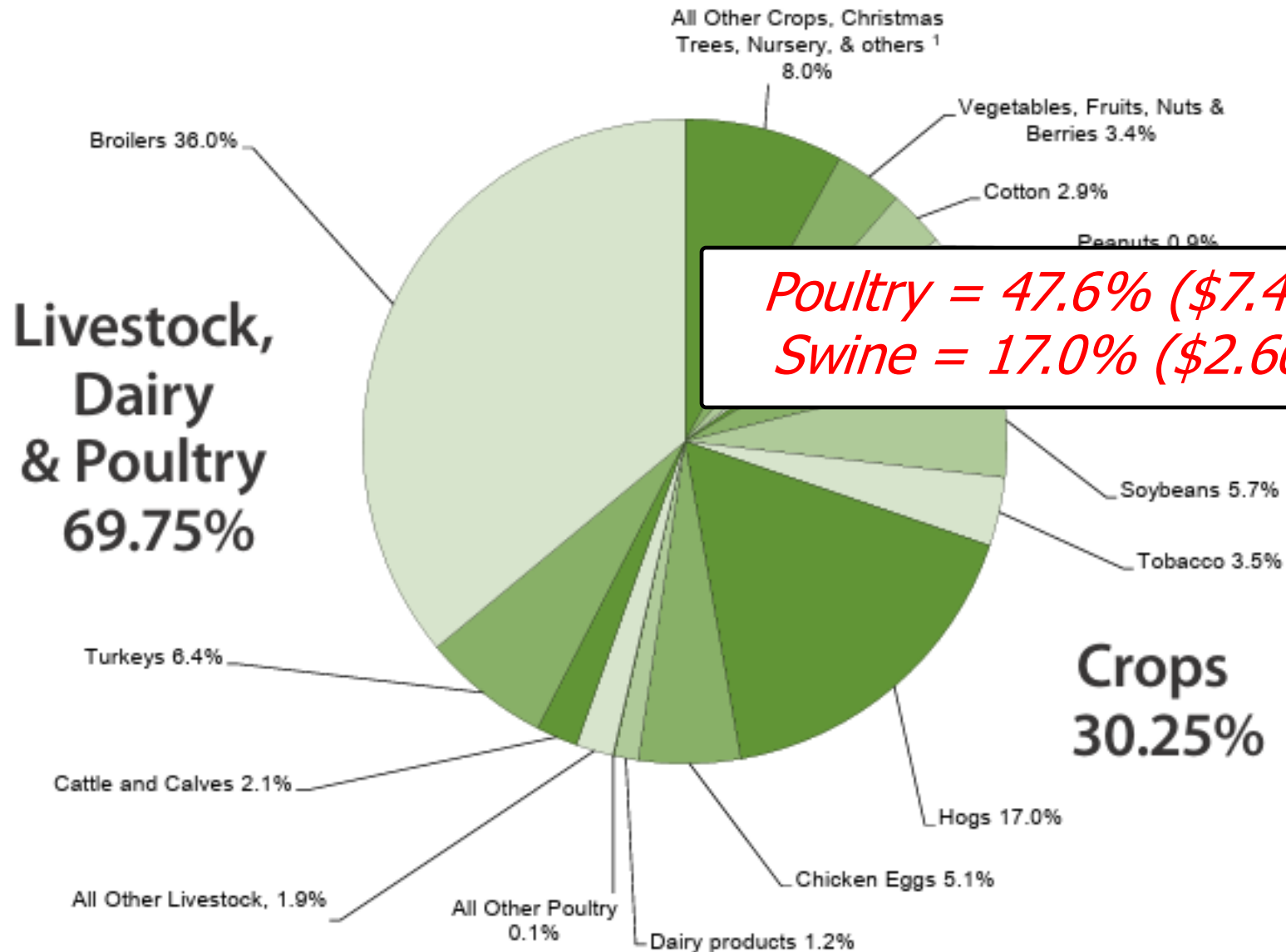


# National and State Update Highly Pathogenic Avian Influenza Outbreak Status, Response, and Regulatory Strategy

Michael Martin, DVM, MPVM, ACPV  
NC State Veterinarian  
Director of Veterinary Division, NCDA&CS

# SOURCE OF FARM CASH RECEIPTS, NORTH CAROLINA, 2023 <sup>1</sup>

\$15,653,235,000





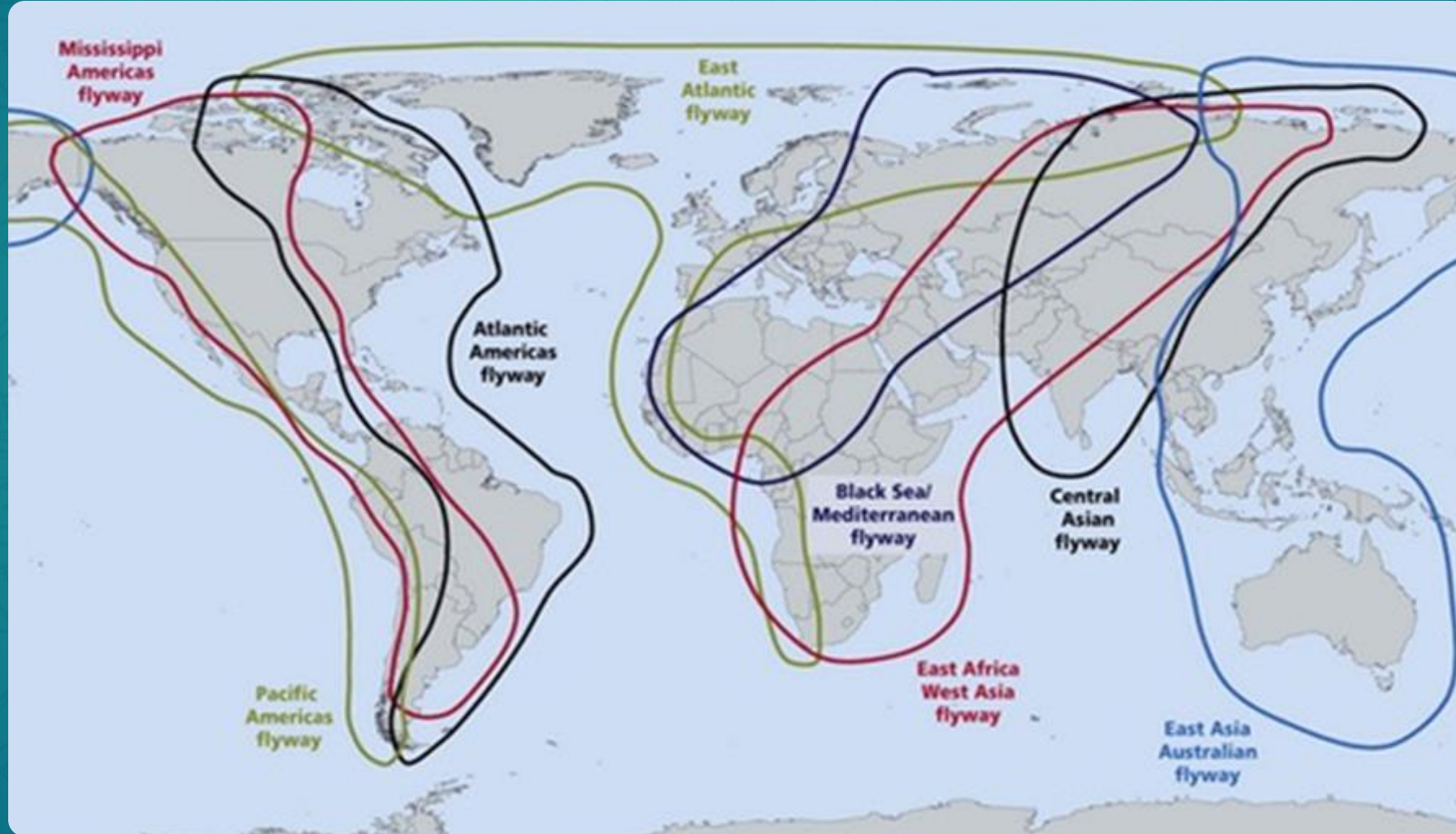
# NORTH CAROLINA'S RANK IN U.S. AGRICULTURE, 2023 <sup>1</sup>

