COLLEGE OF AGRICULTURE & NATURAL RESOURCES

Virginia-Maryland College of Veterinary Medicine

Highly Pathogenic Avian Influenza (HPAI)

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UNIVERSITY OF MARYLAND EXTENSION
Solutions in your community

HPAI Preparedness grower's meeting

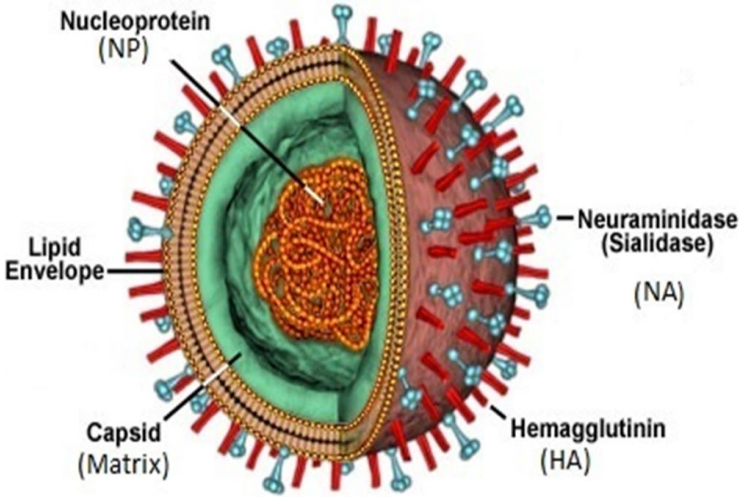
12/09/22

Outline

- What is Avian influenza ?
- Difference LPAI vs. HPAI?
- What are clinical signs of HPAI?
- How HPAI spread?
- How many cases of HPAI in 2022
    - Wild birds and mammals?
    - Commercial and backyard?
- How to prevent and control HPAI?

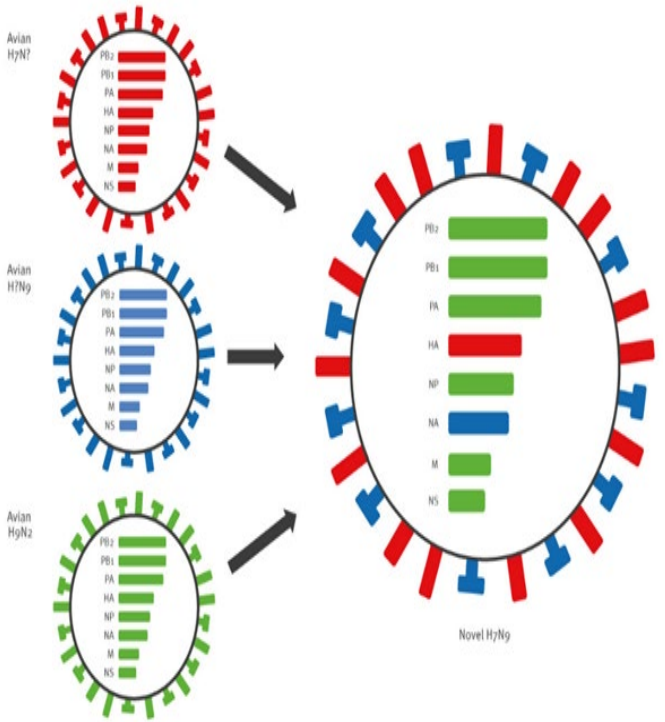
What is Avian influenza ?

- Caused by influenza Type A virus (influenza A).
- Reservoir is water fowl
- Infect many species
- Fastest evolving



Source of Influenza Diversity

- Categorized based on a combination of two groups of proteins on the surface
  - “H” proteins, (H1-H16),
  - “N” proteins, (N1-N9).
- Each combination is considered a different subtype



Difference LPAI vs. HPAI?

Highly pathogenic to what?

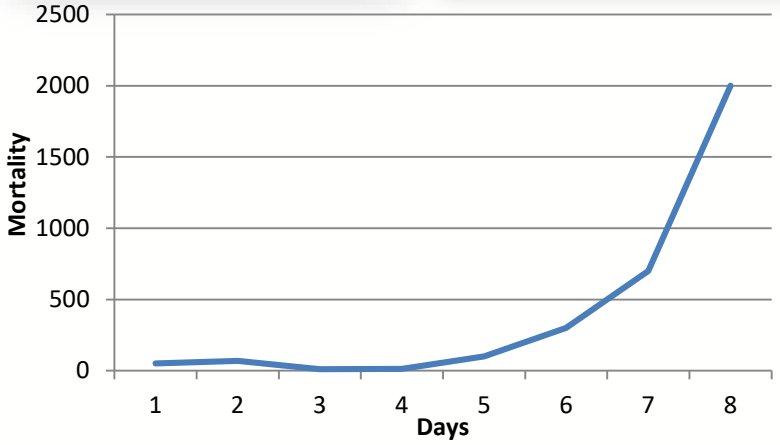
Definition?

- H5 or H7
- Clinical
- Molecular

Public health significance?

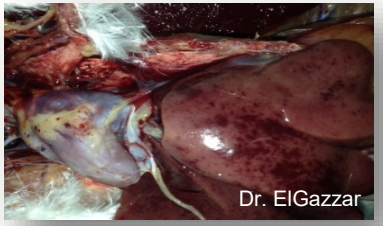
What are clinical signs of HPAI?

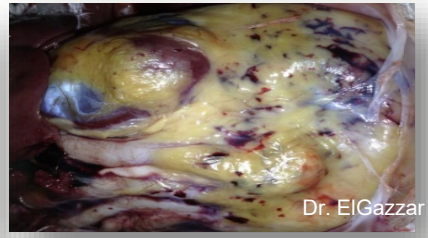
- Sudden death without clinical signs
- Decreased water consumption
- Lack of energy and appetite
- Decreased egg production or soft-shelled or misshapen eggs
- Nasal discharge, coughing, and sneezing
- Incoordination
- Diarrhea.

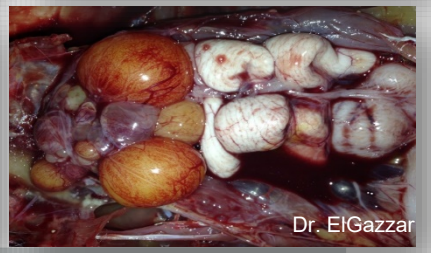


What are necropsy lesions of HPAI?

