Highly Pathogenic Avian Influenza Secure Turkey Supply Plan

A Strategic Plan for Movement of Non-Infected Turkeys, Turkey Eggs, and Turkey Semen in a High Pathogenicity Avian Influenza Control Area

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Secure Turkey Supply Plan

The Secure Turkey Supply Plan contains scientifically sound sampling protocols and proven, highly sensitive testing methods which will be employed in the event of an outbreak of highly pathogenic avian influenza (HPAI). Prior to issuing movement permits for turkeys and turkey eggs in a Control Area, stringent biosecurity measures must be in place on the premises of origin for a sufficient period of time to provide a high degree of confidence that HPAI has not been recently introduced so that the flock could be infected, but undetected. In addition, turkeys must be free of clinical signs associated with HPAI and flock mortality must be within normal parameters before movement of live turkeys will be allowed. The Plan will help avoid restrictions on interstate or international trade, by providing a high degree of confidence to regulatory authorities in other states and other nations that no turkeys infected with HPAI virus will leave a Control Area. All poultry producers in a Control Area can be assured that turkeys moving under a permit issued by the Incident Command do not endanger the health of other uninfected flocks. Lastly, regulatory agencies with public health responsibilities, including the USDA Food Safety Inspection Service and the U. S. Food and Drug Administration, can have a high degree of confidence HPAI virus is absent from turkey products intended for use in animal agriculture or for human consumption.

The Secure Turkey Supply Plan will be supported by risk assessments of potential poultry health impacts and risk assessments of possible public health impacts associated with movement of infected but undetected turkeys from a Control Area during an outbreak of HPAI. A risk assessment of the potential public health impact has been completed (Interagency Risk Assessment for the Public Health Impact of Highly Pathogenic Avian Influenza Virus in Poultry, Shell Eggs, and Egg Products – May 2010; Appendix K). This risk assessment was based on detection of HPAI in the index flock in an outbreak. Future risk assessments for the STS plan will be based on detection of HPAI in turkey flocks under increased surveillance in a Control Area.

The Secure Turkeys Supply Plan Working Group — the multidisciplinary team assembled to prepare the Plan — includes members of the following organizations:

- Iowa State University Center for Food Security and Public Health (CFSPH);
- University of Minnesota Center for Animal Health and Food Safety (CAHFS);
- National Turkey Federation (NTF);
- Association of Veterinarians in Turkey Production; and
- The USDA Animal and Plant Health Inspection Service Veterinary Services (USDA APHIS VS) Centers for Epidemiology and Animal Health (CEAH) and National Center for Animal Health Emergency Management (NCAHEM).

The Secure Turkeys Supply Plan was created by a public-private-academic partnership and provides specific recommendations that emergency response decision makers (such as Incident Commanders) can use in assessing animal health risks in order to rapidly decide whether to provide or deny permits for the movement of turkeys during an HPAI outbreak. This plan is

subject to revision as advances in science occur, the characteristics of HPAI evolve, and as risk assessments are completed. The Secure Turkey Supply Plan supports a continuous supply of turkey products for the U.S. public, facilitates market continuity for the turkey sector and its customers, and fosters a high level of government, industry, trading partner, and consumer confidence in Foreign Animal Disease preparedness and response efforts.

II. Biosecurity Recommendations for Commercial Turkey Premises

- 1. Biosecurity must be in place on the premises of origin before movement permits will be issued for turkeys in a Control Area. A copy of the premises' biosecurity plan must be provided to the Incident Command. A high level of biosecurity (Level 2) will be necessary before approval to move turkeys or turkey-related products can be given, but **BIOSECURITY ALONE DOES NOT GUARANTEE APPROVAL**. Before Incident Commanders approve such movement, the results of a) Active and passive surveillance; b) Geographic proximity to infected premises; and c) Other pertinent factors will be considered. The Incident Command will determine the time period for which biosecurity measures must be in place before turkey eggs or live turkeys are allowed to move.
- 2. Recommended (not required) biosecurity measures (Level 1) for turkey producers to implement prior to an outbreak have been developed based upon extensive input and discussion from turkey industry veterinarians, state and federal epidemiologists, university poultry veterinarians, and federal regulatory agencies. Implementation of these biosecurity measures prior to an outbreak will significantly reduce the likelihood that the HPAI virus will be introduced onto a commercial turkey premises.
 - Level 1 biosecurity measures are recommended (not required) for turkey farms prior to an outbreak of HPAI (**Appendix A**).
 - Level 2 biosecurity measures are recommended following diagnosis of highly pathogenic H5 or H7 avian influenza in a region before turkeys can be permitted to move (Appendix B). The Incident Command will determine which specific biosecurity measures must be in place before turkey eggs or live turkeys are allowed to move.

III. Epidemiology Information

- 1. A short epidemiology questionnaire is available for turkeys moving from a grow-out house to market (**Appendix D**). A longer epidemiology questionnaire is used for movement of all other turkeys and turkey eggs (Appendix F).
- 2. Epidemiology questionnaires should be completed whenever a new infected premises is identified.

- 3. In the event of an outbreak of HPAI, the epidemiology questionnaire shown in Appendix D will be used by the Incident Management Team a) for infected, suspect, and contact premises and b) non-infected breeder farms moving eggs to a hatchery, and c) non-infected brooder farms moving turkeys to a grow-out facility. If turkeys are to be moved interstate, the SAHO of the destination state may require information from the epidemiology questionnaire prior to granting permission for turkeys to enter their state.
- 4. For infected premises, the questionnaire will assist epidemiologists to a) Assess risk factors associated with employees, wild birds, and carcass disposal; b) Determine how HPAI may have been carried onto a farm (trace back information); and c) Determine where HPAI may have traveled from a farm (trace forward information).
- 5. For non-infected turkey premises and hatcheries, this information will assist epidemiologists should HPAI be diagnosed at a later date on one of these premises.
- **6.** For all premises within a HPAI Control Area, epidemiology questionnaire information will be used to help classify premises as Contact Premises, Suspect Premises, At-Risk Premises, or Monitored Premises. The USDA APHIS designation of zones, areas, and premises is shown in **Appendix G.**

IV. Pre-Movement Active Surveillance by Real-Time Reverse Transcriptase Polymerase Chain Reaction (RRT-PCR) Testing for Monitored Premises in a Control Area

1. **Disease Detection Surveillance for Commercial Premises in a Control Area.** Swabs shall be collected from the 5-bird pool sample(s) selected from the daily dead birds or sick birds from each flock on each premises every other day for 14 days. Contact Premises, Suspect Premises, and Monitored Premises that test negative should then be sampled as described for At-Risk Premises. Monitored Premises may be sampled more frequently depending on the need to ship product but at the minimum must be sampled as listed above. For At-Risk Premises, swabs should be collected for the 5-bird pool(s) on each premises once every 5 days for the duration of the quarantine. If daily mortality exceeds 2/1,000 birds in turkeys greater than 2 weeks of age, further diagnostic activities will be initiated and the Incident Command will be notified.