| Rank | Item   | Production |           | N.C. % of U.S. | Top 3 States |    |    |
|------|--|------------|-----------|----------------|--------------|----|----|
|      |  |            |           |                | 1            | 2  | 3  |
| 1    | All Tobacco                                  | 260.1      | (Mil Lbs) | 60.1           | NC           | KY | VA |
| 1    | Flue-cured Tobacco                           | 259.9      | (Mil Lbs) | 82.5           | NC           | VA | GA |
| 1    | Sweet Potatoes                               | 15,171.0   | (000 Cwt) | 60.5           | NC           | CA | MS |
| 1    | All Poultry & Egg Cash Receipts <sup>2</sup> | 7,448.0    | (Mil \$)  | 11.1           | NC           | GA | AR |
| 2    | Annual Pig Crop Dec 21 - Nov 22              | 18.3       | (Mil Hd)  | 13.5           | IA           | NC | MN |
| 2    | Turkeys                                      | 29.0       | (Mil Hd)  | 13.3           | MN           | NC | AR |
| 2    | Trout Sold (foodsize)                        | 3.1        | (Mil Lbs) | 7.2            | ID           | NC | PA |
| 3    | Cucumbers                                    | 1,535.5    | (000 Cwt) | 10.8           | FL           | MI | NC |
| 3    | Peanuts                                      | 516.6      | (Mil Lbs) | 8.8            | GA           | FL | NC |
| 3    | Hogs & Pigs (12-1-23)                        | 7.9        | (Mil Hd)  | 10.5           | IA           | MN | NC |
| 4    | Broilers                                     | 941.1      | (Mil Hd)  | 10.3           | GA           | AL | AR |
| 5    | Burley Tobacco                               | 0.2        | (Mil Lbs) | 0.3            | KY           | TN | PA |



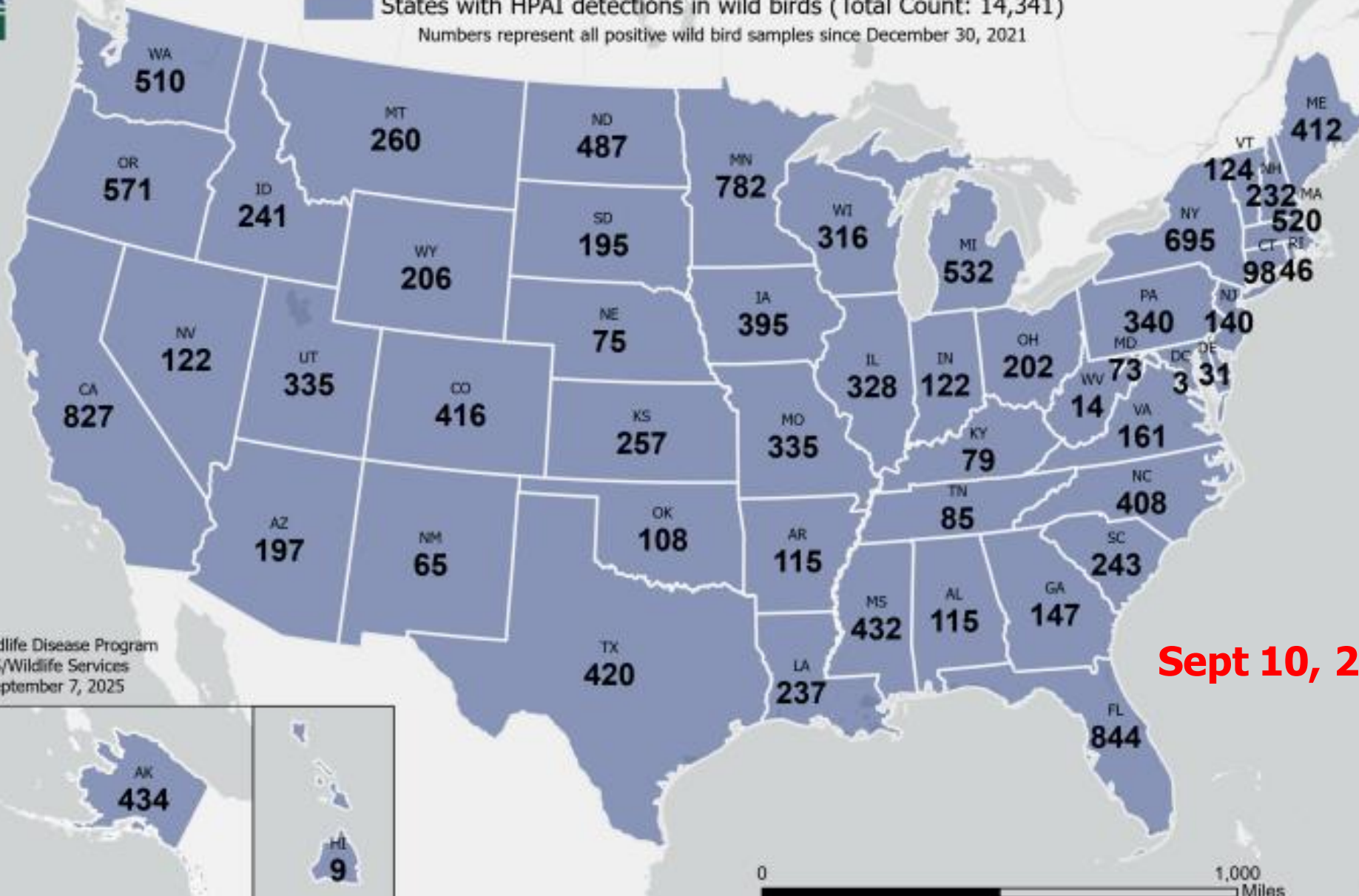


# H5 Eurasian HPAI 2022 USA – How It Started





States with HPAI detections in wild birds (Total Count: 14,341)  
Numbers represent all positive wild bird samples since December 30, 2021



