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Dear Sirs,

The cases of H5 HPAI spreading in 2022 have many of us worried about infections and risk factors. There are some things that we learned in the 2015 outbreak that we feel we should highlight for you and recommend that you implement in light of today's outbreak climate.

In 2015, we learned that pullets infected with the same virus as older layers will have a slower moving infection (see Figure and conference proceedings below). This means that although a pullet flock is infected, it may not have elevated mortality, nor will it have other apparent clinical signs. For reasons we don't understand, pullets may be silently infected, and if an infected but undetected pullet flock is moved to an egg production premises, any flocks on that lay farm are likely to be infected with disastrous results.

Given the broad distribution of H5 HPAI at this time, and the fact that pullet infections may be silent, we recommend extra precautions be taken when moving pullets. The *product specific biosecurity* and *active surveillance protocol* in the Secure Poultry Supply pullet movement guidance provides you with some recommendations that we strongly encourage you to implement immediately (available at securepoultrysupply.umn.edu and attached as a pdf).

Sincerely,

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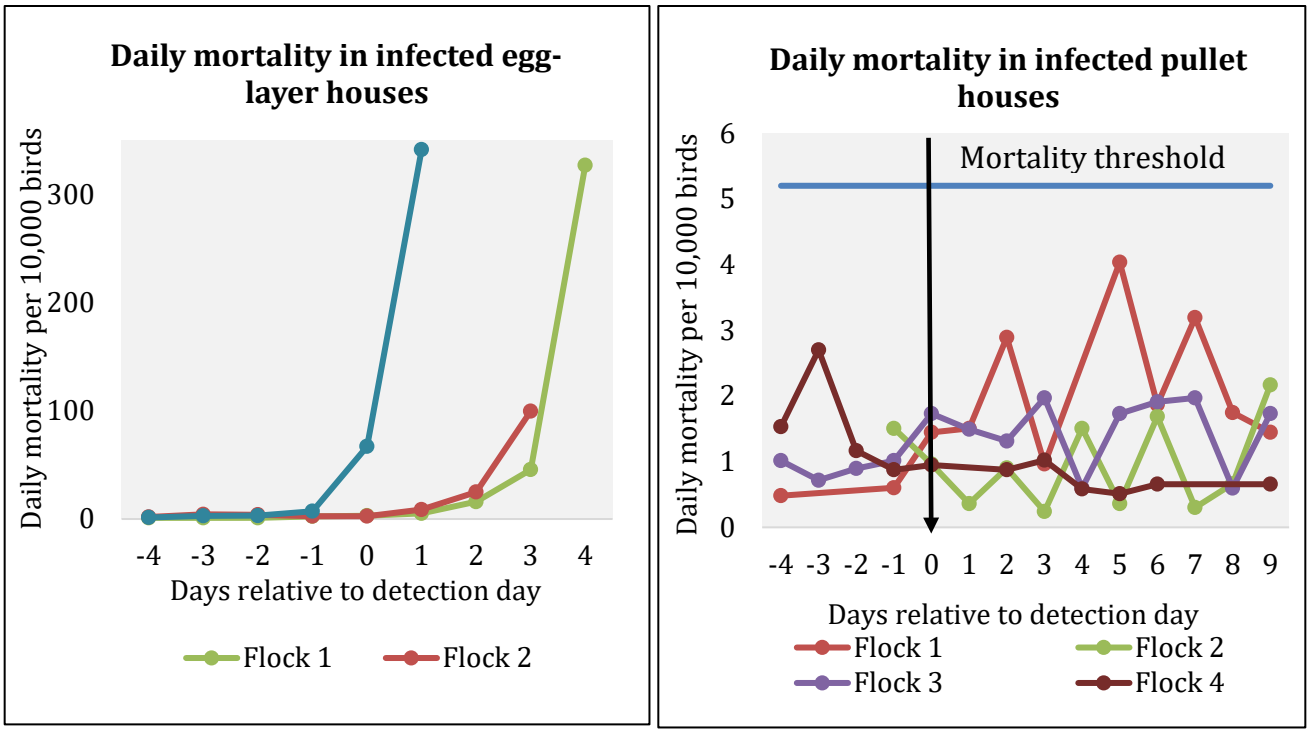

Figure 1. Daily mortality in egg laying hens vs. pullets. The 2015 H5N2 HPAI virus moved slowly through pullets and never caused overall mortality to rise.