2. Pre-Movement Sampling and Testing Protocol for Monitored Breeder and Commercial Premises.

a. **Number of Turkeys Sampled.** One 5-bird pooled sample must be tested by RRT-PCR for each 50 dead turkeys and found to be negative from every house on the premises for two consecutive days prior to movement of live turkeys, turkey eggs, or turkey semen. The time interval between collection of samples on consecutive days must be at least 18 hours. If there are less than 5 dead turkeys in the house, the remainder of the samples should be taken from sick turkeys. Two 5-bird pooled samples that test negative provide a 95% level of confidence that HPAI will be detected if at least 40% of sampled turkeys are shedding HPAI virus. For products that move daily, one 5-bird pool from each house

- on the premises must test negative by the RRT-PCR test on each day prior to movement of turkeys, eggs, or semen.
- b. A **5-bird pooled sample** consists of combined samples taken from five turkeys from each flock on a premises
- c. A **flock** consists of turkeys of the same age in one building which are marketed on the same day.
- d. **Time to Sample Dead or Sick Turkeys**. Samples must be taken within 24 hours prior to movement of live turkeys (or turkey products) from the premises. If an unusual HPAI virus proves to be slow-moving, adjustments to the sampling protocol will be made. For example, if turkeys from one farm will be marketed on four consecutive days, then samples will be collected each day for four days from all barns with birds. Targeting dead and sick birds reduces the sample size required to attain a 95% confidence level because the prevalence of HPAI infected birds should be higher in this group than in the house as a whole.
- e. **Turkeys Selected for Sampling.** Oropharyngeal swabs should be taken only from dead or sick turkeys and dead turkeys should be sampled before sick turkeys. Sick birds selected for sampling should exhibit clinical signs compatible with HPAI (depression or respiratory signs). If the number of dead and sick turkeys in a house is less than 5, then the remaining oropharyngeal swabs may be collected from live turkeys in the house by company personnel approved by the Incident Commander (IC).
- **f. Authorized Sample Collectors.** An individual authorized by the IC will sample each turkey by swabbing the oropharynx.
- g. **Specimen Delivery to a Designated Sampling Location.** Specimens to be tested must be brought to a location near the premises designated by the IC. Three types of specimens may be brought to this location: 1) dead turkeys from each house; 2) heads and necks from dead turkeys in each house; or 3) BHI tubes in which oropharngeal swabs from 5 turkeys in each house have been swirled. Specimens must be placed in a leak-proof container (such as a heavy-duty plastic garbage bag) each morning. Each container and BHI tube shall be labeled with the farm of origin, house of origin, number of birds found dead in the house that day, and the premises identification. It is recommended that heads and necks and BHI tubes be placed in insulated containers with ice packs.
- h. **Sampling Procedure.** One sterile polyester or rayon swab with a plastic handle is used to swab the palatine (choanal) cleft on the roof of the mouth, entire oral cavity, and surface of the tracheal opening of one turkey, picking up as much mucus as possible. Thereafter, the swab is immersed in Brain-Heart Infusion (BHI) broth (2.0-3.0 ml for a 5-bird pool), vigorously swirled in the broth, and as much fluid as possible is squeezed out of the swab by pressing the swab against the inside of the tube before withdrawing the swab from the BHI tube. Swabs from 5 sampled turkeys should be swirled in one BHI tube. Flocked swabs are recommended, but woven swabs are acceptable. Cotton or calcium alginate swabs with wooden handles should not be used. Disposal of swabs after use should be done in accordance with an approved biosecure protocol.
- i. **Disposal of Turkeys after Sampling.** After samples have been taken, farm personnel shall dispose of carcasses in accordance with an approved biosecurity protocol.
- j. **Laboratory Submission.** BHI tubes containing oropharyngeal samples (5 oropharyngeal swabs/BHI tube) will be submitted as directed by the IC to an authorized State Veterinary Diagnostic Laboratory (VDL). These samples must be submitted on the day of sample

- collection by a State or Federal regulatory official or an IC-authorized person. The State VDL and IC will establish the time of day by which samples must be submitted to an authorized VDL (for example, by 12:30 p.m.).
- k. Laboratory Testing and Reporting. VDL personnel performing RRT-PCR will test samples immediately upon receipt and electronically send test results to the IC by the end of each day. The IC will report test results to farm managers as soon as results are available. If RRT-PCR tests are not negative, additional diagnostic testing will be conducted.
- **l. Negative RRT-PCR Results Required.** RRT-PCR tests from all samples collected from turkeys during the preceding 24 hours must be negative prior to movement of turkeys, eggs, or semen from a premises.

V. Flock Mortality, Egg Production, and Visual Inspection prior to Movement

- 1. Prior to moving turkeys to any other location, turkey producers will be required to electronically submit records of daily mortality for the preceding 7 days for each turkey management unit on the premises to the Incident Command (IC).
- 2. If daily mortality is abnormally high (more than 2/1,000 birds in a flock) immediately prior to a scheduled movement of turkeys, eggs, or semen, these products shall not move until diagnostic steps have been initiated and HPAI has been ruled out as the cause of elevated mortality.
- 3. If egg production drops significantly (a total of 15% or more) during a two-day period prior to a scheduled movement, turkey hatching eggs shall not move until diagnostic steps have been initiated and HPAI has been ruled out as the cause of the drop in egg production.
- 4. Company veterinarians or independent producers will be required to report significant unexplained changes in feed consumption, water consumption, or behavior.
- 5. Visual inspection of turkeys in all houses on premises within 24 hours prior to movement will be required for all premises located in the Control Area (infected zone plus buffer zone) that wish to move turkeys. Visual inspection may be performed by a company-designated individual.
- 6. If 50 or more dead turkeys are present in the finishing house immediately prior to or during load-out, the Incident Command must be contacted before turkeys are removed from the house.

VI. Secure Turkey Supply Plan Data Portal

A data portal will be needed for use during an HPAI outbreak by State and Federal regulatory officials to collect mortality data, monitor production parameters, record the results of the epidemiology questionnaire, and record RRT-PCR results from *all* turkey farms in a Control Area.

Appendix A. Recommended Level 1 Biosecurity Measures Prior to an Outbreak of Highly Pathogenic Avian Influenza

A. Biosecurity Policies, Outside Areas, and Parking

Yes	No						
	1. A Biosecurity Manual is available to the farm manager.						
	2. Turkey production companies provide annual biosecurity training for growers farm employees. Biosecurity training stresses the importance of avoiding						
		contact with other birds not owned by the business– including birds at live					
		markets, pet birds, domestic chickens, fighting chickens, ducks, geese,					
		waterfowl, exotic birds, quail, partridge, or pheasants. In the event that contact is					
		made with any of the above, employees agree that they will comply with a 24-					
		hour waiting period before returning to work. Records documenting biosecurity					
	training are maintained in company offices.						
	3. Farm policy requires that employees should not own other birds – including po						
	birds, domestic chickens, fighting chickens, ducks, geese, waterfowl, exotic						
	birds, quail, partridge, or pheasants.						
		4. Signs warning people not to enter the farm or any of its buildings because of					
		disease control (No Admittance- Biosecurity Zone) are posted at the farm					
		entrance and at entrances to turkey houses.					
		5. Only cleaned and sanitized footwear , disposable footwear, or footwear					
	dedicated to a turkey house shall be worn.						
		6. Vehicles should be parked away from turkey houses, as much as possible, and					
		in locations which avoid air from turkey houses.					

B. People

1. Growers, Farm Employees, Service Technicians, Service Crews, Veterinarians

Yes	No	7. Disposable boots, masks, and hairnets should be deposited in an appropriate				
		disposal container prior to exiting the farm.				
		8. Rubber boots should be washed and disinfected prior to wearing on another				
	farm. Dump wash water and clean bottom of bucket with brush.					

2. Truck Drivers, Trucks, and Trailers

Ye	S	No	
			9. Drivers are prohibited from entering turkey houses .

C. Turkeys and Turkey Houses

Yes	No	
		10. Records of daily mortality are available for each flock since placement in the
		turkey house.
		11. Houses are bird-proofed against wild or free-flying birds.
		12. Dogs are not allowed in turkey houses.
		13. Cats are not allowed in turkey houses.

D. Turkey Loadout, Livehaul, and Equipment

Yes	No	
		14. Transport trucks and loadout equipment are cleaned and disinfected prior to
		entry onto the farm.
		15. Sharing equipment between turkey farms is not recommended. In the event
		that equipment must be shared, effective cleaning and disinfecting must take
		place between uses.

E. Other Birds and Pest Control

Yes	No	
		16. No domestic birds are to be maintained on premises outside turkey houses.
		17. Control measures to discourage the presence of wild and migratory birds on
		the premises are in place.