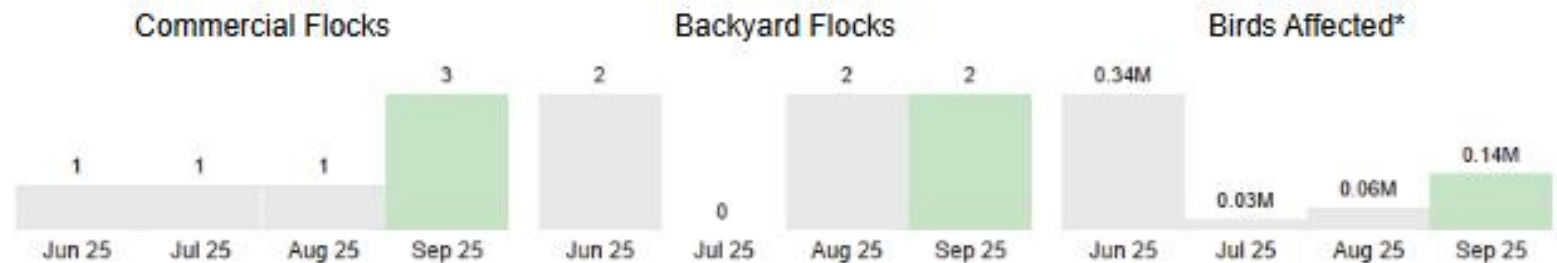
National Wildlife Disease Program  
USDA/APHIS/Wildlife Services  
Published September 7, 2025

**Sept 10, 2025**



## Detections by Month

Bars reflect most recent 4 months.



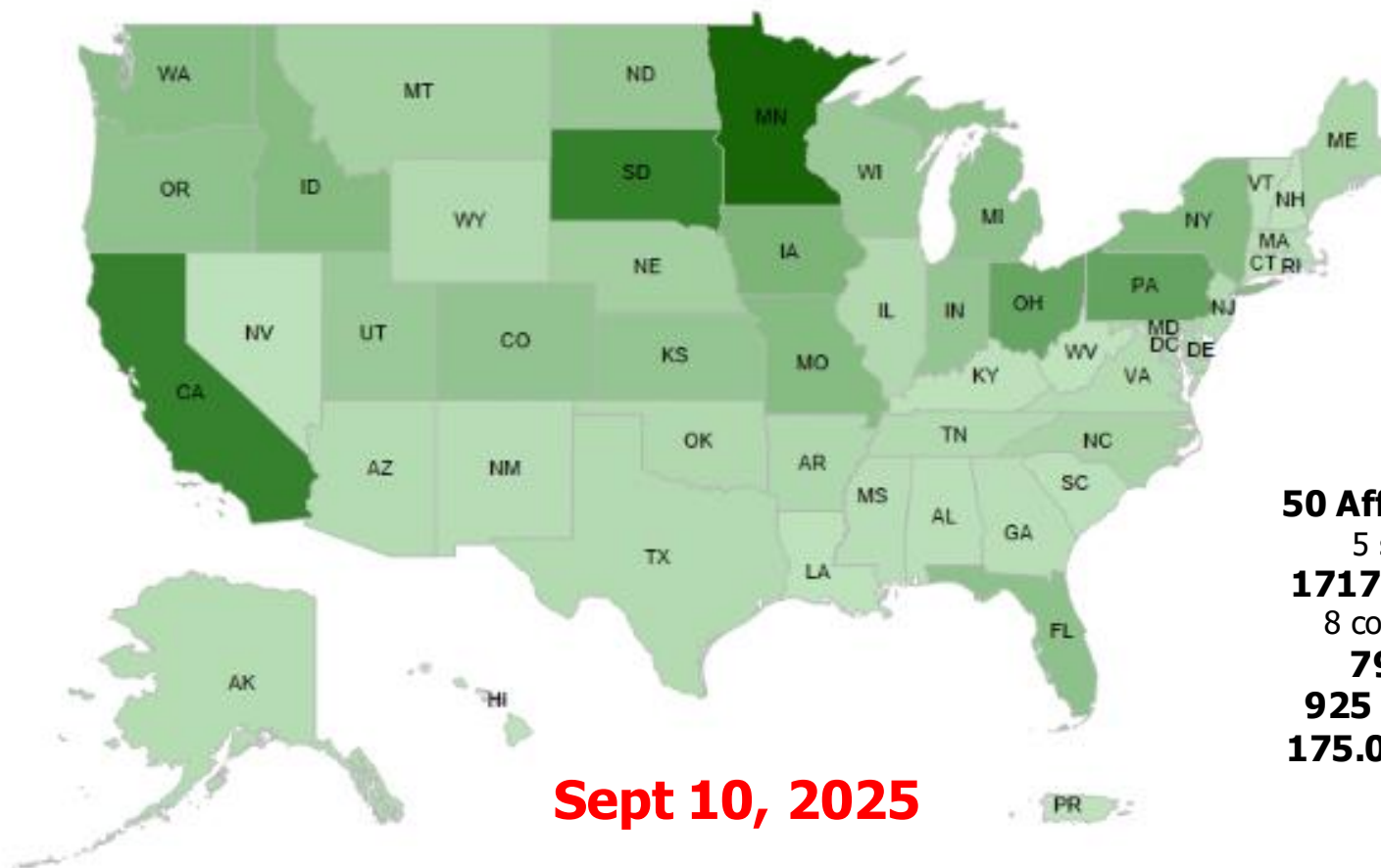
Choose variable  
All Flocks

Choose time period  
Total Outbreak

## All Flocks by State

Legend 0 186

[Click For International Exports](#)

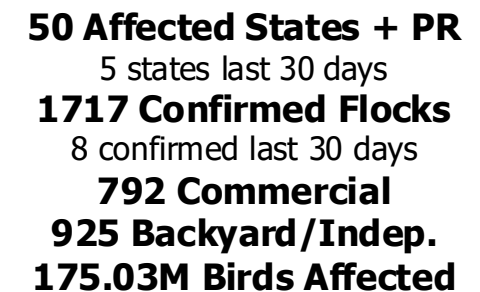


**50 Affected States + PR**  
5 states last 30 days  
**1717 Confirmed Flocks**  
8 confirmed last 30 days  
**792 Commercial**  
**925 Backyard/Indep.**  
**175.03M Birds Affected**