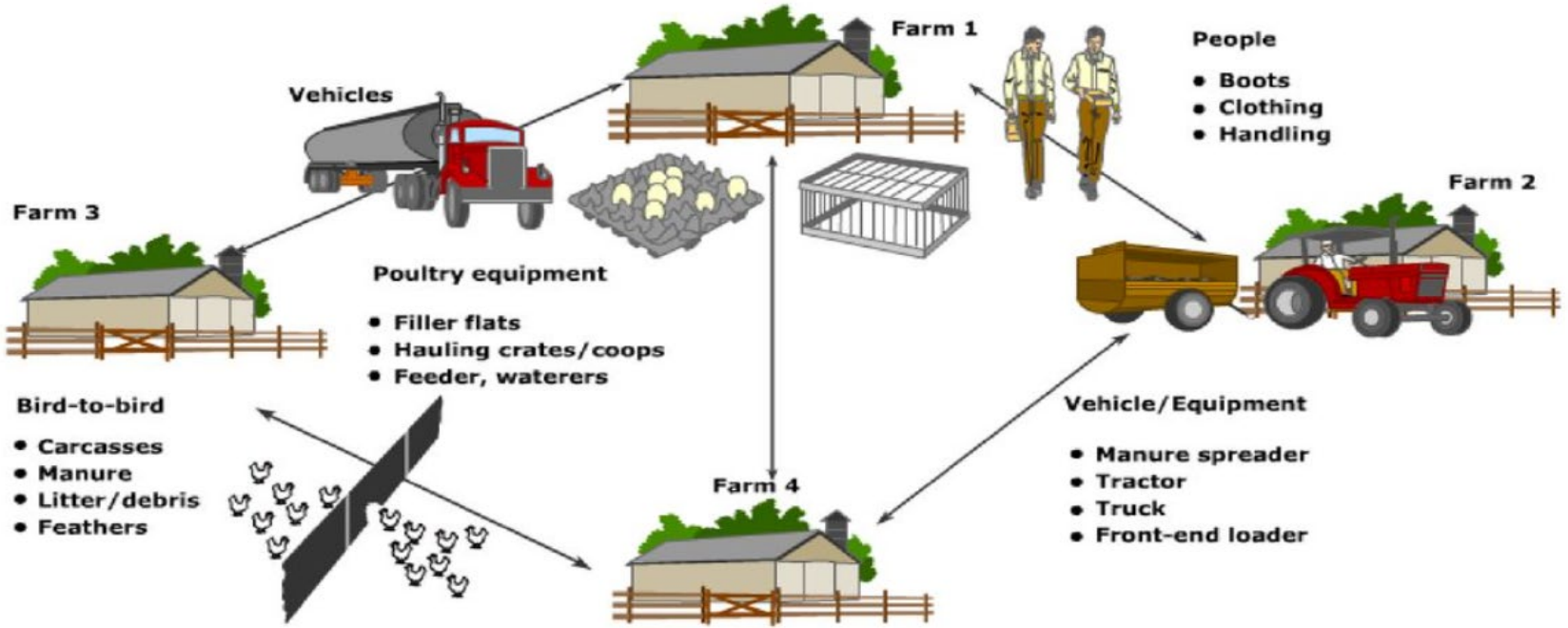
- Swelling of head, comb, eyelid, wattles, and hocks
- Purple discoloration of wattles, comb, and legs
- Most prominent necropsy lesions are petechial hemorrhages on internal organs







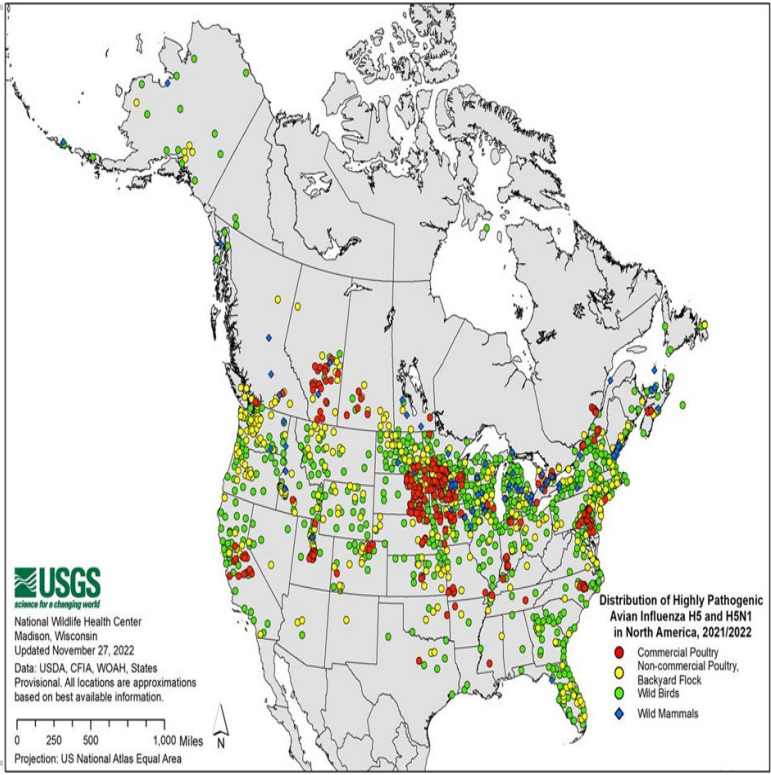
How HPAI spread locally?



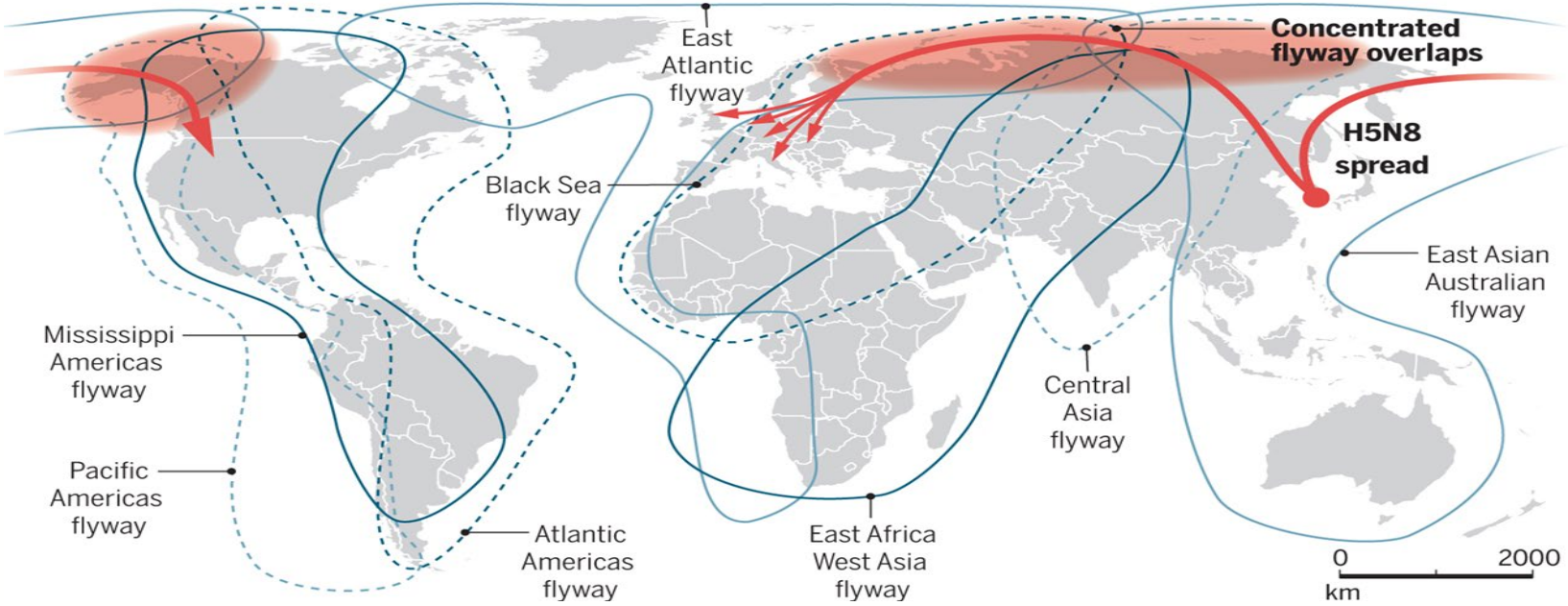
USDA

The first 2021/2022 detection of Eurasian strain (EA) (HPAI) H5N1 in North America

- Occurred in December 2021 in Newfoundland and Labrador, Canada.
- Confirmed in wild birds, backyard flocks, commercial poultry facilities, and wild mammals