F. Feed and water

Yes	No					
		18. Feed bins are secured to prevent contamination by wild birds or rodents.				
		9. Spilled feed is cleaned up promptly to prevent attracting wild birds and				
		rodents.				
		20. Water sources are secure and cannot be accessed by free-flying birds or				
		rodents or water sources are disinfected.				

G. Manure Removal and Dead Bird Disposal

Yes	No						
		21. Dead turkeys are collected and removed from the house each day.					
	22. Disposal of dead turkeys does not expose turkeys in other houses or other						
		farms to potential pathogens. There is a dedicated on-site location for mortality					
		that is as far away from the barns as possible.					
	23. Multiple poultry farms should not share initial collection sites for dead poultry						
	24. Manure trucks should never go from one poultry farm to a nother on the						
	same day. However, if required, the manure trucks must be washed with detergent and disinfected prior to arrival at the next farm.						
		25. Vehicles that have been to a rendering plant must be cleaned and disinfected					
	before returning to the turkey farm.						
		26. Containers for dead turkeys (dumpsters) should never leave the farm.					

Appendix B. Recommended Level 2 Biosecurity Measures Following an Outbreak of Highly Pathogenic Avian Influenza

A. Biosecurity Policies, Outside Areas, and Parking

- 1. A written Level 2 biosecurity plan is available which will be implemented during an outbreak of highly pathogenic avian influenza.
- 2. **Entry and exit from an Infected Premises** will be controlled by the Incident Commander or his duly authorized representative.

B. People

1. Growers, Farm Employees, Service Technicians, Service Crews, Veterinarians

- 3. **Routine flock visits** by utility employees (such as meter readers) and service people **are prohibited** and must be replaced by telephone communications. During the 5-day period prior to movement of turkeys, no farm visits should occur except for feed delivery and emergency service calls.
- 4. Cleaned and disinfected footwear or site-provided footwear or footwear covers must be worn prior to entering turkey houses.
- 5. Clean protective clothing and head covering dedicated to the farm should be worn prior to entering turkey houses.
- 6. Farm policy **prohibits exposure to equipment** from other farms that has not been washed and disinfected. Equipment should be inspected prior to entry onto the farm.
- 7. Thoroughly **disinfect any equipment taken into poultry house** before putting it back into a vehicle.
- 8. Disposable personal protective equipment (PPE, such as coveralls, disposable boots, masks, and hairnets) should be deposited in an appropriate disposal container prior to exiting the farm. Non-disposable PPE (such as eye protection or respirators) should be placed in a plastic bag or container and cleaned and disinfected before re-use.
- 9. **Hand hygiene is mandatory** after contact with infected or exposed poultry, contact with contaminated surfaces, or after removing gloves. Hands must be washed with soap and water for 15 to 20 seconds or hand disinfectants must be used.

2. Truck Drivers, Trucks, Trailers, and Other Vehicles

- 10. All vehicles must pass through a designated entry and exit checkpoint located at the perimeter of the Infected Zone.
- **11. No movement of trucks, other vehicles, or people** shall occur within the Infected Zone without a permit from the Incident Commander. Initial movement permits will be issued by the Incident Commander but subsequent electronic permits can be generated at the farm.
- 12. The outside of all vehicles will be cleaned & disinfected under supervision of regulatory personnel with an approved disinfectant at a cleaning and disinfection (C&D) station at or near the turkey premises within the Control Area. If cleaning and disinfection cannot be completed at the turkey premises the vehicles must be accompanied by a permit issued by the Incident Commander to travel to a C&D station within the Infected Zone. Trucks will be washed to remove mud and debris to the extent needed to allow effective operation of disinfectant sprayers. Vehicle must be approved by an authorized inspector before proceeding into or out of the Infected Zone.
- 13. **Drivers use a hand sanitizer** before leaving and after re-entering the cab.
- 14. **Vehicle windows should be rolled up** at all times while on the poultry farm in order to prevent flies from getting into the vehicle.
- 15. **Spray insecticide** inside trucks as needed to eliminate the transporting of flies from farm to farm during warm months of the year.
- 16. Clean & disinfect vehicles inside the cabs daily with an approved aerosol disinfectant. Spray the floors, pedals, and bottoms of feet with disinfectant after every stop.
- 17. All **drivers and passengers must wear boots** (rubber or disposable) before getting out of the vehicle. Boots must be worn the whole time on the farm. **When exiting** the farm, **put disposable boots, masks, and hairnets** in an appropriate disposal container prior to exiting the farm. Then spray shoes with disinfectant before entering your vehicle. Rubber boots and any tools used on the farm must be cleaned and disinfected prior to being removed from the turkey premises.
- 18. **Feed delivery within the Infected Zone** will not include split loads. Left-over feed will remain on the farm or be taken to other farms within the Infected Zone. A permit from the Incident Commander's office is required to move feed off of a farm located in the Infected Zone.
- 19. **Poult** restocking of premises and movement of Turkeys from brooder farms to grow-out farms within the Infected Zone will not occur for a minimum of 21 days following official approval of cleaning and disinfection procedures or as otherwise approved by the Incident Commander. Placements in the Control Area will be evaluated on an individual basis. Deliveries to farms will be in disposable containers only. Drivers must stay in the truck on all deliveries. Poult delivery trucks must be cleaned and disinfected after delivery into Control Area.

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3. Visitors, Surveillance Crews, and Contract Laborers*

20. **No visitors** should be allowed on the farm or enter turkey houses **unless** absolutely necessary.

- 21. Visitors, laborers, and surveillance crews who have had **contact with birds** during the preceding 48 hours are **prohibited from entering** turkey houses. Surveillance crews should collect samples from dead turkeys in closed containers next to the roadway so that entering the farm is unnecessary; i. e., barrel surveillance. See measure 24 below.
- 22. Visitors and laborers must wear clean coveralls, hair nets, and clean footwear and must use disinfection stations provided at the door before entering a turkey house. Disposable personal protective equipment (PPE, such as coveralls or footwear) should be properly discarded, and non-disposable PPE (such as eye protection or respirators) must be cleaned and disinfected before removal from the turkey premises.

*Turkey loading crews are exempt from the requirement that contract laborers have no contact with birds during the preceding 48 hours.

C. Turkeys and Turkey Houses

- 23. **If mortality rates in a turkey house** exceeds 2/1,000 turkeys in a flock from an unknown cause, the Incident Commander must be notified immediately. An appropriate regulatory official will provide assistance in collecting and delivering appropriate samples to a veterinary diagnostic laboratory.
- **24.** Dead turkeys must be placed in closed containers and left in a location approved by the Incident Commander so **surveillance crews** can collect appropriate samples without entering the premises.

D. Turkey Loadout, Livehaul, and Equipment

- 25. Turkey loading **crews are prohibited from entering other turkey houses** on the same farm.
- 26. **Before entering the premises**, loadout and live haul equipment have been **cleaned** and disinfected under the appropriate protocol.
- 27. After a turkey house is depopulated, **turkey-loading equipment is cleaned and disinfected** as shown in the NAHEMS guidelines.
- 28. **Loadouts and livehaul** within the Control Area will be limited to one farm per night per crew and must be supported by a movement permit issued by the Incident Commander. Schedules will be forced through the processing plant as necessary. Crews will wear clean clothes and footwear. Equipment, clothing, and footwear must be cleaned and disinfected following load out. Personnel must bathe.
- 29. **Livehaul trucks and equipment** must be cleaned and disinfected at the processing plant before going to turkey farms as shown in the NAHEMS guidelines.