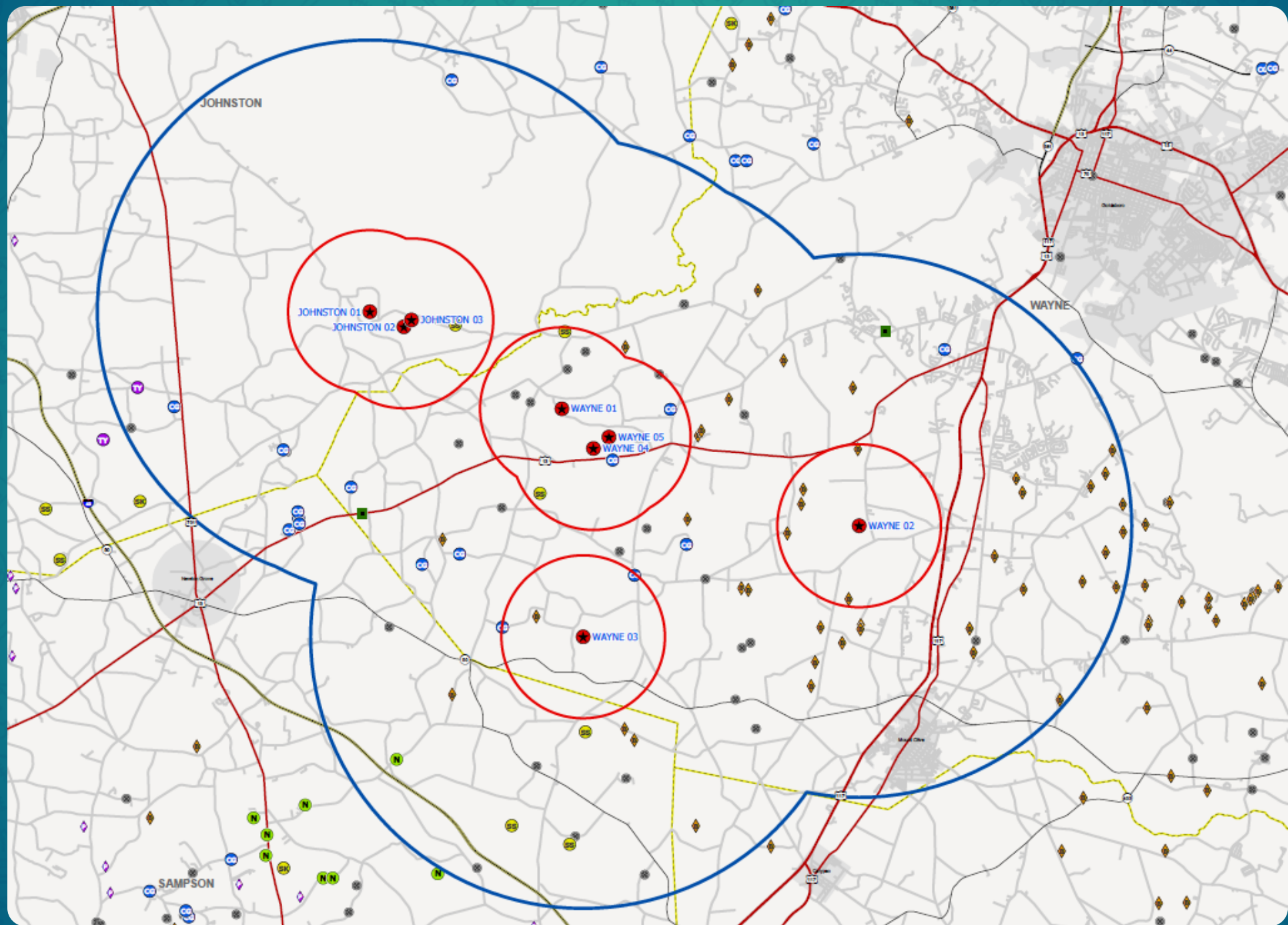
**Sept 10, 2025**

Bars reflect most recent 4 months.

Bars reflect most recent 4 months.



**Sept 10, 2025**





# Point Source Introduction: no shared mutation

| root   | C | C | T | G | G | G | A | C | A | A | G | C | A | A | T | A | C | T | C | C | C | G | A | G | G | G | A | A | G | G | T | G | C | A | A | A | C | C | C | T | G | G | A | A |   |
|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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| 22-001743-007_AH0203269_GADW_2022-01-06_SC     | T | T | T | G | A | A | C | A | A | G | C | A | A | T | A | C | T | C | C | C | G | A | G | G | G | A | A | G | G | T | G | C | A | A | A | C | C | C | T | G | G | A | A |   |   |
| 22-009981-005_TURKEY_2022-03-31_Johnston03_NC  | T | T | T | G | A | A | T | G | A | T | T | G | G | A | G | T | A | A | T | G | A | A | G | A | A | G | A | A | G | G | T | G | C | A | A | A | C | C | C | T | G | G | A | A |   |
| 22-010145-002_TURKEY_2022-03-31_Wayne_01_NC    | T | T | T | G | A | A | T | G | A | T | T | G | G | A | G | T | A | A | T | G | A | A | G | A | A | G | A | A | G | G | T | G | C | A | A | A | C | C | C | T | G | G | A | A |   |
| 22-010144-001_TURKEY_2022-03-31_Wayne_01_NC    | T | T | T | G | A | A | T | G | A | T | T | G | G | A | G | T | A | A | T | G | A | A | G | A | A | G | A | A | G | G | T | G | C | A | A | A | C | C | C | T | G | G | A | A |   |
| 22-009983-007_TURKEY_2022-03-31_Wayne01_NC     | T | T | T | G | A | A | T | G | A | T | T | G | G | A | G | T | A | A | T | G | A | A | G | A | A | G | A | A | G | G | T | G | C | A | A | A | C | C | C | T | G | G | A | A |   |
| 22-010145-001_TURKEY_2022-03-31_Wayne_01_NC    | T | T | T | G | A | A | T | G | A | T | T | G | G | A | G | T | A | A | T | G | A | A | G | A | A | G | A | A | G | G | T | G | C | A | A | A | C | C | C | T | G | G | A | A |   |
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| 22-009982-002_TURKEY_2022-03-31_Johnston02_NC  | T | T | T | G | A | A | T | G | A | T | T | G | G | A | G | T | A | A | T | G | A | A | G | A | A | G | A | A | G | G | T | G | C | A | A | A | C | C | C | T | G | G | A | A |   |
| 22-009332-002_TURKEY_2022-03-27_Johnston01_NC  | T | T | T | G | A | A | T | G | A | T | T | G | G | A | G | T | A | A | T | G | A | A | G | A | A | G | A | A | G | G | T | G | C | A | A | A | C | C | C | T | G | G | A | A |   |
| 22-010298-001_CHICKEN_2022-04-04_Wayne_03_NC   | T | T | T | G | A | A | T | G | A | T | T | G | G | A | G | T | A | A | T | G | A | A | G | A | A | G | A | A | G | G | T | G | C | A | A | A | C | C | C | T | G | G | A | A |   |
| 22-009981-003_TURKEY_2022-03-31_Johnston03_NC  | T | T | T | G | A | A | T | G | A | T | T | G | G | A | G | T | A | A | T | G | A | A | G | A | A | G | A | A | G | G | T | G | C | A | A | A | C | C | C | T | G | G | A | A |   |
| 22-009583-001_NCBF-TU_2022-03-27_Johnston01_NC | T | T | T | G | A | A | T | G | A | T | T | G | G | A | G | T | A | A | T | G | A | A | A | A | A | G | A | A | G | G | T | G | C | A | A | A | C | C | C | T | G | G | A | A |   |
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| 22-009982-001_TURKEY_2022-03-31_Johnston02_NC  | T | T | T | G | A | A | T | G | A | T | T | G | G | A | G | T | A | A | T | G | A | A | G | G | A | A | G | A | A | G | G | T | G | C | A | A | A | C | C | C | T | G | G | A | A |
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| 22-009981-004_TURKEY_2022-03-31_Johnston03_NC  | T | T | T | G | A | A | T | G | A | T | T | G | G | A | G | T | A | A | T | G | A | A | G | A | A | G | A | A | G | G | T | G | C | A | A | A | C | C | C | T | G | G | A | A |   |
| 22-010929-008_CHICKEN_2022-04-11_Wayne_06_NC   | T | T | T | G | A | A | T | G | A | T | T | G | G | A | G | T | A | A | T | G | A | A | G | A | A | G | A | A | G | T | A | T | A | A | A | C | C | C | T | G | G | A | A |   |   |
| 22-010929-009_CHICKEN_2022-04-11_Wayne_06_NC   | T | T | T | G | A | A | T | G | A | T | T | G | G | A | G | T | A | A | T | G | A | A | G | A | A | G | A | A | G | T | A | T | A | A | A | C | C | C | T | G | G | A | A |   |   |
| 22-010929-002_CHICKEN_2022-04-11_Wayne_06_NC   | T | T | T | G | A | A | T | G | A | T | T | G | G | A | G | T | A | A | T | G | A | A | G | A | A | G | A | A | G | T | A | T | A | A | A | C | C | C | T | G | G | A | A |   |   |
| 22-010929-007_CHICKEN_2022-04-11_Wayne_06_NC   | T | T | T | G | A | A | T | G | A | T | T | G | G | A | G | T | A | A | T | G | A | A | G | A | A | G | A | A | G | T | A | T | A | A | A | C | C | C | T | G | G | A | A |   |   |
| 22-010929-004_CHICKEN_2022-04-11_Wayne_06_NC   | T | T | T | G | A | A | T | G | A | T | T | G | G | A | G | T | A | A | T | G | A | A | G | A | A | G | A | A | G | T | A | T | A | A | A | C | C | C | T | G | G | A | A |   |   |
| 22-010929-001_CHICKEN_2022-04-11_Wayne_06_NC   | T | T | T | G | A | A | T | G | A | T | T | G | G | A | G | T | A | A | T | G | A | A | G | A | A | G | A | A | G | T | A | T | A | A | A | C | C | C | T | G | G | A | A |   |   |
| 22-010448-001_TURKEY_2022-04-06_Wayne_05_NC    | T | T | T | G | A | A | T | G | A | T | T | G | G | A | G | T | A | A | T | G | A | A | G | A | A | G | A | A | G | G | T | G | C | Y | G | G | G | T | C | C | T | G | G | A | A |
| 22-010448-004_TURKEY_2022-04-06_Wayne_05_NC    | T | T | T | G | A | A | T | G | A | T | T | G | G | A | G | T | A | A | T | G | A | A | G | A | A | G | A | A | G | G | T | G | C | Y | G | G | G | T | C | C | T | G | G | A | A |
| 22-010448-003_TURKEY_2022-04-06_Wayne_05_NC    | T | T | T | G | A | A | T | G | A | T | T | G | G | A | G | T | A | A | T | G | A | A | G | A | A | G | A | A | G | G | T | G | C | Y | G | G | G | T | C | C | T | G | G | A | A |
| 22-009981-002_TURKEY_2022-03-31_Johnston03_NC  | T | T | T | G | A | A | T | G | A | T | T | G | G | A | G | T | A | A | T | G | A | A | G | A | A | G | A | A | G | G | T | G | C | A | A | A | C | A | C | T | G | G | A | A |   |
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| 22-009981-001_TURKEY_2022-03-31_Johnston03_NC  | T | T | T | G | A | A | T | G | A | T | T | G | G | A | G | T | A | A | T | G | A | A | G | A | A | G | A | A | G | G | T | G | C | A | A | A | C | M | Y | T | G | G | A | A |   |
| 22-010299-002_CHICKEN_2022-04-UNK_Wayne_04_NC  | T | T | T | G | A | A | T | G | A | T | T | G | G | A | G | T | A | A | T | G | A | A | G | A | A | G | A | A | G | G | T | G | C | A | A | A | C | T | R | G | A | A | A |   |   |
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| 22-010146-001_TURKEY_2022-04-04_Wayne_02_NC    | T | T | T | G | A | A | T | G | A | T | T | G | G | A | G | T | A | A | T | G | A | A | G | A | A | G | A | A | G | G | T | G | C | A | A | A | C | C | C | T | G | A | R | R |   |