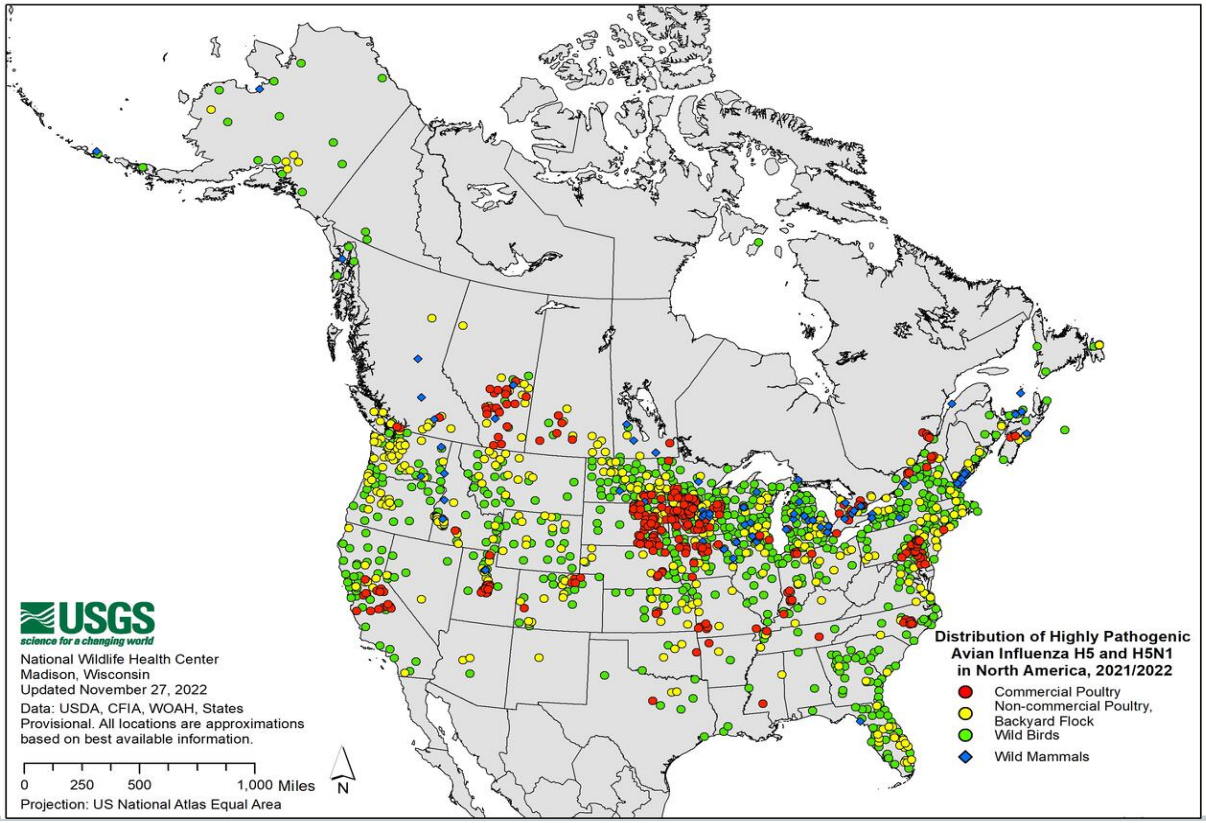
How HPAI spread globally?



Global movement of wild birds The complex overlap of flyways

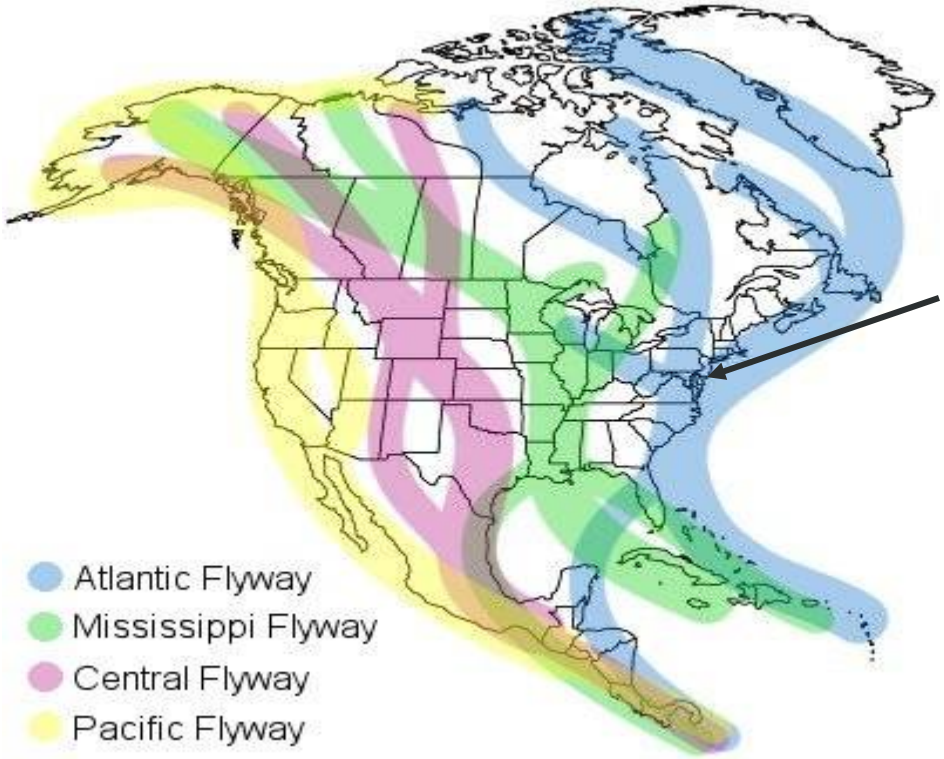
Olsen B., et al., Science 312, 384 (2006).

Distribution of Highly Pathogenic Avian Influenza H5 and H5N1 in North America, 2021/2022. Updated November 27



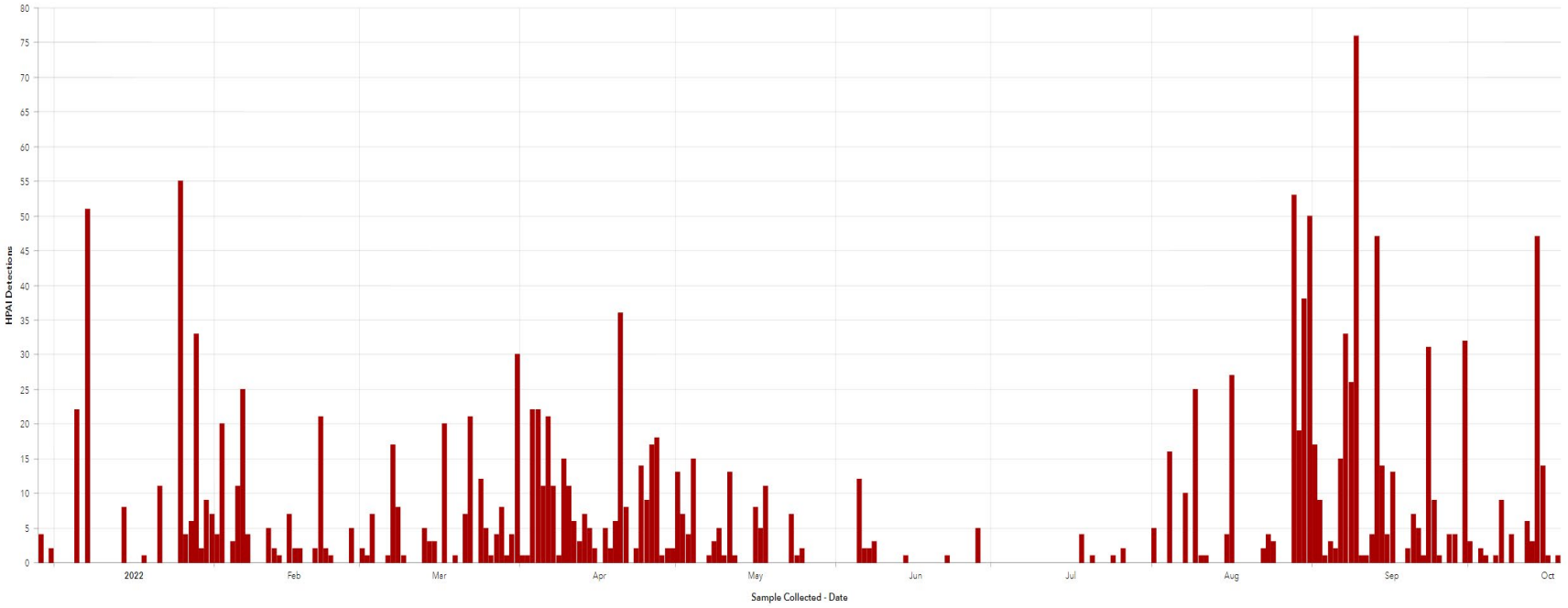
https://www.usgs.gov/media/images/distribution-highly-pathogenic-avian-influenza-h5-and-h5n1-north-america-20212022