- 30. Livehaul trucks must follow a route approved by the Incident Command team.
- **31.** Turkeys from farms in an Infected Zone should be **loaded on a day at the end of a week.**

E. Manure Removal and Dead Bird Disposal

- 32. **Composting** must be managed properly to ensure **carcasses are covered** to prevent exposure to wild animals and to maintain adequate temperatures for composting.
- 33. When **on-farm incineration** is used, carcasses must be protected from exposure to wild animals.
- 34. **No movement of poultry litter or dead turkeys off a farm** is allowed for premises in an Infected Zone without a permit issued by the Incident Commander.
- **35. Trucks moving manure or dead birds should be covered** to prevent the dissemination of potentially contaminated feathers and follow a designated approved route.
- **36.** Trucks moving manure or dead birds must be cleaned and disinfected using the appropriate protocol after delivery.

Appendix C. Biosecurity for Turkey Hatching Eggs and Day-Old Poults

1. Turkey Hatching Eggs

a. Farm operations

- i. Farm-specific materials must be used for gathering eggs
- ii. Hatching eggs must be packed in either new disposable materials or plastic materials that were previously cleaned and disinfected at the hatchery*.
- iii. Hatching eggs must be washed and sanitized with a chlorine rinse with at least a 200 ppm concentration or with an EPA registered disinfectant for avian influenza virus according to the manufacturer's label directions for application on hatching eggs.
- iv. If flats are taken into a hen house, eggs must be washed and sanitized while on the flats or transferred to clean flats after being washed or sanitized. Employees who manually transfer eggs must wash their hands with soap and water or use a hand sanitizer immediately before doing so.
- v. Farm personnel should disinfect the egg storage room floor and buggy wheels before buggies are moved for loading; or egg buggies must be washed and sanitized immediately prior to moving into an egg storage room cooler, being careful to cover the entire circumference of the buggie wheels.
- vi. Farm personnel should don disposable gloves and disposable boots or boots which have been cleaned and disinfected immediately before entering egg storage coolers.

*Disinfectants for hard and nonporous surfaces may be selected from EPA registered products or from other products shown to be efficacious against avian influenza viruses. These products include acetic acid (5%), citric acid (1% and 3%), calcium hypochlorite (750 ppm), sodium hypochlorite (750 ppm), laundry detergent with peroxygen (bleach), and commercially available iodine/acid disinfectant. (Avian Diseases 52:118-123, 2008)

b. Transport of hatching eggs

- i. Turkey hatching eggs must be moved from the turkey breeding farm directly and only to a hatchery.
- ii. The transport vehicle shall be sealed by farm or company personnel under the authorization of the Incident Commander.
- iii. Egg pick-up drivers shall not enter poult processing areas, conduct poult deliveries, or handle poults on the same day that they have delivered eggs to the hatchery.
- iv. The State Animal Health Official of the State of destination must receive a copy of the restricted movement permit within 24 hours of issuance

c. Hatchery operations

- i. Egg deliveries to the hatchery and transfer of hatching eggs into setters must be conducted after hatching and poult processing operations on the same day have been completed or have separate personnel performing these functions.
- ii. If the hatchery has a loading dock that is used for hatching eggs and poults, poults must leave the loading dock before eggs are received or hatchery loading docks, connecting passages, and receiving storage areas must be cleaned and disinfected with an EPA registered disinfectant after receiving each truckload of hatching eggs.
- iii. Egg contents leaked onto hatchery floors must be cleaned and disinfected according to hatchery SOP as soon as possible.
- iv. Employees must wash their hands with soap or apply a hand sanitizer before entering the hatcher room or poult processing rooms. Employees must take precautions to prevent the transfer of microbial contamination into the poult processing room via shoes by utilizing a foot bath or clean disposable shoe covers.
- v. Egg-handling materials shall be returned to the premises of origin after at least 24 hours have elapsed since these materials were moved from the farm and without contacting materials going to other premises.

2. Day-Old Poults

- a. Shall be moved in clean reusable or new paper boxes with clean reusable or new pads.
- b. The State Animal Health Official of the State of destination must be faxed a copy of the restricted movement permit within 24 hours of issuance.

Appendix D. Epidemiology Questionnaire for Turkeys Moving to Market

Date:				
Business/farm name:				
*Primary contact:				
Cell telephone number:				
Fax number:				
Home telephone number:				
E-mail address:econdary contact:				
usiness/farm name:				
Business address:				
Business telephone number:				
Fax number:				
Home telephone number:				
E-mail address:				
County:				
Range:				
GPS coordinates (decimal degrees) at farm	n gate:			

^{*} Person who controls marketing decisions for this flock, i.e. when and where the flock will be marketed.

Farm Information State Premises Identification Number: Turkeys on premises: Number: Number of turkey houses on premises: Name of Destination Slaughter Plant: Address of Destination Slaughter Plant: Planned route to Destination Slaughter Plant: Load-out Crew Identification: Flock Health Information. 1. Has the mortality rate remained at less than 2/1,000 turkeys in the flock during the preceding 14 days? ☐ Yes ☐ No If the answer is "no", a copy of pertinent mortality records for the preceding 14 days must be submitted to the Incident Command. b. Diagnostic tests conducted: c. Test results: 2. Have you noticed unusual listlessness or depression in the flock during the preceding 2 days?

☐ Yes ☐ No

3.	Avian	influenza	test results	(preceding	30 days)
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Date	Sample Type	No. Samples Tested	Laboratory Used	Results

Trace Back Information

In the last 14 days, did the following movements **ONTO** the farm occur? If yes, please provide as much accurate information as possible for each unique source. You can add more rows by 'right clicking' in the box and selecting "Insert > Insert Rows Below".

Live Turkeys	(or other birds):	☐ Yes	\square No	☐ Don't know
--------------	-------------------	-------	--------------	--------------

		RRT-PCR tested for avian influenza prior to	
Date?	Source?	moving onto your farm? (Yes/No)	Test Date?
	_		
Additional	Comments:		

Foreign Animal Disease investigators may find it helpful to sketch the location of buildings in relation	to the
road access on the reverse side of this page.	

Appendix E. Turkey Marketing Schedule*

				Number		Farm
Date of	Processor	Grower	House	Turkeys	Number	Depopulated?
Movement	(Destination)	(Farm of Origin)	No.(s)#	Moving	Loads	Depopulated? (Yes or No) [@]

*The FAST Turkeys Plan will be administered by the State Animal Health Official's (SAHO) office in each participating state. The SAHO and the turkey industry in each state may need to create a state-specific form for providing the turkey marketing information requested above. This information should be provided every two weeks to the Incident Command team.

#The number (or identification) of the house or houses from which turkeys will be loaded onto livehaul trucks.

@Will live turkeys remain on the farm after load-out has been completed?

Appendix F. Epidemiology Questionnaire for Turkeys, Turkey Eggs, and Turkey Semen Moving to Non-Market Locations

Date:		
Business/farm name:		
*Primary contact:		
Business address:		
Business telephone numb	er:	
Cell telephone number: _		
Fax number:		
Home telephone number		
E-mail address:		
Secondary contact:		
Business address:		
Business telephone numb	er:	
Cell telephone number: _		
Fax number:		
Home telephone number		
E-mail address:		
Farm mailing address (911):		
City:	Zip code:	
County:	Township:	
Range:	Section:	
GPS coordinates (decimal degrees) at farm gate:	

^{*} Person who controls movement decisions for this flock, i.e. when and where the flock will be moved.

☐ Yes ☐ No

Farm Information State Premises Identification Number: Turkeys on premises: Number of turkey houses on premises: Date on which turkeys or turkey eggs will move: House number(s) from which turkeys or turkey Eggs will be moved: Number of Truck Loads that will move: Business Name of Destination: Address of Destination: Planned route to Destination: Flock Health Information. 1. Has the mortality rate exceeded 2/1,000 turkeys in the flock during the preceding 14 days? ☐ Yes ☐ No If the answer is "no", a copy of pertinent mortality records for the preceding 14 days must be submitted to the Incident Command. b. Diagnostic tests conducted: Test results:

Have you noticed unusual listlessness or depression in the flock during the preceding 2 days?

2.