# Lateral Transmission: shared mutation

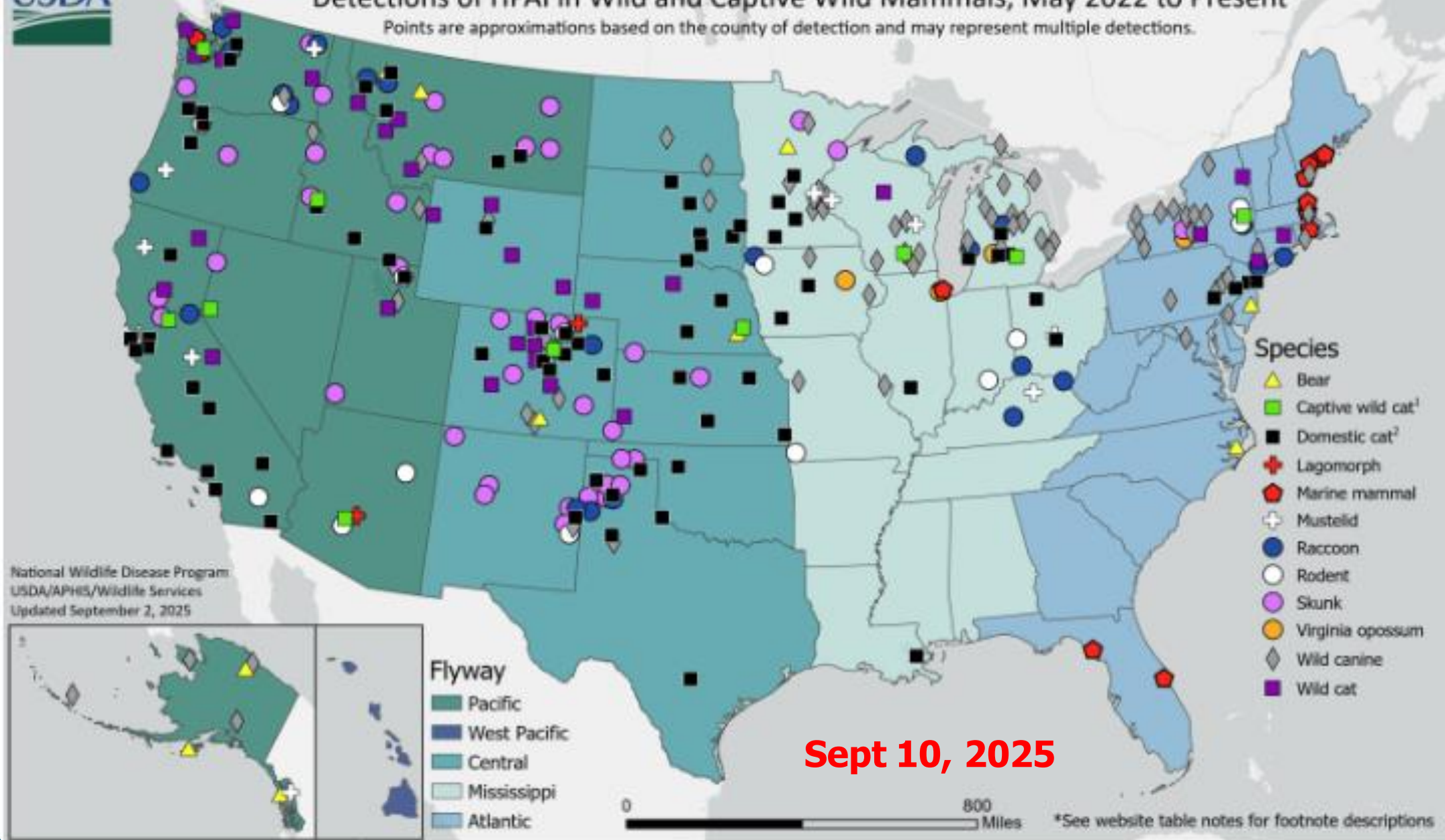
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|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24-002119-001_Wild-Bird_WODU_2023-12-23_GA   | G | G | A | G | A | T | T | C | G | C | C | A | G | A | A | A | C | G | C | A | T | A | C | A | A | C | A | C |
| 24-001296-006_GUINEA_2024-01-11_Horry-01_SC  | G | G | A | A | G | C | C | T | A | T | C | A | G | A | A | A | C | G | C | A | T | A | C | A | A | C | A | C |
| 24-001296-002_DUCK_2024-01-11_Horry-01_SC    | G | G | A | A | G | C | C | T | A | T | T | G | G | A | A | A | C | G | C | A | T | A | C | A | A | C | A | C |
| 24-001296-005_CHICKEN_2024-01-11_Horry-01_SC | G | G | A | A | G | C | C | T | A | T | C | A | R | A | A | A | C | G | C | A | T | A | C | A | A | C | A | C |
| 23-040913-002_AH0184350_WODU_2023-12-13_SC   | G | G | A | A | G | T | T | C | G | C | C | A | G | G | G | C | C | G | C | A | T | A | C | A | A | C | A | C |
| 24-005140-001_TURKEY_2024-02-15_Duplin-01_NC | G | G | A | A | G | T | T | C | G | C | C | A | G | G | A | A | T | T | T | G | C | A | C | A | A | C | A | C |
| 24-005140-002_TURKEY_2024-02-15_Duplin-01_NC | G | G | A | A | G | T | T | C | G | C | C | A | G | G | A | A | T | T | T | G | C | A | C | A | A | C | A | C |
| 24-004217-001_TURKEY_2024-02-08_Lenoir-01_NC | G | G | A | A | G | T | T | C | G | C | C | A | G | G | A | A | T | T | T | G | C | A | C | A | A | C | A | C |
| 23-040913-005_AH0184347_WODU_2023-12-13_SC   | G | G | C | A | G | T | T | C | G | C | C | A | G | A | A | A | C | G | C | A | T | G | T | T | A | C | A | C |
| 23-040577-001_Wild-Bird_BAEA_2023-12-13_SC   | G | G | C | A | G | T | T | C | G | C | C | A | G | A | A | A | C | G | C | A | T | G | C | A | G | T | G | T |