Migratory Fly Ways in NA



Delmarva is part of the Atlantic Flyway

Wild Bird Avian Influenza Surveillance



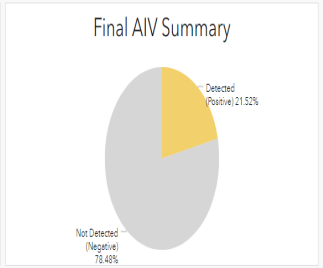
HPAI Detections in wild birds

https://www.aphis.usda.gov/aphis/maps/animal-health/wild-bird-avian-flu-surveillance

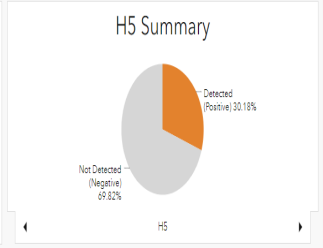
Wild Bird Avian Influenza Surveillance

National

Samples Tested
34.5k



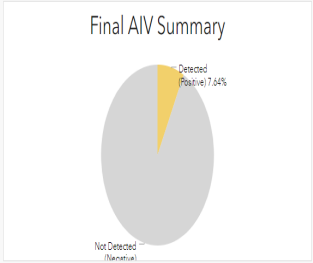
All AIV Detections *
7.4k



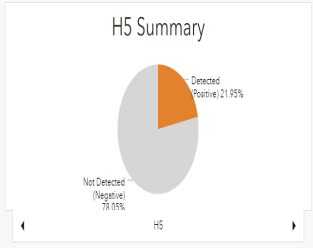
HPAI Detections
1.6k

DE

Samples Tested
1.1k



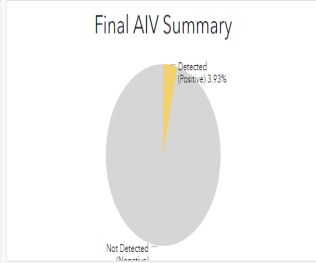
All AIV Detections *
81



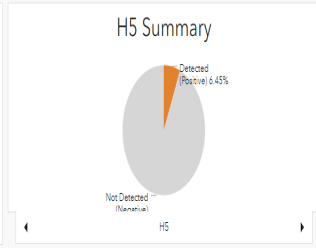
HPAI Detections
10

MD

Samples Tested
764



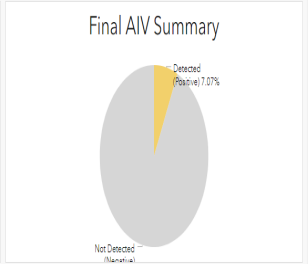
All AIV Detections *
30



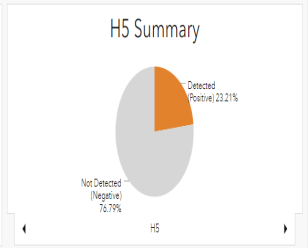
HPAI Detections
2

VA

Samples Tested
1.6k



All AIV Detections *
111

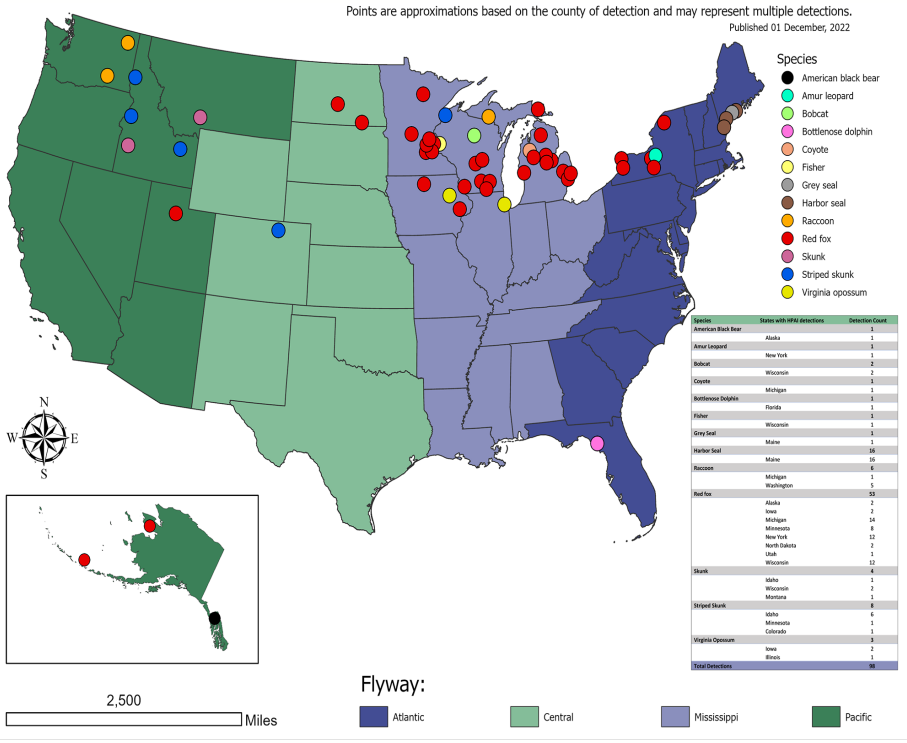


HPAI Detections
15

https://www.aphis.usda.gov/aphis/maps/animal-health/wild-bird-avian-flu-surveillance

2022 Detections of Highly Pathogenic Avian Influenza in Mammals

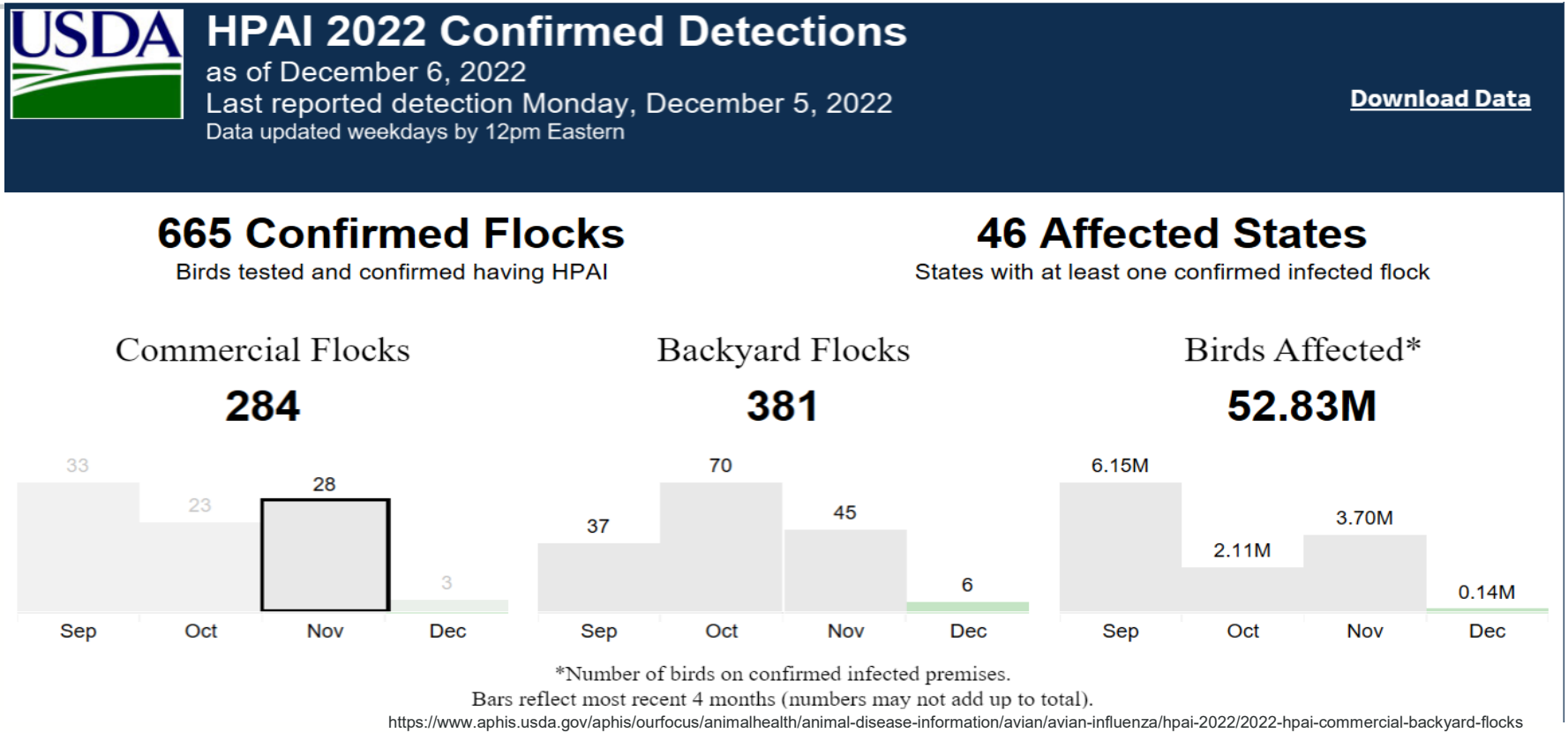
- Total detections 98
- Red fox 53 cases