Employee Risk Factors

4. hato	heri		at other poultry premises or have they visited other paughtering facilities within the past 14 days?	ooultry premises, ☐ Yes ☐ No
5. prod	cessi	Do any of your emloyees live or ng plant, slaughter facility or rend	associate with someone who works at another poult ering plant?	try farm, hatchery, ☐ Yes ☐ No
6.		Have you hired new personnel d	uring the past 14 days?	□Yes □No
	a)	If Yes, did they work for another	poultry premises before you hired them?	□ Yes □ No
	b)	If Yes, where did they work prior	to coming to your premises?	
7.		Has an employee from this premi	ses visited a rendering plant within the past 14 days?	□Yes □No
	a)	If Yes, what plant?		
Bio	seci	urity Risk Factors		
8.	taini	Have migratory waterfowl been ng turkeys in the last 14 days?	seen on the ground or water within 0.62m (1 km) of yo	our buildings □ Yes □ No
	a)	If Yes, please describe:		
9.		Have free flying birds been obse	erved in the turkey houses in the past 14 days?	□ Yes □ No
10.		Is feed protected from exposure t and/or wild mammals?	o feces from wild birds, waterfowl, rodents	□ Yes □ No
11.		Is water protected from exposure and/or wild mammals?	to feces from wild birds, waterfowl, rodents	□Yes □No
12.		Which of the following describes disposal method? (Mark ALL th	this farm's usual carcass (daily mortality) at apply)	
		 □ Rendering □ Composting □ Burial □ Incineration □ Other (specify:	□ on-farm □ off -farm)
13.	Do	you dispose of dead birds from o	ther farms?	□ Yes □ No
		a) If Yes, please provide m	ore details.	

Trace Back Information

In the last 14 days, did the following movements **ONTO** the farm occur? If yes, please provide as much accurate information as possible for each unique source.

14.	Live Turkeys (or other birds)		□Yes	□No	☐ Don't know
	If Yes, identify the source:				
	Additional Comments:				
15.	Feed trucks	☐ Yes ☐ No ☐ Don't know			
	If Yes, identify the source:				
	Additional Comments:				
16.	Fresh litter/bedding		□Yes	□No	□ Don't know
	If Yes, identify the source:				
	Additional Comments:				
17.	Personnel or equipment used to	handle/haul manure and/or used litte	r? □ Y€	es 🗆 N	Io □ Don't know
	If Yes, identify the source:				
	Additional Comments:				
18.	Load-out crews		□Ye	s 🗆 N	o □ Don't know
	If Yes, identify the source:				
	Additional Comments:				

	19. Off-site renderer	☐ Yes	□No	☐ Don't know
	If Yes, identify the source:			
	Additional Comments:			
).	Non-company Visitors to the Farm	☐ Yes	□No	☐ Don't know
	If Yes, identify the source:			
	Additional Comments:			
ı tl	race Forward Information the last 14 days, did the following movements OFF the farm occur? If yes, ple formation as possible for each unique off-farm destination.			
ı tl	race Forward Information the last 14 days, did the following movements OFF the farm occur? If yes, ple	ase provide	e as muc	
ı tl	race Forward Information the last 14 days, did the following movements OFF the farm occur? If yes, ple formation as possible for each unique off-farm destination.	ase provido □Yes	e as muc	h accurate
ı tl	race Forward Information the last 14 days, did the following movements OFF the farm occur? If yes, ple formation as possible for each unique off-farm destination. Live Turkeys (or other birds)	ase provido □ Yes	e as muc	h accurate
ı tl	race Forward Information the last 14 days, did the following movements OFF the farm occur? If yes, ple formation as possible for each unique off-farm destination. Live Turkeys (or other birds) If Yes, identify the destination:	ase provido □ Yes	e as muc	h accurate □ Don't know
n tl nfo 1.	race Forward Information the last 14 days, did the following movements OFF the farm occur? If yes, ple formation as possible for each unique off-farm destination. Live Turkeys (or other birds) If Yes, identify the destination: Additional Comments:	ase provide □ Yes	e as muc □ No □ No	h accurate □ Don't know □ Don't know

Farm personnel or equipment used to haul manure/used litter to off-farm locations . Yes No Don't know If Yes, identify the destination:				
If Yes, identify the destination: Additional Comments:				
Farm personnel or equipment used for load-out at off-farm locations . Yes No Don't know If Yes, identify the destination:				
If Yes, identify the destination:				
Additional Comments:				
Farm personnel or equipment used for off-farm carcass disposal :				
If Yes, identify the destination:				
Additional Comments:				
26. People or equipment went from your farm to another premises with birds . \square Yes \square No \square Don't know				
If Yes, identify the destination:				
Additional Comments:				

Foreign Animal Disease investigators may find it helpful to sketch the location of buildings in relation to the road access on the reverse side of this page.

Appendix G. Designation of Zones, Areas, and Premises

A critical component for FAD response is the designation of zones, areas, and premises. Epidemiological investigation and tracing will be used to classify premises. It is the responsibility of the Incident Management Team to designate zones and premises in an FAD outbreak. These zones, areas, and premises designations will be used in quarantine and movement control efforts.

Table 1 summarizes the premises designations that would be employed in an FAD outbreak response. Table 2 summarizes the zone and area designations that would be used in an FAD outbreak response.

Table 1. Summary of Premises Designations

Premises	Definition	Zone
Infected Premises (IP)	Premises where a presumptive positive case or confirmed positive case exists based on laboratory results, compatible clinical signs, case definition, and international standards.	Infected Zone
Contact Premises (CP)	Premises with susceptible animals that may have been exposed to the FAD agent, either directly or indirectly, including but not limited to exposure to animals, animal products, fomites, or people from Infected Premises.	Infected Zone, Buffer Zone
Suspect Premises (SP)	Premises under investigation due to the presence of susceptible animals reported to have clinical signs compatible with the FAD. This is intended to be a short-term premises designation.	Infected Zone, Buffer Zone, Surveillance Zone, Vaccination Zone
At-Risk Premises (ARP)	Premises with susceptible animals, but none have clinical signs compatible with the FAD. Premises objectively demonstrates that it is not an Infected Premises, Contact Premises, or Suspect Premises. At-Risk Premises seek to move susceptible animals or products within the Control Area by permit. Only At-Risk Premises are eligible to become Monitored Premises.	Infected Zone, Buffer Zone
Monitored Premises (MP)	Premises objectively demonstrates that it is not an Infected Premises, Contact Premises, or 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.	Infected Zone, Buffer Zone

Table 1. Summary of Premises Designations

Premises	Definition	Zone
Free Premises (FP)	Premises outside of a Control Area and not a Contact or Suspect Premises.	Surveillance Zone, Free Area
Vaccinated Premises (VP)	Premises where emergency vaccination has been performed. This is a secondary premises designation.	Containment Vaccination Zone, Protection Vaccination Zone

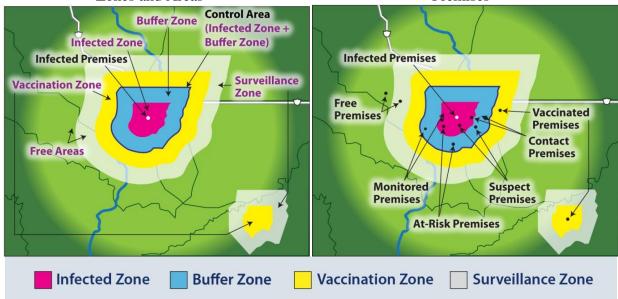
Table 2. Summary of Zone and Area Designations

Zone/Area	Definition
Infected Zone (IZ)	Zone that immediately surrounds an Infected Premises.
Buffer Zone (BZ)	Zone that immediately surrounds an Infected Zone or a Contact Premises.
Control Area (CA)	Consists of an Infected Zone and a Buffer Zone.
Surveillance Zone (SZ)	Zone outside and along the border of a Control Area.
Free Area (FA)	Area not included in any Control Area.
Vaccination Zone (VZ)	Emergency Vaccination Zone classified as either Containment Vaccination Zone (typically inside the Control Area) or Protection Vaccination Zone (typically outside Control Area). This is a secondary zone designation.

