of VSD alone (without +) as a last resort. Per the AVMA Guidelines for the Depopulation of Animals Section 6.9.7, VSD alone (without +) is generally not recommended.

APPENDIX A: AVMA DEPOPULATION METHODS IN POULTRY

Table 1—Depopulation methods by species. (continued)

Species and setting	Preferred	Permitted in constrained circumstances	Not recommended
Chapter 6: Poultry	POE and POHS		
Floor-reared, confined poultry, including aviary-style housing	Water-based foam generators Water-based foam nozzles Whole-house gassing Partial-house gassing Containerized gassing Cervical dislocation Mechanically assisted cervical dislocation Captive bolt gun	Gunshot VSD+ Exsanguination Controlled demolition Decapitation	VSD alone
Cage-housed poultry	Whole-house gassing Partial-house gassing Containerized gassing	Compressed air foam Cervical dislocation Mechanically assisted cervical dislocation Captive bolt gun VSD+ Decapitation	Water-based foam generators Water-based foam nozzles Gunshot VSD alone
Outdoor-access poultry	Captive bolt gun Cervical dislocation Mechanically assisted cervical dislocation Containerized gassing	Water-based foam generators Water-based foam nozzles Partial-house gassing Gunshot via firearm or pellet gun Exsanguination Controlled demolition Decapitation Cervical dislocation	Whole-house gassing VSD alone