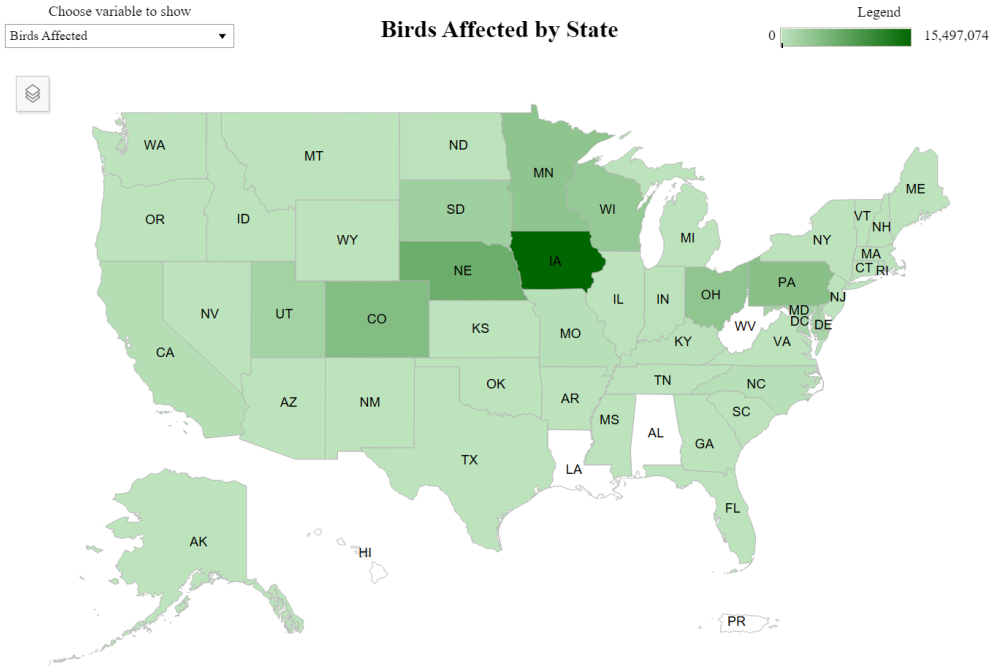
Species	States with HPAI detections	Detection Count
American Black Bear		1
	Alaska	1
Amur Leopard		1
	New York	1
Bobcat		2
	Wisconsin	2
Coyote		1
	Michigan	1
Bottlenose Dolphin		1
	Florida	1
Fisher		1
	Wisconsin	1
Grey Seal		1
	Maine	1
Harbor Seal		16
	Maine	16
Raccoon		6
	Michigan	1
	Washington	5
Red fox		53
	Alaska	2
	Iowa	2
	Michigan	14
	Minnesota	8
	New York	12
	North Dakota	2
	Utah	1
	Wisconsin	12
Skunk		4
	Idaho	1
	Wisconsin	2
	Montana	1
Striped Skunk		8
	Idaho	6
	Minnesota	1
	Colorado	1
Virginia Opossum		3
	Iowa	2
	Illinois	1
Total Detections		98

https://www.aphis.usda.gov/animal_health/animal_diseases/avian/images/hpai-mammals-map.png

Distribution of Highly Pathogenic Avian Influenza H5 and H5N1 in North America, 2021/2022. Updated November 27

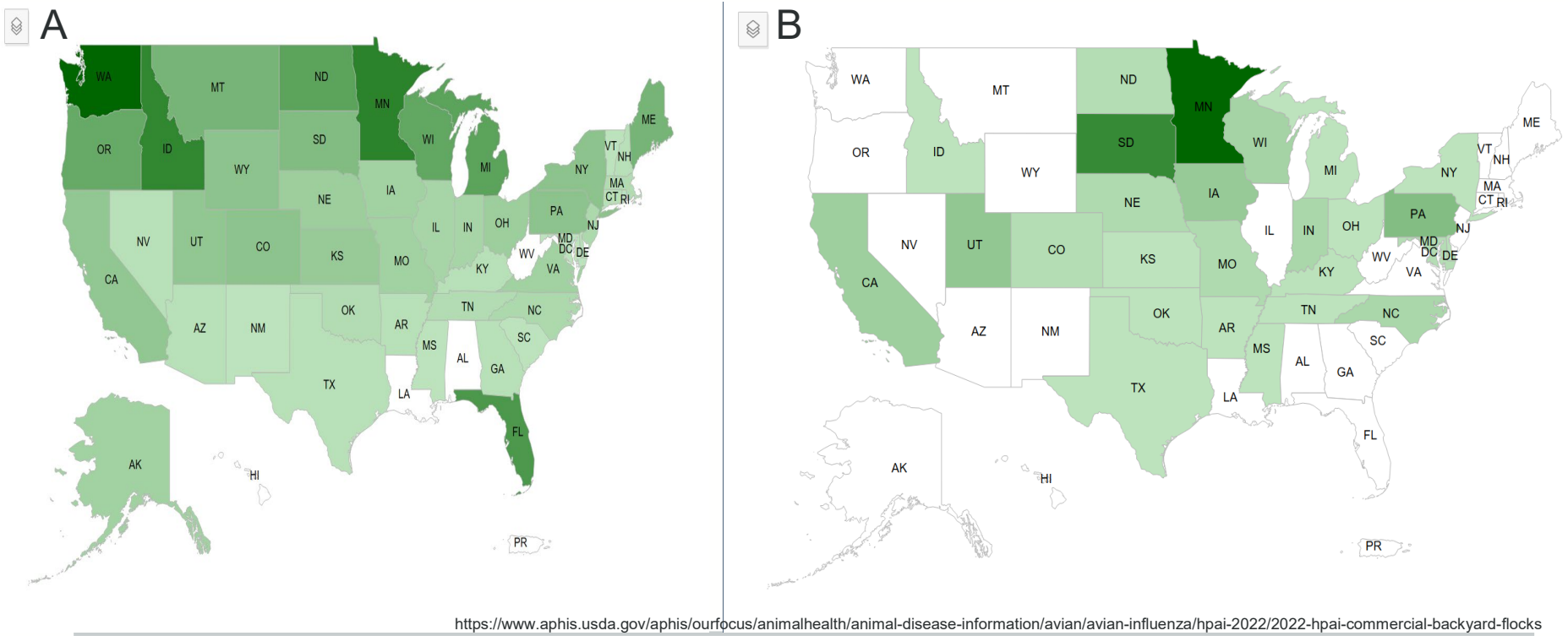


All Birds affected by State



https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/avian/avian-influenza/hpai-2022/2022-hpai-commercial-backyard-flocks

