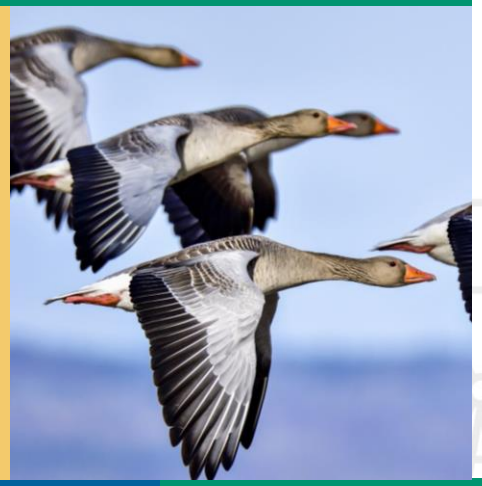

HPAI: Background and Epidemiology in Michigan

Nora Wineland, DVM, MS, DACVPM

State Veterinarian

May 14, 2025

Outline

- Nomenclature and Response for Poultry
- Review of the Current Outbreak
- Surveillance in Dairy Cattle
- Concluding Remarks

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Nomenclature and Response for Poultry

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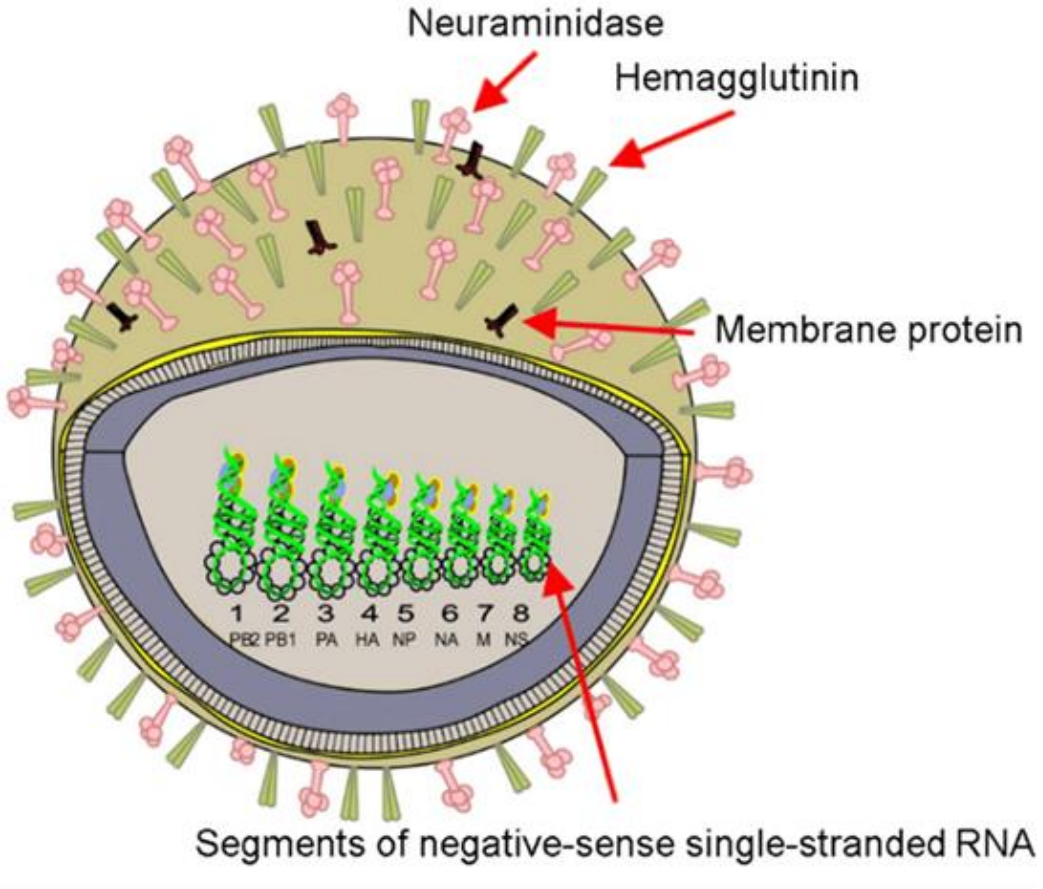
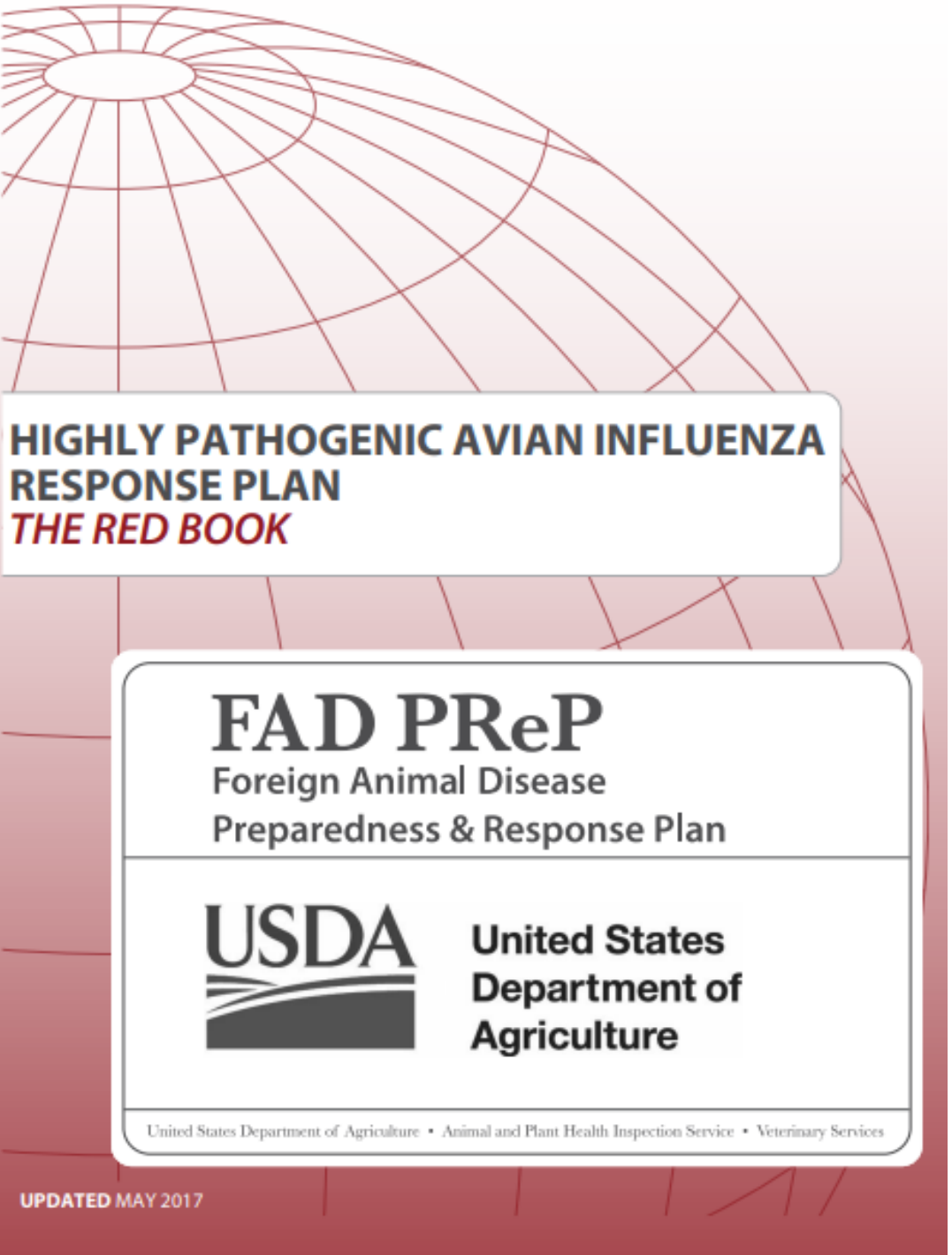
Avian Influenza

- Classified by a combination of two groups of proteins:
  - Hemagglutinin proteins (H1–H16)
  - Neuraminidase proteins (N1–N9)
  - Many different combinations of “H” and “N” proteins are possible
    - Each combination = different subtype
    - Broken down into different strains that circulate within flyways
- Avian influenza viruses are further classified by their pathogenicity (low or high)
  - The ability of a particular virus strain to produce disease in domestic poultry



https://www.researchgate.net/figure/Scheme-of-the-avian-influenza-virus_fig4_349682451