An evaluation of the performance of pre-movement active surveillance testing protocol options and enhanced biosecurity for moving pullets during an outbreak of highly pathogenic avian influenza

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In the United States, highly pathogenic avian influenza (HPAI) emergency response plans include provisions for the managed movement of non-infected animals and non-contaminated animal products to stabilize animal agriculture, the food supply, and the economy. Moving pullets to egg-layer facilities to ensure a constant supply of eggs to consumers is one such movement. However, risk managers have to consider the possibility of missed HPAI detections that would result in direct outbreak spread when making decisions to permit the movement of live birds. Pre-movement active surveillance using the influenza-A matrix gene real-time reverse transcriptase polymerase chain reaction test (RRT-PCR) is a key risk mitigation measure to increase confidence that HPAI infected and undetected pullets are not moved. We used within-flock HPAI disease transmission models and simulations models of active surveillance to evaluate the performance of active surveillance protocols for moving live pullets. The simulation models were modified to reflect pullet production systems using data provided by industry stakeholders. Specifically, we predict the likelihood of HPAI detection immediately prior to movement for 1) four separate 11-bird active surveillance sampling protocol options, 2) the number of days of daily testing (5 or 10 days) before pullet movement, and 3) sampling protocols where both tracheal and cloacal swabs from the same bird are tested. During the 2015 H5N2 HPAI outbreak in the Upper Midwestern United States, mortality patterns indicative of slow within-flock spread were observed in some pullet flocks. In these outbreaks, there was either no increase in mortality or the onset of increased mortality was considerably delayed, occurring after detection by diagnostic testing. We performed scenario analyses with both normal and low adequate contact rates to ensure that surveillance protocols are robust to variability in the rate of HPAI spread. In addition to active surveillance testing, a period of extreme biosecurity implemented for some number of days immediately prior to movement, referred to as a pre-movement isolation period (PMIP), has been incorporated into live-bird movement protocols as another strategy to reduce the chances of moving infected and undetected flocks. In general, the chances of detecting HPAI would be lower in scenarios where a flock becomes exposed close to movement, as there is less time for disease mortality to occur. Missing low prevalence infections in pullet flocks would result in a direct transmission pathway. We show that targeting biosecurity measures on the days immediately prior to movement during PMIP reduces the chances of moving an infected, undetected flock. We also evaluate the likelihood of HPAI detection where PMIP biosecurity measures are implemented for 5 or 10 days. The analysis presented here will inform further risk assessment and risk management decisions for pullet movement during an HPAI outbreak.

Keywords: Surveillance; Highly Pathogenic Avian Influenza; Biosecurity

PERMIT GUIDANCE - MOVEMENT OF PULLETS OUT OF THE PULLET BARN

RISK ASSESSMENT FOR MOVEMENT ("An Assessment of the Risk Associated with the Movement of Pullets Out of the Pullet Barn In a Control Area during a Highly Pathogenic Avian Influenza Outbreak in the United States."): Completed; USDA Reviewed / Cleared August 2019; USDA Permit Guidance Second Review - Pending

If the permit guidance below has been met, ***the likelihood of moving a large number of infectious pullets*** (>80 birds) from premises within an HPAI Control Area out of a pullet barn is rated to be ***low.***

Pullets may move within or out of the Control Area by permit.

PERMIT GUIDANCE INCLUDES:

1. Poultry are moving from a premises that meets the criteria for a Monitored Premises designation and has a national premises identification number,
2. A Pre-Movement Isolation Period (PMIP) is established as defined by the cross-commodity PMIP standards, and for the duration defined for the type of movement requested,
3. Product-specific biosecurity as described is implemented,
4. The route for transport is acceptable,
5. Load out and live haul biosecurity is implemented,
6. Active surveillance protocol of daily rRT-PCR testing of all dead birds in pools of 11 (up to a maximum of 4 pools) starting 8 days before load-out begins on the premises and continuing throughout load-out for all flocks greater than 28 days of age on the premises.