Figure 1 illustrates all the zones and premises. Note: Figures are not to scale. The Vaccination Zone can be either a Protection Vaccination Zone or Containment Vaccination Zone.

Zones and Areas **Premises Control Area** Buffer Zone (Infected Zone + **Infected Zone Buffer Zone**)

Figure 1. Example Zones and Premises



For details on the zones, areas, and premises, please see the *APHIS Framework for Foreign Animal Disease Preparedness and Response*. For additional information integrating the zones, areas, and premises designations with specific FAD response strategies, please see the disease specific response plans, such as the *FMD Response Plan: The Red Book*.

These documents are available on the following sites:

- FAD PReP collaboration website at: https://fadprep.lmi.org.
- APHIS FAD PReP website (for APHIS employees) at: http://inside.aphis.usda.gov/vs/em/fadprep.shtml.

Appendix H. Sampling Protocol for RRT-PCR Testing

Probability of Detection:

The probability of detecting at least one infected bird in the group of daily dead or sick birds (daily dead) depends on the prevalence of HPAI infected dead birds, the number of dead HPAI birds tested, and the test sensitivity. For example, if there are two HPAI infected dead birds in a group of 10 dead birds, there is a higher probability of detecting HPAI presence if each 5-bird pool tested has an infected bird instead of two infected birds in one 5-bird pool and no infected bird in the other 5-bird pool.

In addition, the number of HPAI infected birds in the daily dead depends on the number of HPAI infected birds in the flock (prevalence). In turn, the number of HPAI infected birds in the flock depends on the transmission rate (number of birds newly infected by one infected bird per time period) and the length of time since HPAI was introduced into the flock.

The probability of detection is limited by the test sensitivity of the pooled sample.

For example, with a test sensitivity of 86.5 percent, one pool containing at least one known infected bird still has only 86.5% chance of testing positive and thus only an 86.5% chance of detecting infection. Thus multiple 5-bird pool samples must be tested to exceed the required 95% or 99% confidence level even with the increased prevalence, assuming that all the infected birds don't wind up in the same pool

The samples are drawn from the daily dead or sick birds and not based on the number of birds in the house *per se*. In any size house, three sampling pools of 5 birds are required from the daily dead or sick birds. Targeting the daily sick and dead birds reduces the sample size required for the 95% confidence level because the prevalence of HPAI infected birds should be higher in this group than in the house as a whole.

Daily Probability of Detecting HPAI in Turkey Houses*		
RRT-PCR Test Sensitivity 86.5 %	Target Population	
No. Pools Tested	5-Birds per Pool	
1	81%	
2	96%	
3	99%	
4	99%	
2 3 4	99% 99%	

^{*} Probability of detecting at least one HPAI infected bird where the HPAI prevalence is 40 percent in the target population of the daily dead or sick birds.

Appendix I. Truck Cleaning and Disinfection Protocol and Report

Company name:	Facility location:
Driver's signature:	Supervisor's signature:
Time of the day:	Date:

See the NAHEMS Cleaning and Disinfection Guidelines¹ for additional information.

- 1. Remove trash from tractor cab and sweep out dry soil and debris. Clean the entire interior of the tractor cab using an appropriate detergent.
- 2. Pre-rinse all areas of the truck and remove visible organic matter. A pressurized water source may work best for this task. (Remove accumulated ice if operating in winter weather conditions.).
- 3. Thoroughly clean all truck surfaces, paying particular attention to the truck bed, undercarriage, and wheels. Application of detergent foam followed by a high-pressure rinse may be most effective.
- 3. Apply an approved disinfectant to all truck surfaces (interior and exterior) following the safety precautions of the disinfectant manufacturer.²
- 4. Return vehicle to a clean area or site for next use.
- **5.** Document all actions taken on the sanitation report.

Truck Sanitation Report

- 1. *Truck driver*. Review the sanitation report for accuracy and completeness and inspect the sanitary conditions of all truck components and take a copy of the completed sanitation report with you before going to another turkey farm.
- 2. Company Supervisor or designee. Before the truck leaves the processing plant premises, review the sanitation report and inspect the truck, noting any details on form. If areas are found unacceptable, take corrective actions to make them acceptable. Note any corrective action taken on the form. Sign the form, verifying that everything was acceptable before the truck is allowed to be used at the farm. File completed and signed forms with the Incident Command.

¹ URL: https://fadprep.lmi.org/NAHEMS/NAHEMS%20-%202010%20and%20beyond/FAD-PReP">https://fadprep.lmi.org/NAHEMS/NAHEMS%20-%202010%20and%20beyond/FAD-PReP">https://fadprep.lmi.org/NAHEMS/NAHEMS%20-%202010%20and%20beyond/FAD-PReP">https://fadprep.lmi.org/NAHEMS/NAHEMS%20-%202010%20and%20beyond/FAD-PReP">https://fadprep.lmi.org/NAHEMS/NAHEMS%20-%202010%20and%20beyond/FAD-PReP">https://fadprep.lmi.org/NAHEMS/NAHEMS%20-%202010%20and%20beyond/FAD-PReP">https://fadprep.lmi.org/NAHEMS/NAHEMS%20-%202010%20and%20beyond/FAD-PReP">https://fadprep.lmi.org/NAHEMS/NAHEMS%20-%202010%20and%20beyond/FAD-PReP">https://fadprep.lmi.org/NAHEMS/NAHEMS%20-%202010%20and%20beyond/FAD-PReP">https://fadprep.lmi.org/NAHEMS/NAHEMS%20-%202010%20and%20beyond/FAD-PReP">https://fadprep.lmi.org/NAHEMS/NAHEMS%20-%202010%20and%20beyond/FAD-PReP">https://fadprep.lmi.org/NAHEMS/NAH

² EPA, Registered Antimicrobial Products with Label Claims for Avian (Bird) Flu Disinfectants, March 13, 2008, www.epa.gov/pesticides/factsheets/avian_flu_products.htm.

Appendix J. Initial Permit for Movement of Turkeys, Turkey Eggs, and Turkey Semen

<u>Pe</u>	Permit Number: XX.0 Date of Permit:			
*xx is premises number, initial permits will be numbered zero and subsequent permits 1, 2, 3 and so on. Shipment is permitted from				
*	The cargo interior and exterior of the transport vehicle must will not be allowed outside the cab or else the cab interior n truck's tires and wheel wells must be cleaned and disinfecte Control Area.	nust also be cleaned and disinfected. The		
*	❖ One 5-bird pooled sample must be tested by RRT-PCR for negative from every house on the premises for two consecuturkeys, turkey eggs, or turkey semen. The time interval be consecutive days must be at least 18 hours. If there are less remainder of the samples should be taken from sick turkeys National Animal Health Laboratory Network laboratory.)	tive days prior to movement of live tween collection of samples on than 5 dead turkeys in the house, the		
	Dates of two consecutive negative RRT-PCR tests for Notification (This permit allows movement of			
res	results are available).			
Th	This permit is valid ONLY if copies of reports of negative 1	RRT-PCR test results from samples		
	collected from every house on the premises during the past t			
La	I certify that this flock meets the standards of the Secure Turkey	Zunniy Dian		
10	reentry that this flock meets the standards of the Secure Turkey	Supply Flaii.		
	/			
Inc	Incident Commander Printed Name and Signature	Date (mm/dd/yyyy)		
I certify that the mortality of this turkey flock is within normal range and no unusual clinical signs of disease are present in these turkeys on the date of shipment.				
Πa	Form Monocon Drinted Name / Cientera	ote of chinas and (man /dd/man)		
га	Farm Manager Printed Name/Signature D	ate of shipment (mm/dd/yyyy)		

Appendix K. Subsequent Permit for Movement of Turkeys, Turkey Eggs, and Turkey Semen