Follow USDA's Requirements

- MDARD works very closely with Michigan's Area Veterinarian in Charge (USDA VS)
- Follow the *Highly Pathogenic Avian Influenza Response Plan: The Red Book*

HPAI Response Process for Poultry

1. Detection and Quarantine
2. Appraisal and Compensation
3. Depopulation
4. Disposal
5. Virus Elimination
6. Testing
7. Restocking
8. Maintain Biosecurity

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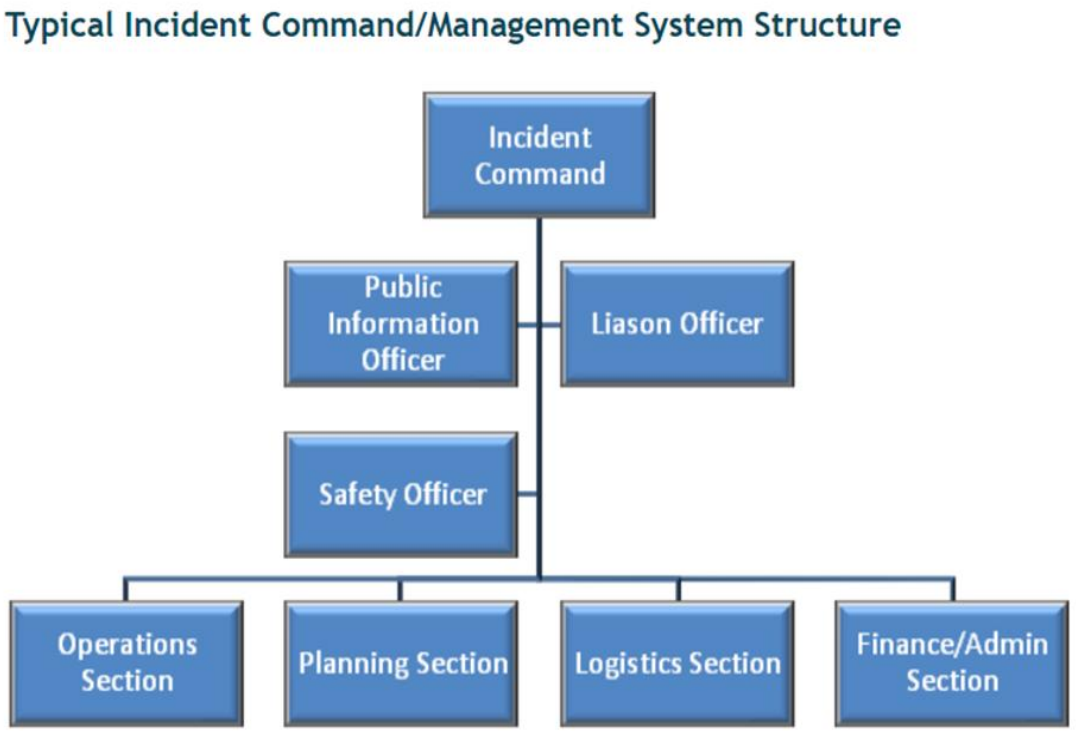
Incident Management Team Assembled

- Premises verified; field veterinarian deployed
- Samples collected; delivered to the Michigan State University Veterinary Diagnostic Laboratory; quarantine
- RRT-PCR testing completed
    - If results non-negative, samples forwarded to National Veterinary Services Laboratories for confirmation
    - Whole genome sequence testing
- Depopulation and disposal
- Fallow periods, control areas, and permitted movements



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The Animal Industry Act

- Public Act 466 of 1988
- Cannot disclose information that would identify a specific producer/premises unless there is a significant public health risk
- “Animal HIPAA”

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Review of the Current Outbreak

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Highly Pathogenic Avian Influenza (HPAI)

- Highly contagious virus primarily affecting wild and domestic birds
- First Michigan case in domestic flock was reported on February 23, 2022
- Have had 50 HPAI-positive flocks in Michigan to date
- Most infections were introduced by wild birds

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Staff Statistics

At the height of the incident, average staff in response to the outbreak for one day:

Total Staff	USDA	MDARD
81	48	33

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And, Now it's in Cows?!