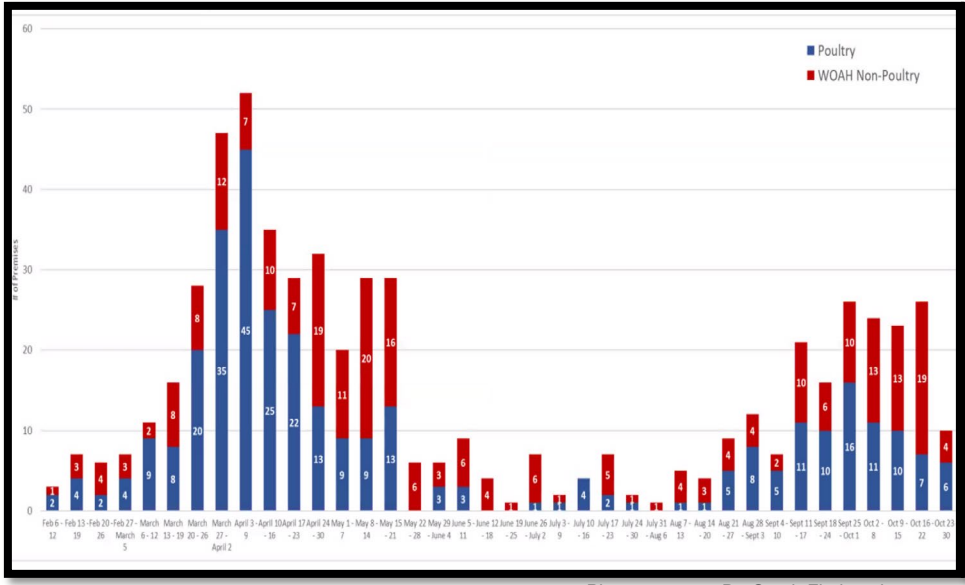
Commercial & Backyard flocks



https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/avian/avian-influenza/hpai-2022/2022-hpai-commercial-backyard-flocks

HPAI epidemiological curve

HPAI Detections in poultry and non poultry



HPAI Detections in wild birds

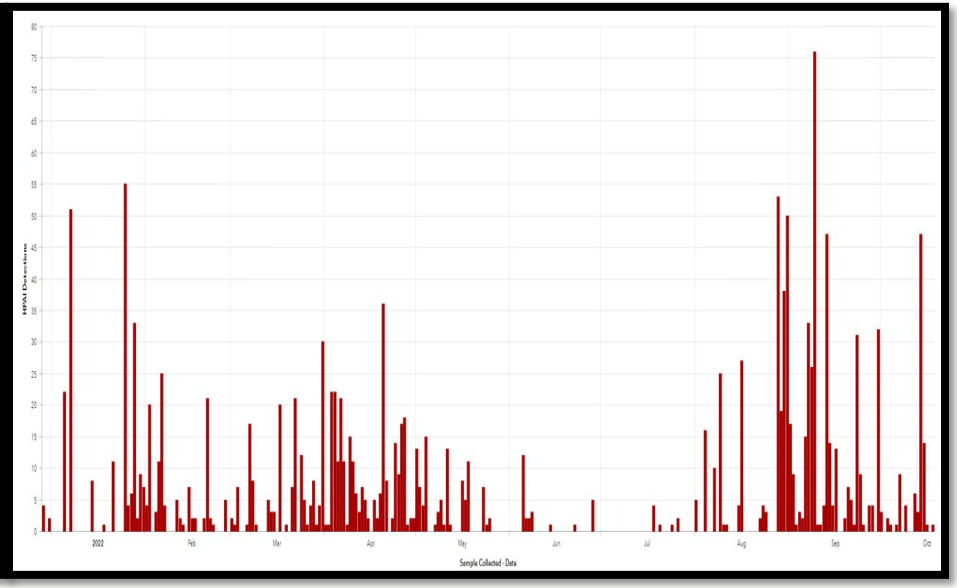


Photo courtesy: Dr. Sarah Firebaugh

HPAI cases in Delmarva

DE

Confirmed	State	County Name	Special Id	Production
24-Sep-22	Delaware	Kent	Kent 02	Backyard Producer (non-poultry)
17-Mar-22	Delaware	Kent	Kent 01	Commercial Broiler Production
08-Mar-22	Delaware	New Castle	New Castle 02	Commercial Table Egg Pullets
22-Feb-22	Delaware	New Castle	New Castle 01	Commercial Table Egg Layer

MD

Confirmed	State	County Name	Special Id	Production
29-Nov-22	Maryland	Washington	Washington 01	Commercial Table Egg Breeder
22-Sep-22	Maryland	Anne Arundel	Anne Arundel 01	Backyard Producer (non-poultry)
18-Mar-22	Maryland	Cecil	Cecil 04	Commercial Table Egg Pullets
10-Mar-22	Maryland	Cecil	Cecil 02	Commercial Table Egg Layer
08-Mar-22	Maryland	Queen Anne's	Queen Anne's 01	Commercial Broiler Production
04-Mar-22	Maryland	Cecil	Cecil 01	Commercial Table Egg Layer

VA

Confirmed	State	County Name	Special Id	Production
07-Nov-22	Virginia	Gloucester	Gloucester 01	Backyard Producer (non-poultry)
22-Oct-22	Virginia	Southampton	Southampton 01	Backyard Producer (non-poultry)
20-Oct-22	Virginia	Virginia Beach City	Virginia Beach 01	Backyard Producer (non-poultry)
06-Oct-22	Virginia	Hampton City	Hampton 01	Petting Zoo/Exhibition Farm
29-Aug-22	Virginia	Caroline	Caroline 01	Backyard Producer (non-poultry)
12-Feb-22	Virginia	Fauquier	Fauquier 01	Backyard Producer (non-poultry)

How to prevent HPAI ?

- NPIP Biosecurity Plans
- NPIP Biosecurity Audits

Precision Biosecurity

Checklist

14 point Checklist for Self-Assessment of Poultry Biosecurity

Information Manual

Information Manual for Implementing Poultry Biosecurity

Download Customizable Templates for Writing a Biosecurity Plan

WRITE your Biosecurity Plan

TYPE your Biosecurity Plan

Implementation of Poultry Biosecurity for Biosecurity Coordinators

Watch 17 min Video

Download PowerPoint

Premises Map

Instructions for Creating and Labeling a Premises Map

PBA and LOS

Examples of Perimeter Buffer Areas and Lines of Separation on Poultry Sites

Disinfection

Cleaning and Disinfection Information

https://poultrybiosecurity.org/

The NPIP 14 Biosecurity Principles

How to control HPAI ?

1. Prevention
2. Response plan
3. Continuity of Business

Goals of an HPAI Response

(1) **Detect**, control, and contain HPAI in poultry as **quickly** as possible

(2) **Eradicate** HPAI using strategies that seek to protect public health and the environment, and to stabilize animal agriculture, the food supply, and the economy

(3) Provide science- and risk-based approaches and systems to facilitate **continuity of business** for non-infected animals and non-contaminated animal products

How to control HPAI case?

HPAI Response process

HPAI Response process

1 Detect

You see unusual signs of illness or sudden deaths in your flock. You can report it to your private veterinarian or a State or USDA veterinarian. Samples are taken and tested. You find out your flock is positive for HPAI.

2 Quarantine

USDA and State personnel come to your farm. We assign you a case manager, who will be your main point of contact onsite, answer your questions, and guide you through the needed paperwork. We will also place your operation under quarantine, meaning only authorized workers are allowed in and out, and movement restrictions for poultry, poultry products, and equipment go into effect. We contact neighboring poultry farms and start testing their birds to see if they've been affected, too.