Permit Number: XX.0 *xx is premises number, initial permits will be numbered zero and subsequent permits 1, 2, 3 and so on.					
Shipment is permitted from(farm name)					
to	(destination).				
*	The cargo interior and exterior of the transport vehicle must be cleaned and disinfected. The driver will not be allowed outside the cab or else the cab interior must also be cleaned and disinfected. The truck's tires and wheel wells must be cleaned and disinfected when leaving premises within the Control Area.				
*	One 5-bird pool from each house on the premises must test negative by the RRT-PCR test within one day prior to movement of turkeys, eggs, or semen from the premises (The test must be conducted by a National Animal Health Laboratory Network laboratory.)				
Date of latest negative RRT-PCR test for Notifiable Avian Influenza: (This permit allows movement of product until the next day's RRT-PCR test results are available).					
This permit is valid ONLY if a copy of the report of negative RRT-PCR test results from samples collected from each house on the premises during the previous day is attached.					
I certify that the mortality of this turkey flock is within normal range and no unusual clinical signs of disease are present in these turkeys on the date of shipment.					
	/				
Fa	rm Manager Printed Name/Signature Date of shipment (mm/dd/yyyy)				

Appendix L. Public Health Risk Assessment for Movement of Infected But Undetected Turkeys Out of, Within, and Into a Control Area During an Outbreak of Highly Pathogenic Avian Influenza*

- 1. **Public Health Risk Assessment**. The United States Department of Agriculture's (USDA) Food Safety and Inspection Service (FSIS) developed a quantitative public health risk assessment for the highly pathogenic avian influenza virus (HPAI) in turkey products for human consumption in collaboration with the Department of Health and Human Services' (DHHS) Food and Drug Administration (FDA) and USDA's Animal and Plant Health Inspection Service (APHIS). The risk assessment was developed by an Interagency Workgroup formed from representatives of each of these three agencies. This risk assessment included 1) an estimate of the exposure and potential human illness from consumption of HPAI-contaminated turkey from the index flock and 2) examined the effectiveness of mitigation strategies to control HPAI if detected in the United States. The risk assessment was completed in May 2010 and the complete title is "Interagency Risk Assessment for the Public Health Impact of Highly Pathogenic Avian Influenza Virus in Poultry, Shell Eggs, and Egg Products."
- Public Health Context. Avian influenza viruses are typically species-specific, causing 2. disease in birds. However, HPAI H5N1 and other H5 and H7 subtypes have recently become a zoonotic concern. In June 2011, the World Health Organization reported that worldwide from 2003-2011, there have been 555 confirmed HPAI human illnesses, resulting in 324 deaths. Retrospective studies have determined that the majority of these cases are associated with close contact with live or dead HPAI-infected birds likely caused by respiratory inhalation of infective droplets or self-inoculation (e.g., by a human handler touching their mucous membranes or conjunctiva after contact with avian feces, avian respiratory secretions, or avian body fluids), rather than consumption of poultry or shell eggs or egg products. Currently, there is no compelling epidemiological evidence linking the consumption of cooked poultry meat, shell eggs, or egg products to human illness caused by HPAI. HPAI is not considered to be a foodborne pathogen although the virus has been isolated from poultry muscle and the interior of eggs. Two HPAI-confirmed human illnesses may have been related to the consumption of infected raw duck blood products, although contact with live or dead HPAI-infected poultry could not be epidemiologically excluded. Despite this lack of evidence, the possibility of poultry and egg consumption as an exposure route of HPAI remains a concern to food safety experts. In light of this and the recent HPAI poultry and human illnesses in Asia, Africa, Europe, and the Middle East, the Interagency Workgroup developed the 2010 food safety risk assessment for HPAI exposure and illnesses in humans from consumption of poultry meat, shell eggs, and egg products.
- 3. **Model Approach.** The risk assessment model simulates human exposure and potential illness from consumption of HPAI H5 and H7 strains that can make humans ill and lead to death. Exposure from HPAI is modeled separately for poultry meat and consists of three modules representing 1) production, 2) processing, and 3) consumer preparation. The production module assumes introduction of HPAI into the index flock of a single U.S. meat poultry house following

HPAI entry into the U.S. A bird-to-bird transmission model simulates HPAI spread to estimate within-flock prevalence of HPAI at the farm and for poultry meat production, during transportation. For an infected flock destined for meat production the transmission model simulates an increase in the prevalence of HPAI in the flock until substantial bird mortality would allow the disease to be detected or the undetected flock is sent to slaughter. In the processing module, it was assumed birds sent to slaughter are subject to federal inspection, which could result in the removal of infected birds. The likelihood an infected bird is identified due to visible pathology was dependent on how long the bird was infected before slaughter. The amount of HPAI in each serving of poultry is related to the time between infection and slaughter. The consumer preparation module examines the impact of cooking and cross-contamination on levels of HPAI, thereby resulting in estimates of the level of HPAI ingested by the consumer. The predicted amount of contaminated poultry meat available for human consumption is used along with a dose-response function to estimate the number of potential human illnesses. Other routes of exposure such as inhalation, mucosal contact, and wound exposures by food preparers and consumer contact with contaminated raw poultry, as well as farm and processing occupational exposures, are not addressed in this risk assessment.

- 4. **Turkey Model Results.** This risk assessment has been developed as a tool to evaluate mitigation scenarios should HPAI be identified in the U.S. Using scenario analysis, the following was found:
 - If a turkey flock is exposed to HPAI, the model predicts a 98% probability that a turkey flock would be identified as HPAI-positive before slaughter and not enter commerce. This is because flocks infected early in the grow-out period will have enough time to demonstrate significant mortality (≥ 2% flock mortality over a single day) on the farm, resulting in identification of the flock as HPAI-positive.
 - There is a 2% probability that an HPAI-infected turkey flock may go to slaughter without detection of the disease. This would happen when HPAI infects a flock that is approaching market weight with not enough time for the flock to demonstrate significant mortality on the farm. In these instances, some fraction of HPAI-contaminated poultry meat may enter commerce.
 - On-farm HPAI testing as a potential mitigation strategy has the greatest impact of lowering predicted illnesses. Approximately 95% of illnesses are mitigated if flocks are tested immediately before being sent for slaughter.
 - Increased on-farm surveillance of daily flock mortality is predicted to reduce human exposure and illness. However, the model predicts that relying on a **single day of flock mortality to identify all HPAI-infected, but undetected flocks is impractical.** This is because a flock may have few dead birds if infected late in its grow-out period as about 36 to 42 hours are required before infected birds die from HPAI.

^{*}Interagency Risk Assessment for the Public Health Impact of Highly Pathogenic Avian Influenza Virus in Poultry, Shell Eggs, and Egg Products, May 2010

Appendix M. Recommended Criteria for Issuing Movement Permits for Turkeys

Only movement of live birds from AI Monitored Premises will be considered. Monitored Premises are located in the Infected Zone or Buffer Zone, which constitute the Control Area. Monitored Premises have susceptible birds that do not have clinical signs (or other epidemiological evidence) compatible with highly pathogenic avian influenza (HPAI). Monitored Premises objectively demonstrate the following:

- They do not meet the definitions for Infected Premises, Contact Premises, or Suspect Premises by complete epidemiological investigation and questionnaire and diagnostic testing.
- Biosecurity measures and precautions have been taken to protect the premises against HPAI.
- Flock health parameters are normal.
- Surveillance requirements are negative for HPAI.