1. Poultry are moving from a premises that meets the criteria for a Monitored Premises designation and has a national premises identification number.

- A Monitored Premises (MP) objectively demonstrates that it is not an Infected Premises, Contact Premises, nor Suspect Premises. Only At-Risk Premises are eligible to become Monitored Premises. Monitored Premises meet a set of defined criteria in seeking to move susceptible animals or products out of the Control Area by permit. For the Secure Poultry Supply Plans, the following criteria must be met:
    - Pre-movement rRT-PCR testing is negative,
    - Epidemiological questionnaire is completed,
    - No unexplained mortality, no unexplained clinical signs, and no unexplained changes in production parameters, and
    - Biosecurity measures are acceptable to state and federal authorities.
- For permitted movement through EMRS, an accurate national premises identification number (i.e., 7 character alphanumeric code as described in 9 CFR § 71.1; not the state ID) or other acceptable ID system for movement is required.

2. A Pre-Movement Isolation Period (PMIP) is established as defined by the cross-commodity PMIP standards, and for the duration defined for the type of movement requested.

- The PMIP starts 8 days prior to the scheduled pullet movement date and continues through load-out.
    - Other durations may be permitted in consultation with the Incident Command (IC) (e.g., the first few days of an outbreak).

3. Product-specific biosecurity as described in individual plan is implemented

- Non-critical operational visits should be scheduled to occur outside of the PMIP. The following activities have a risk for lateral transmission of HPAI virus and are prohibited during the PMIP:
    - Off-farm disposal of mortality is prohibited. Producers must manage risks associated with dead birds on-site (i.e., managing scavenger species attraction to mortality (See 9.2.4.1 Dead Bird Disposal during PMIP in the risk assessment).
    - Off-farm removal of manure or litter is prohibited. Producers must manage risks associated with manure or litter movement on-site (i.e., managing insect attraction to litter)
    - Off-farm garbage disposal is prohibited. Producers must manage risks associated with garbage storage on-site (i.e., managing scavenger species attraction to garbage).
    - Visiting other poultry farms is prohibited for people who work on poultry farms. People should only have contact with their assigned flock(s) on a single premises.
    - All non-emergency visitors are prohibited from entering farms. All routine, or operational visits (excluding feed delivery) must be replaced by electronic or telephone communication, take place at a non-poultry site outside the control area, or must be scheduled prior to or following the PMIP.
    - Entering a poultry house is prohibited unless the person is wearing footwear and clothing dedicated to the line of separation (LOS) area.
    - Pre-staging of shared critical equipment is prohibited.
    - Movement of non-critical equipment from off-site onto the premises is prohibited.
    - Moving live poultry onto or off of the premises is prohibited. If necessary, movement of mature pullets should be modified to accommodate day-old chick delivery outside of the PMIP.
- Critical operational visits that may continue during the PMIP require specific biosecurity measures and may require a permit:
    - Feed delivery should use a dedicated truck and deliver directly from a stand-alone feed mill (no poultry on-site at feed mill). Trucks delivering feed or individual feed ingredients that are produced or stored on poultry premises will require a permit. Permitting of feed delivery from premises with poultry on-site will require PCR surveillance of poultry on premises sufficient to satisfy Incident Command.

- Emergency fuel delivery and emergency repair or replacement of critical mechanical equipment.
- Service visits to address changes in bird health.