## Detections of HPAI in Wild and Captive Wild Mammals, May 2022 to Present

Points are approximations based on the county of detection and may represent multiple detections.



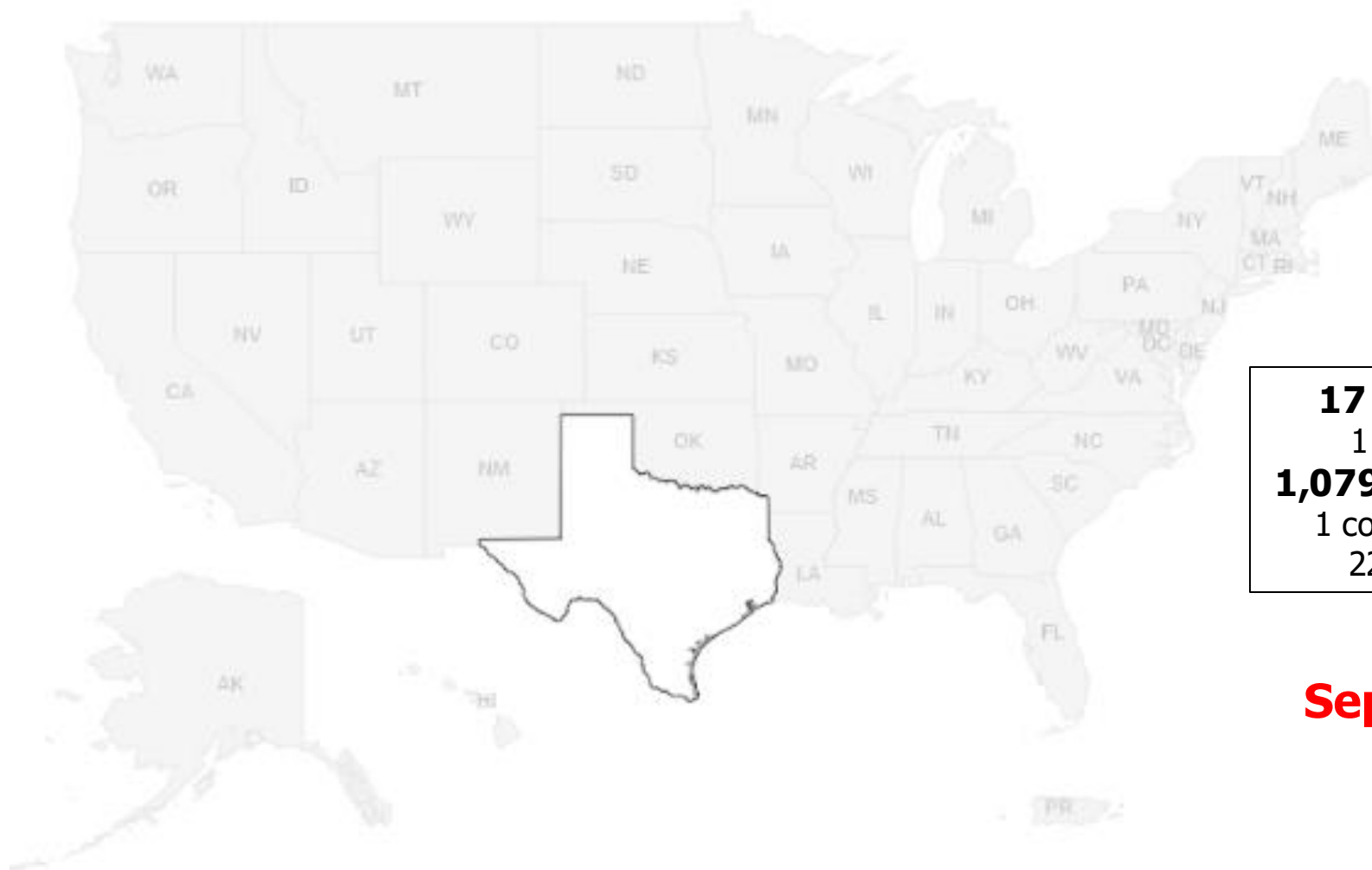


## HPAI Confirmed Cases in Livestock Herds

Reporting period: March 25, 2024 through September 10, 2025  
Last reported new confirmed case: Tuesday, September 2, 2025  
*Data updated weekdays by 12pm Eastern*

[Download Data](#)