3 Appraise

We work with you to create a flock inventory. This lists how many birds you have, what species they are, their age, and other key details. USDA will compensate for birds that must be destroyed using species-specific calculators.

4 Depopulate

Infected flocks are depopulated as quickly as possible—ideally within 24 hours of the first HPAI detection—to get rid of the virus.

5 Compensate

Affected producers and growers must certify that a biosecurity plan was in place prior to an HPAI detection. Split payments can be provided between the owner and contract grower. You receive your first indemnity payment early on in the response process. We also pay you a standard amount for virus elimination activities (cleanup work).

6 Manage Disposal

USDA will help you dispose of the dead birds safely. Disposal methods include composting, burial, incineration, rendering, or landfilling. The options you'll have depend on several things: what type of farm you have, the specific conditions there, State and local laws, and what you prefer.

7 Eliminate Virus

The next step is to wipe out all traces of the virus at your property. To kill the virus, thoroughly clean and disinfect the barn, equipment, and all affected areas of your farm. You can do this work yourself or hire contractors to handle it.

8 Test

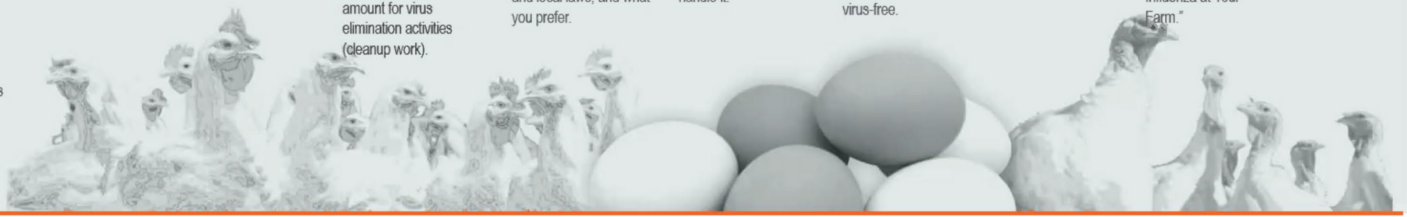
As soon as you're ready, let your case manager know you're finished with cleanup. Your site must then stay empty for at least 21 days. During this time, we'll return to collect and test environmental samples. We need to confirm that your property is completely virus-free.

9 Restock

Once USDA and the State both approve, you can restock your facilities and start production again. State officials will release your farm from quarantine after all required testing and waiting periods are done.

10 Maintain Biosecurity

After restocking, you'll need to continue maintaining the highest biosecurity standards to keep the virus from coming back. For biosecurity tips, go to www.aphis.usda.gov/-publications and download the factsheet "Prevent Avian Influenza at Your Farm."



How Long Does the Process Take?

Ideally, this entire process could be completed in as soon as 60–120 days. However, the timeframe varies depending on many things (for example, flock size, depopulation and disposal methods used, test results, farm's location). We're committed to restoring production as fast as we can while also protecting poultry health.

Questions?

Talk with your case manager or the State or Federal officials responding to the disease event in your area.

For general information and contacts, visit:
www.usda.gov/avian_influenza.html
www.aphis.usda.gov/fadprep
www.aphis.usda.gov/animalhealth/
defendtheflock

Animal and Plant Health Inspection Service • APHIS 91-85-005 • Issued March 2017

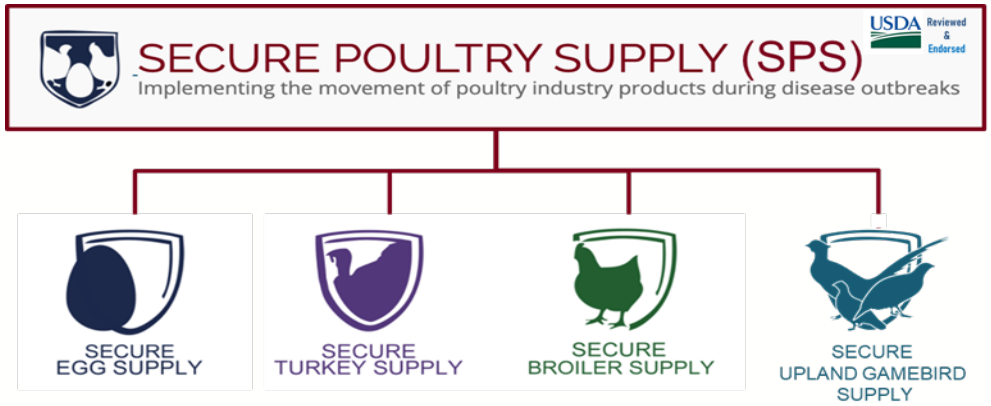
Keys to successfully control HPAI

- Clear plan for response and Continuity of business
- Effective communication between state, federal, company and grower
- EMT pre-outbreak exercises
- Experienced crews
- Sufficient sampling logistics

https://www.womenonbusiness.com/advantages-building-culture-teamwork-corporate-events/

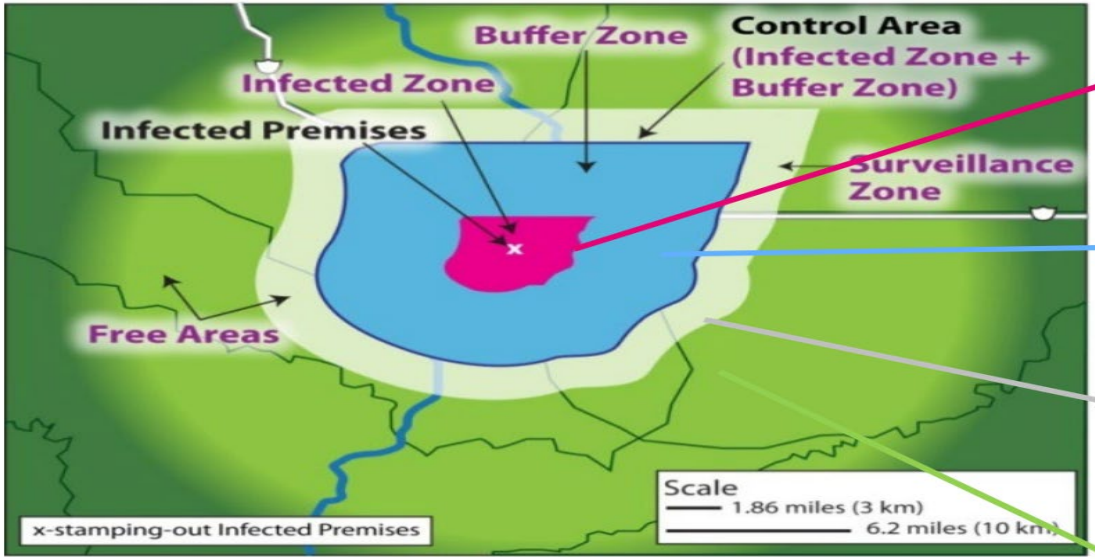
Response: Continuity of Business

- Risk-based permitting-reducing lateral spread



https://www.securebroilersupply.com/

Overview of Control Areas and Zones during an HPAI Response



In the **Infected Zone** (which is ***part*** **of the Control Area**), there are movement controls and surveillance activities. Infected Premises are quarantined.

In the **Buffer Zone** (which is ***part*** **of the Control Area**), there are movement controls and surveillance activities.

In the **Surveillance Zone** (which is ***part*** **of the Free Area**), targeted poultry surveillance may be conducted (i.e. commercial premises).

In the **Free Area** (which ***includes*** **the Surveillance Zone**), routine or program surveillance may occur (i.e. NPIP and wild birds).

Infected + Buffer Zone = Control Area

Surveillance + = Free Area

https://www.aphis.usda.gov/animal_health/emergency_management/downloads/hpai/hpai_zones.pdf

Risk of Avian Influenza Transmission in Broiler Supply Chain

Background Information

This risk assessment data was collected and distributed by the Secure Broiler Supply (SBS) Working Group, the University of Minnesota's Secure Food Systems Team and the United States Department of Agriculture (USDA): Animal and Plant Health Inspection Service (APHIS), Veterinary Service (VS) and Center for Veterinary Epidemiology and Animal Health (CEAH)

SBS Working Group: an organization made up of representatives from the broiler industry, academia, State Animal Health Officials (SAHO) and the USDA:APHIS

Does this assessment apply to my facility?