- In addition to standard biosecurity protocols, the following enhanced biosecurity measures must be implemented during the PMIP:
  - All people who are going to cross a line of separation (LOS):
    - Should shower and change clothes prior to or at the time of entering the premises.
    - Must wear necessary protective clothing and footwear dedicated to that LOS area as described in appropriate biosecurity protocols.
  - All vehicles and equipment entering the premises shall be cleaned and disinfected using a protocol acceptable to regulatory personnel prior to entering premises.
    - Driver must mitigate the risk of moving insects on and off the farm (e.g.,
      - Vehicle windows should be rolled up at all times while on the poultry farm in order to prevent flies from getting into the vehicle.
      - Spray insecticide inside trucks as needed to eliminate the transporting of flies from farm to farm during warm months of the year).
    - Driver must mitigate the risks of contaminating themselves and their vehicle interior due to exiting and re-entering the vehicle (e.g.,
      - Drivers are prohibited from entering turkey houses.
      - All drivers and passengers must wear boots (rubber or disposable) before getting out of the vehicle. When exiting the farm, put disposable boots in an appropriate disposal container prior to exiting the farm and spray shoes with disinfectant before entering their vehicle. Rubber boots and any tools used on the farm must be cleaned and disinfected prior to being removed from the premises.
      - All drivers must use hand sanitizer before leaving and after re-entering the cab.
      - All drivers must spray the floors, pedals, and bottoms of feet with disinfectant after every stop).
  - Additional product specific mitigations that have the potential to reduce risk further, if they are feasible for the specific premises, are available in *Appendix 14: Potential Mitigations to Lower Risk* within the associated risk assessment.

4. The route for transport is acceptable.

- The route for pullet transport should be selected in consultation with a poultry veterinarian or production manager to minimize contact with and proximity to live poultry and poultry products.

5. Load out and live haul biosecurity is implemented.

Load-out begins as the first crew, vehicle, or equipment arrives on the premises and ends when the last load of pullets departs the premises. Pre-staging of equipment during PMIP is prohibited. Additional biosecurity and mitigation measures are summarized as follows:

- All PMIP biosecurity measures must be continued throughout the pullets' load-out process except that the load-out crew and equipment are allowed on-site:
    - No off-farm movement of mortality, manure, litter, or garbage.
    - No visitors (except emergency and feed deliveries) enter the premises.
    - Feed (or feed ingredients) delivered from a premises with poultry on-site requires a permit and rRT-PCR testing of the poultry on the premises where the feed/ingredients are produced or stored.
    - All vehicles and equipment entering the premises shall be cleaned and disinfected (C&D) using an acceptable protocol taking into account environmental conditions of the premises, and/or region, and/or season (this includes C&D protocols for both personal vehicles and vehicles transporting the load-out crew).
        - Some acceptable protocols for Cleaning and Disinfection (C&D) may be found in the USDA Foreign Animal Disease Preparedness and Response Plan (FAD PReP) Standard Operating Procedures (SOPs), which provide operational guidance for responding to an animal health emergency in the United States.
    - All persons crossing a line of separation (LOS), to include load-out crew entering the barn to be loaded out, must use *LOS-specific* footwear and *LOS-specific* clothing.
    - No pre-staging of equipment in a barn prior to beginning load-out in that barn.
    - No movement of other non-critical (non-load-out) equipment from off-site, on-site.
- Additional load-out equipment, load-out crew, and barn-to-barn biosecurity must be implemented:
    - Load-out trucks and equipment are C&D prior to first arrival at pullet premises.
        - C&D of load-out trailers and dollies must be verified upon first arrival at the premises (e.g., inspected for cleanliness by a person NOT with the load-out crew).
    - Load-out dollies move only from the truck directly into the bird area of the pullet barn to be loaded out.
    - The pullet barn must be completely empty at the end of the move.
    - Load-out crews must shower and change into clean clothes and clean footwear prior to or at the time of arrival at the pullet premises on a daily basis.
    - Load-out crews only enter the barn in which they are working. Appropriate hand and boot sanitation must occur at the time when crossing any LOS.
    - Every load-out crew shall have on-farm supervision (i.e., a supervisor present with the authority to direct crew to follow protocol and halt activities if needed)

throughout load-out activities, including watching the crew cross the LOS and following barn entry/exit protocols.
    - Crew using restrooms, lunchrooms, or common areas should not co-mingle with other employees.
        - A sanitation protocol is implemented for disinfection of common areas at the frequency needed to guard against cross-contamination.
- The destination for the entire pullet flock being loaded out is a single location (no split loads to multiple locations); that is, load-out trucks/equipment are only moving between the pullet premises and one other location.