### Number of New Confirmed Cases in Cattle by State, Last 30 Days





# HPAI Recent Detection – Sequencing

- B3.13
  - Most dairy herds and poultry flocks in areas with positive herds
  - Has not been observed re-entering wild bird populations
- D1
  - Originated in migratory birds Pacific NW flyway
  - Started emerging in domestic poultry in late 2024
  - Currently predominant isolate found in domestic poultry
  - Two dairy herds identified as separate introductions from wild birds

# National Landscape – Human Health

## Human Infections in the US



**41 cases: exposure to dairy cattle**



**25 cases: exposure to poultry**



**1 case: exposure to backyard poultry and wild birds**



**3 cases with unknown exposure**

**1 Death**

**No evidence of person-to-person spread**

**Sept 10, 2025**



# Other HPAI issues

- Waste water testing samples
  - What are the goals?
  - What does positive H5 mean?
    - Undetermined vs dairy source?
    - Depends on who you talk to...
- Feral swine testing
  - What are the goals?
  - What will we do with the data?
  - How would feral swine positives differ compared to wild bird positives?
    - Follow up surveillance, etc.
- Differences between requirements for poultry vs dairy and federal resources available





# Other HPAI issues - NC Cat Testing

- 2024 cat HPAI surveillance
  - Test cats submitted to SLPH for rabies testing (- results)
    - County focus: dairy cattle farms, wastewater detections, positive poultry flocks

| # submitted for rabies | # rabies (-); HPAI testing | # HPAI (+) |
|------------------------|----------------------------|------------|
| 868                    | 47                         | 0          |

- Current surveillance
  - Focus on exposure: must have
    - Clinical signs consistent with HPAI
    - **AND** exposure to infected poultry or dairy farm, contact with sick/dead wild birds, or fed raw poultry/unpasteurized dairy






News &gt; World &gt; Americas

# Former director of the CDC predicts the next pandemic will be from bird flu

While mortality from Covid-19 was 0.6 per cent, Robert Redfield says bird flu mortality likely to be 'somewhere between 25 and 50 per cent'

Gustaf Kilander Washington DC • Monday 17 June 2024 00:25 EDT •  Comments



“I really do think it’s very likely that we will, at some time, it’s not a question of if, it’s more of a question of when we will have a bird flu pandemic,” Redfield told NewsNation on Friday.

## Is the Current Bird Flu Made in America?

Does a new publication in "Poultry, Fisheries & Wildlife Sciences" make this claim?



ROBERT W MALONE MD, MS

JAN 01, 2025

‘If true, the assertions that the H5N1

On social media and in broadcast interviews, very strong statements about the origin of the currently circulating Avian Influenza are being made by a team comprised of a clinical renal cardiologist, a writer of true crime novels, and an MPH who **graduated in 2024 with a specialization in epidemiology**. None of these authors has any training or experience in virology, sequence analysis, viral evolution or geospatial tracking of viral evolution. If true, the assertions that the H5N1 strain currently circulating in the United States were created in an Athens, Georgia, USDA laboratory and (simultaneously, independently?) in the Rotterdam, Netherlands Erasmus medical center would be explosive, would increase general public fear, and would certainly increase distrust of both USDA and other US Government-sponsored virology research. If false, this would be another clear-cut example of psychological bioterrorism, particularly if any associated conflicts of interest were identified..

center would be explosive’



JOANNE MCARTHUR—DJURRATTSALLIANSEN, WE ANIMALS MEDIA

JULY 06, 2023 | MEDIA RELEASE

Zoonotic Disease Threats in the U.S.  
Uncovered in Comprehensive New Report

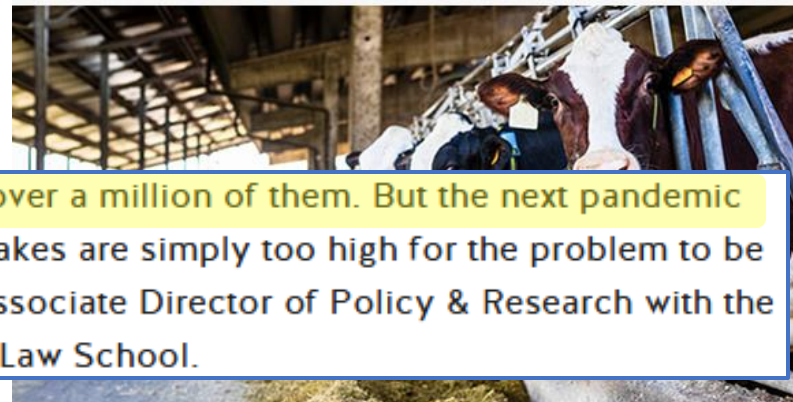
TOP STORY

Avian influenza poses growing risk to large, small cats

AVMA | News

Your source for information on the veterinary profession

Study: Three bovine veterinarians unknowingly infected  
with H5N1



"Covid has infected more than 100 million Americans and killed over a million of them. But the next pandemic may be far worse and might happen sooner than we think. The stakes are simply too high for the problem to be ignored," said Ann Linder, one of the report's lead authors and Associate Director of Policy & Research with the Brooks McCormick Jr. Animal Law & Policy Program at Harvard Law School.



Published July 25, 2023

A close-up photograph of a pig's face, specifically its pink snout and eyes, as it looks through the vertical metal bars of a cage. The pig has black and white markings on its face. The background is slightly blurred, showing more of the cage and some straw bedding.

### *Could the Next Pandemic Start at the County Fair?*

Since 2011, there have been more human swine flu cases reported in the United States than anywhere else in the world. Most have occurred at farm-animal showcases.

Since 2011, there have been more confirmed human cases of swine flu in the United States than anywhere else in the world. (That may be because other nations are doing less testing and surveillance, and many cases here and abroad are likely to go undetected, experts say.) Most have been linked to agricultural shows and fairs. “They have become kind of hot spots,” Ms. Linder said.