In the absence of specific risk assessments, moving live birds is an unknown risk. Prior to permitting, potential contact with infected and/or epidemiologically linked flocks and the biosecurity of premises containing these flocks will be assessed. Methods to reduce the risk associated with moving live turkeys include the following:

- Pre-movement restrictions people, equipment, and vehicles having direct or indirect contact with Infected Premises (including contact with manure, live or dead birds, work crews, or equipment from an Infected Premises) will not be allowed onto turkey farms before movement of live turkeys.
- All In-All out all turkeys should move within a time period approved by the IC.
- At the time of loading, mortality must be within normal limits and clinical signs associated with HPAI must be absent.
- If supplemental diagnostic tests are conducted prior to movement of turkeys, results must be reported to the IC.
- After the move, turkeys not moving to market (brooder turkeys to grower unit, replacement breeders to egg production unit) must be monitored as directed by the Incident Command (IC).

To maintain market continuity for the turkey industry during an outbreak of HPAI, turkeys from monitored and uninfected flocks within the Control Area must be allowed to move in a manner that does not pose a risk to animal or human health. The table below provides guidance for regulatory personnel responsible for issuing permits for movement of turkeys in a Control Area during an outbreak of HPAI. If the answer to all questions is "Yes," then it is recommended that movement permits be considered.

Immature turkeys in a brooder house must test negative by the RRT-PCR test before they will be allowed to move to a finishing house. Turkeys in a finishing house must test negative by the RRT-PCR test before a permit will be issued which allows them to move to a processing plant (see Section IV). If one or more samples test positive for the avian influenza matrix gene,

samples will be further tested for H5 and H7 avian influenza genes by RRT-PCR. A positive RRT-PCR test for H5 or H7 avian influenza genes indicates the presence of Notifiable Avian Influenza (an influenza A virus of the H5 or H7 subtype). This test does not differentiate between viruses of low and high pathogenicity. However, after a Control Area has been established due to the diagnosis of HPAI, a positive RRT-PCR test for H5 or H7 avian influenza is assumed to identify HPAI.

In the absence of specific risk assessments to the contrary, movement of turkey poults from a hatchery to a brooder house is considered to pose a low to negligible risk. Restrictions on movement of poults from a hatchery to a brooder house will be limited to ensuring that the receiving facility can provide a safe environment wherein poults will not be exposed to potentially infected older turkeys.

The Interagency Risk Assessment for the Public Health Impact of Highly Pathogenic Avian Influenza Virus in Poultry, Shell Eggs, and Egg Products (May 2010) has determined that the risk of transmitting HPAI virus to humans via the food supply is negligible.

Permitting Guidance for Movement of Turkeys		
1. Level 2 Biosecurity Measures are in place?	Yes	
2. Traceability Information is Available (Premises ID, GPS	Yes	
Coordinates, other)?		
3. Epidemiology Questionnaire data is acceptable?	Yes	
4. RRT-PCR tests are negative for samples collected	Yes	
during the preceding 24 hours?		
5. Mortality is no more than 2/1,000 turkeys in the flock	Yes	
for each of the preceding 7 days?		
6. Visual inspection is normal within 24 hours prior to	Yes	
movement?		
7. Fewer than 50 dead turkeys are present in the house	Yes	
immediately prior to loadout.		
8. Drivers and trucks are biosecure; the route from the farm	Yes	
of origin to the grow-out house or turkey processing		
plant avoids poultry farms?		
9. Permit Guidance to Move Turkeys if all above	Consider Issuing	
responses are "Yes"	MOVEMENT PERMIT	

Appendix N. Recommended Criteria for Issuing Movement Permits for Turkey Hatching Eggs and Turkey Semen

Only movement of turkey hatching eggs and semen from breeding flocks in AI Monitored Premises will be considered. Monitored Premises are located in the Infected Zone or Buffer Zone, which constitute the Control Area. Monitored Premises have susceptible birds that do not have clinical signs (or other epidemiological evidence) compatible with highly pathogenic avian influenza (HPAI). Monitored Premises objectively demonstrate the following:

- They do not meet the definitions for Infected Premises, Contact Premises, or Suspect Premises by complete epidemiological investigation and questionnaire and diagnostic testing.
- Biosecurity measures and precautions have been taken to protect the premises against HPAI.
- Flock health parameters are normal.
- Surveillance requirements are negative for HPAI.

In the absence of specific risk assessments, moving turkey hatching eggs or semen is an unknown risk. Prior to permitting, potential contact with infected and/or epidemiologically linked flocks and the biosecurity of premises containing these flocks will be assessed. Measures to reduce the risk associated with moving turkey hatching eggs or semen include the following:

- Pre-movement restrictions people, equipment, and vehicles having direct or indirect contact with Infected Premises (including contact with manure, live or dead birds, work crews, or equipment from an Infected Premises) will not be allowed onto turkey breeder farms before movement of hatching eggs or semen.
- For hen breeder farms or tom breeder farms that do not have their own on-farm artificial insemination crews, artificial insemination crews must visit only one farm per day. Crew members must shower and don clean clothes and disposable boots or boots which have been cleaned and disinfected between farm visits.
- Pre-movement active surveillance by real-time reverse transcriptase polymerase chain reaction (RRT-PCR) testing of turkey breeding toms and hens on farms in a Control Area (see Section IV). Holding turkey hatching eggs for 2 days prior to movement allows sufficient time for two RRT-PCR tests to be conducted and reduces the likelihood of moving contaminated eggs or semen before HPAI infection is detected. For example, eggs produced on Monday could be moved on Wednesday after receiving 2 negative RRT-PCR test results from the turkey breeder flock of origin on Tuesday and Wednesday.
- Requiring flock mortality, egg production, and clinical signs to be within normal limits prior to movement of semen or eggs from turkey breeding farms (see Section V).
- Biosecurity protocols for turkey hatching eggs and day-old poults (see Appendix C).
- Reduction in the frequency of semen movement from twice weekly to once weekly.

Turkey breeder hens and toms producing fertile hatching eggs must test negative for avian influenza matrix genes by the RRT-PCR test before hatching eggs will be allowed to move from a breeder farm to a hatchery or semen will be allowed to move from a tom breeder farm to a hen breeder farm (see Section IV). If one or more samples test positive for the avian influenza matrix gene, samples will be further tested for H5 and H7 avian influenza genes by RRT-PCR. A positive RRT-PCR test for H5 or H7 avian influenza genes indicates the presence of Notifiable Avian Influenza (an influenza A virus of the H5 or H7 subtype). This test does not differentiate between viruses of low and high pathogenicity. However, after a Control Area has been established due to the diagnosis of HPAI, a positive RRT-PCR test for H5 or H7 avian influenza is assumed to identify HPAI.

To maintain market continuity for the turkey industry during an outbreak of HPAI, turkey hatching eggs and semen from monitored and uninfected flocks within the Control Area must be allowed to move in a manner that does not pose a risk to animal or human health. The table below provides guidance for regulatory personnel responsible for issuing permits for movement of turkey hatching eggs and semen in a Control Area during an outbreak of HPAI. If the answer to all questions is "Yes," then it is recommended that movement permits be considered.

Permitting Guidance for Movement of Turkey Hatching Eggs and Turkey Semen		
1. Level 2 Biosecurity Measures are in place?	Yes	
2. Traceability Information is Available (Premises ID, GPS Coordinates, other)?	Yes	
3. Epidemiology Questionnaire data is acceptable?	Yes	
4. RRT-PCR tests are negative for samples collected from turkey breeder flocks on each of 2 consecutive days before moving turkey hatching eggs or semen?	Yes	
5. Mortality is no more than 2/1,000 turkeys in the turkey breeder flock immediately prior to moving hatching eggs or semen?	Yes	
6. Egg production is within normal limits (total decline of less than 15%) during the two-day period prior to movement of turkey hatching eggs?	Yes	
7. Visual inspection is normal in turkey breeder flocks within 24 hours prior to movement?	Yes	
8. Drivers and trucks are biosecure; the route from the turkey breeder tom farm to the turkey breeder hen farm or from the turkey breeder hen farm to the hatchery avoids as many poultry farms as possible?	Yes	
9. Permit Guidance to Move Turkey Eggs or Semen if all above responses are "Yes"	Consider Issuing MOVEMENT PERMIT	