6. Active surveillance protocol of daily rRT-PCR testing of all dead birds in pools of 11 (up to a maximum of 4 pools) starting 8 days before load-out begins on the premises and continues throughout load-out for all flocks greater than 28 days of age on the premises

- PMIP active surveillance
    - Daily testing of all dead birds, in flocks greater than 28 days of age, in 11-swab pools (up to a maximum of 4 pools) by NAHLN labs beginning 8 days *prior to load-out.*
- Load-out active surveillance
    - Daily testing of all dead birds, in flocks greater than 28 days of age, in 11-swab pools (up to a maximum of 4 pools) by NAHLN labs *continues throughout load-out.*
    - Negative results of tests taken within 24 hours of scheduled movement (at barn level) must be documented before birds are moved off the premises. (An example of the testing protocols and load-out schedule is detailed below in Figure 1. NOTE: This is an example based on a hypothetical pullet farm.)

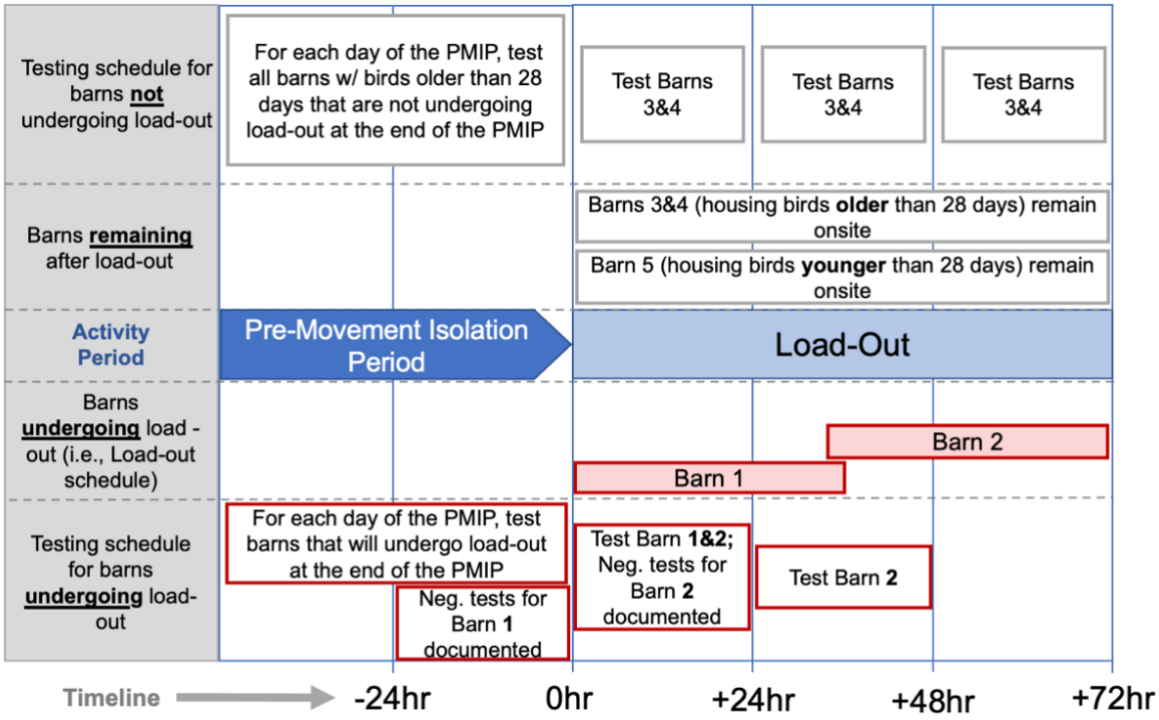

Figure 1. Daily testing (of all dead birds, with max of four 11-swab pools) is required of birds in all barns that are not loaded out within 24 hours of the start of premises-level load out. In this example, there are five barns on a multi-age premises and transfer of two barns off the premises takes 72 hours. NOTE: Pullet load-outs typically take 3-5 five days but may take up to 10 days. Additionally, while only 2 days of the PMIP is visualized in the timeline, the PMIP needs to start a full 8 days prior to the start of load-out.