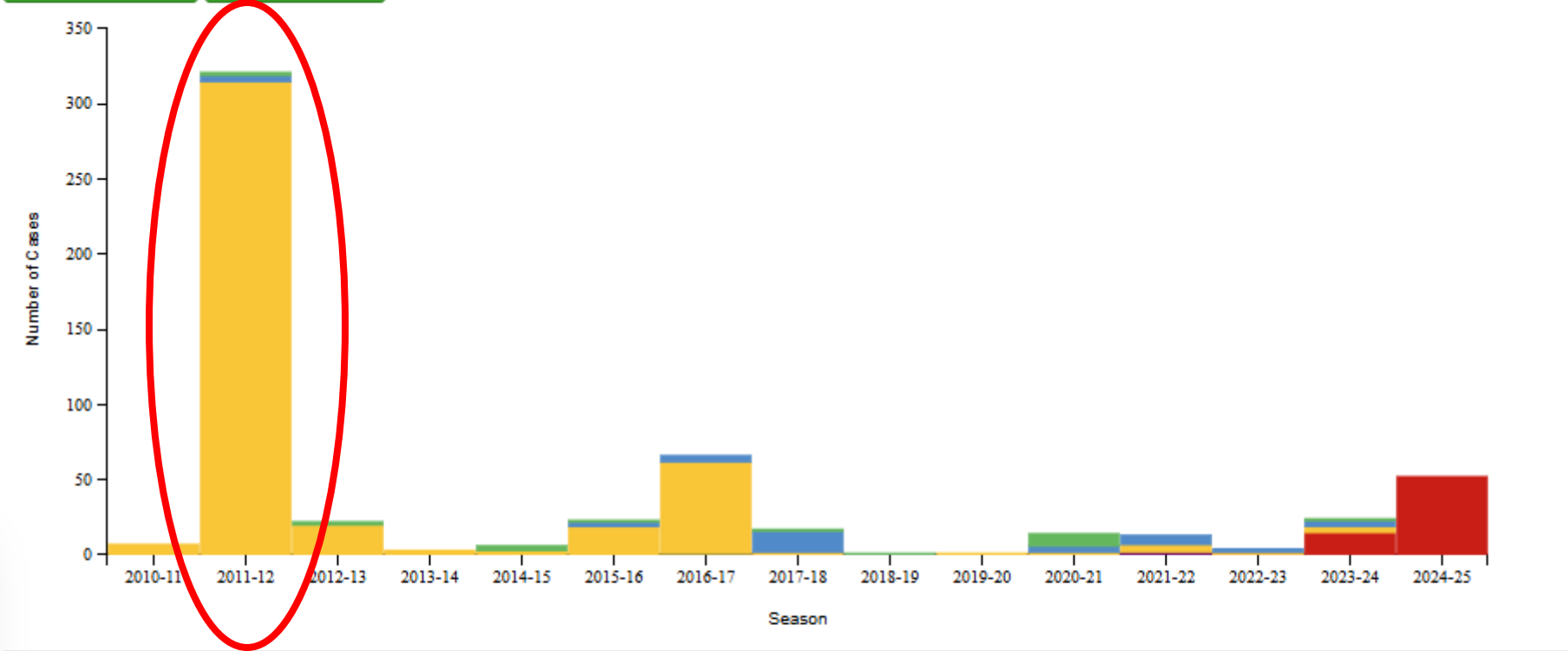
At about 25 percent of fairs, at least one pig tests positive for the flu, which tends to spread widely, the researchers found. “By the end of the fair,” Dr. Bowman said, “you have 200 pigs shedding influenza virus.”

**Based on 40 fairs tested in Ohio in 2012:**

<https://pmc.ncbi.nlm.nih.gov/articles/PMC4178388/>

CASES BY SEASON AND SUBTYPE

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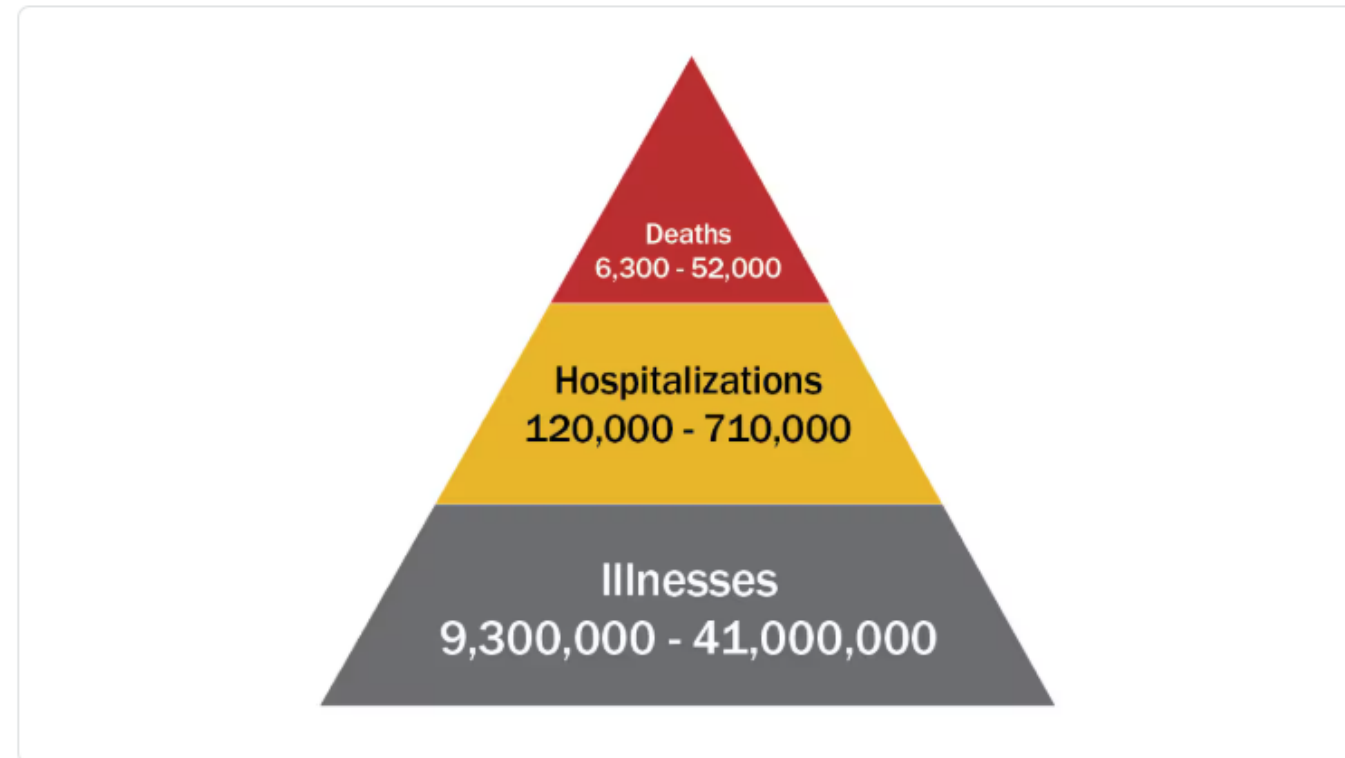


|                               | 2010-11 | 2011-12 | 2012-13 | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 | 2020-21 | 2021-22 | 2022-23 | 2023-24 | 2024-25 | Total |
|-------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-------|
| <div></div> Influenza A H1N1v | 0       | 2       | 2       | 0       | 3       | 1       | 0       | 1       | 1       | 0       | 8       | 0       | 0       | 1       | 0       | 19    |
| <div></div> Influenza A H1N2v | 0       | 4       | 0       | 0       | 0       | 3       | 4       | 14      | 0       | 0       | 4       | 6       | 2       | 4       | 0       | 41    |
| <div></div> Influenza A H3N2v | 7       | 315     | 20      | 3       | 3       | 19      | 61      | 2       | 0       | 1       | 2       | 5       | 1       | 4       | 0       | 443   |

# Estimated Range of Annual Burden of Flu in the US from 2010 – 2024

The burden of flu disease in the United States can vary widely and is determined by a number of factors including the characteristics of circulating viruses, the timing of the season, how well flu vaccine is working to protect against illness, and how many people got vaccinated. While the burden of flu can vary, each year flu places a substantial burden on the health of people in the United States each year.

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<https://www.cdc.gov/flu-burden/php/about/...>



# Pandemic Preparedness

- Public trust
  - We can do better
  - We should focus on facts and describing risk
  - Words matter (use correct definitions)
  - Don't overinflate or predict the next pandemic
    - Messaging should not be focused on promotion of a program or research project
    - Public trust has and will continue to diminish using our current rhetoric



“ Life is one d\*\*ned thing after another.

Elbert Hubbard (1856–1915) ”



*"Hit It Out of the Park!"*

2025

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September #, 2025