Only applies to facilities with:

- Intensively raised commercial poultry

OR

- Contract grow-out broiler premises with no other poultry on the premises
  - Must practice all-in, all-out single-age growing system

Facilities MUST:

- Participate in USDA-APHIS National Poultry Improvement Plan (NPIP)
- Follow the SBS Plan in the event of a Highly Pathogenic AI (HPAI) outbreak

What is the SBS plan?

- Science-based plan made up of outbreak measures and protocols
- Used to reduce the risk of HPAI spread associated with the movement of hatching eggs and day-old chicks into, within and outside of a Control Area
- Includes many categories, such as active surveillance, holding time, biosecurity, cleaning and disinfection

When does this apply to my facility?

- This applies to the movement of broilers to market into, within and out of a Control Area during a HPAI outbreak in the United States

What pathways of HPAI transmission are assessed?

The pathways of disease transmission are categorized into three groups:

Local Area Spread - refers to pathways that may cause virus transmission due to a HPAI infected poultry flock nearby

- Insects
- Aerosol - transmission of HPAI through the air
- Wild birds
- Live haul routes

Movement of People, Vehicles or Equipment

- Critical operational visits
- Growers, employees and their vehicles
- Shared equipment
- Dead bird disposal
- Garbage management

Load-Out Processes

- Load-out and transport to slaughter

How is the risk of each pathway measured?

Each pathway was assessed and given a Likelihood Rating. This measurement is assessing the likelihood of a broiler flock becoming infected with HPAI due to a given pathway.

The likelihood that the broiler flock will become infected with HPAI due to the given route of transmission may be:

- Extremely High: Almost certain
- High: There is more than an even chance
- Moderate: It is unlikely but does occur
- Low: It is very unlikely
- Very Low: There is more than a remote chance
- Negligible: There is an insignificant chance

For more information see pgs 2 - 3 of handout

Risk of Avian Influenza Transmission in Broiler Supply Chain

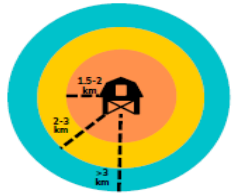
Local Area Spread

Insects

- Likelihood varies with distance from the infected premises
- If your facility is 1.5 km (0.93 miles) or closer to the infected flock, there are too many variables to assess the risk

	Distance from Infected Premises (km)		
Source Premise Type	1.5 - 2 km	2 - 3 km	> 3 km
Known Infected Premise	Moderate to Negligible	Low to Negligible	Negligible
Infected Undetected Premise	Low to Negligible	Low to Negligible	Negligible

Risk of Transmission Via Insects from Known Infected Premises

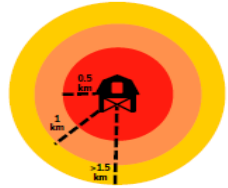


Aerosol

- Likelihood varies with distance from the infected premises
- If your facility is 1.5 km (0.93 miles) or further from the infected flock, aerosol is not an important route of transmission

	Distance from Infected Premises (km)		
Source Premise Type	0.5 km	1 km	> 1.5 km
Known Infected Premise	High to Moderate	Moderate	Low
Infected Undetected Premise	Moderate to Low	Low	Low to Negligible

Risk of Aerosol Transmission from Known Infected Premises



Wild Birds

- Likelihood varies with type of bird and exposure type
- Aquatic and large non-aquatic birds do not usually gain entry into poultry barns
- Passerines (examples: songbirds, finches & sparrows) are more likely to gain entry into poultry barns and come in direct contact with poultry

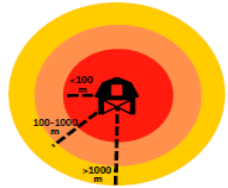
Bird Type	Likelihood Rating
Aquatic wild birds	Low
Non-aquatic wild birds (Passerine)	Moderate to Low
Non-aquatic wild birds (Non-Passerine)	Low

Live Haul Routes

- Likelihood varies with distance and type of flock on the live haul route
- Assessing likelihood of transmission from feathers, feces and other materials that may carry viral infection

	Distance from Live Haul (m)		
Characteristics of Live Haul	< 100 m	100 - 1000 m	> 1000 m
Truck with birds with no PMIP or testing	High	Moderate	Low
Truck with birds with less than optimum PMIP and/or testing	Low	Very Low	Negligible
Truck with birds with PMIP and PCR negative testing	Very Low	Negligible	Negligible

Risk of Transmission Via Live Haul Route Truck Hauling Birds with No PMIP or Testing



Infected Premise

1 km = 0.62 mi
1000 m = 0.62 mi

Risk of Avian Influenza Transmission in Broiler Supply Chain

Movement of People, Vehicles & Equipment

Critical Operational Visits

- Refers to emergency maintenance or feed delivery that occurs during the Pre-Movement Isolation Period (PMIP)

Contaminated Component	Likelihood Rating
Contaminated feed	Negligible
Feed delivery (driver or vehicle)	Low
Other critical visitors (driver or vehicle)	Moderate to Low

Shared Equipment

- May contaminate the area, personnel or direct to the birds
- During the PMIP, the only off-site equipment that can enter the premises is equipment associated with critical operational visits

Pathway	Likelihood Rating
Shared equipment	Low

Growers, Employees & Their Vehicles

- Variable depending on whether the contaminated person enters the poultry barn or does not enter poultry barn
- Only applicable provided that the proper measures (from SBS PMIP) for people are strictly followed, including use of farm-specific clothing and barn-specific footwear

Person Type	Likelihood Rating
People entering poultry barns	Low
People not entering poultry barns	Very Low

Dead Bird Disposal

- Varies with site of disposal
- Disposal must be on-site during the PMIP and may be off-site prior to the PMIP
- Dead bird storage should not be accessible to scavenger animals, such as wild birds, foxes and insects. Scavenger animals can carry HPAI and be a potential source of infection.

Disposal Practice	Likelihood Rating
On-farm dead bird disposal during PMIP	Moderate to Low
Off-site dead bird disposal prior to PMIP	Moderate

Garbage Management

- Assessing risk of transmission for contaminated items in the garbage that may be tracked into the poultry barn
- No off-site movement of garbage allowed during the PMIP

Disposal Practice	Likelihood Rating
Garbage management	Low

Load-Out

Load-Out Crews, Vehicles or Equipment

- If a flock were infected via contaminated load-out crews or equipment, decreasing the time from load-out to slaughter limits the amount of time the disease can spread
- Do not perform "split" or "partial" load-outs as this can leave susceptible and/or infected birds on the farm

Pathway	Likelihood Rating
Load-out and transport to slaughter	Moderate to Low

Avian influenza is dynamic

- Outbreaks became more frequent
- Shorter timeframes to address previous challenges before the next outbreak
- Be prepared with knowledge
- Exercises the response
- Practice biosecurity
- It’s the new normal

Summary

- Learned about AI and HPAI.
- Learned how HPAI spread.
- Learned about the current H5 HPAI.
- Learned how to Prevent HPAI.
- Learned how to control HPAI.
- The NPIP biosecurity principles.
- Plans for continuity of business.

Resources

- https://poultrybiosecurity.org/
- https://www.securebroilersupply.com/
- https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/avian/defend-the-flock-program/dtf-resources
- http://www.poultryimprovement.org/documents/AuditForm-2018BiosecurityPrinciples.pdf
- https://extension.umd.edu/programs/agriculture-food-systems/program-areas/animal-science/poultry/avian-influenza
- https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/avian/avian-influenza/ai-guidance-documents
- https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/avian/avian-influenza/hpai-2022/2022-hpai-commercial-backyard-flocks

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Questions

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