- In early 2024, a "mystery disease" was seen in dairy cows from Texas
  - Signs: Off feed, decreased milk production, and abnormal milk and feces
  - The U.S. Department of Agriculture announced the detection of HPAI in these animals on March 25, 2024
- While HPAI can affect mammals, finding it in dairy cattle is new

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HPAI in Michigan for 2024

- **March 8**
  - Michigan herd imported clinically normal cattle from Texas
- **March 10**
  - Texas origin herd broke with HPAI
- **March 20**
  - Michigan herd that imported cattle started exhibiting symptoms
- **March 29**
  - MDARD and USDA announced Michigan's first HPAI-positive dairy herd
- **April 1**
  - Received the first sick bird call from an Ionia County poultry operation
  - Received another sick herd call for second dairy

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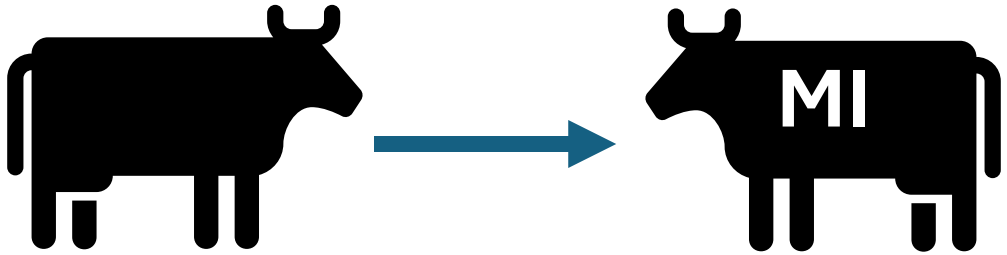
Determining How Infection Occurred

- **Whole genome sequencing**
  - Helps determine the direction/type of spread

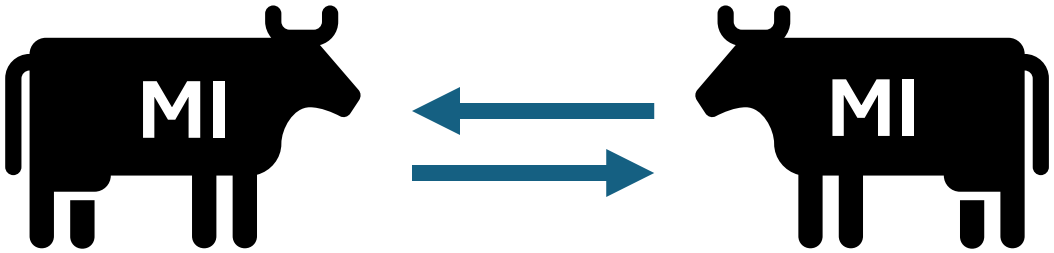
- **Epidemiological questionnaire findings**
    - Animal movement
    - Wildlife and peri-domestics
    - Shared equipment (trailers, feed trucks, deadstock trucks)
    - Shared personnel (workers, nutritionists, etc.)
    - Visitors (school groups, friends, neighbors)
    - Milk trucks

Multifactorial Spread: Animal Movements



One herd confirmed to have imported the virus

Affected dairies acquired cattle from in and out of state

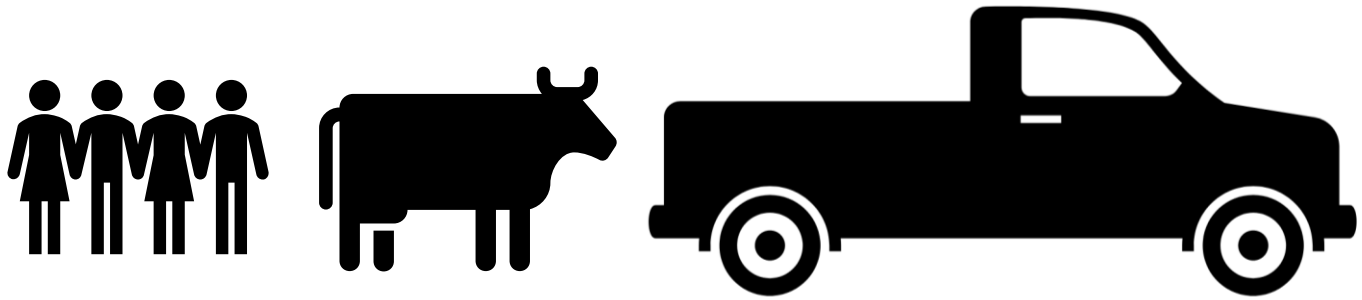


Between herd spread

Multifactorial Spread: Visitors, Shared Vehicles, and Equipment

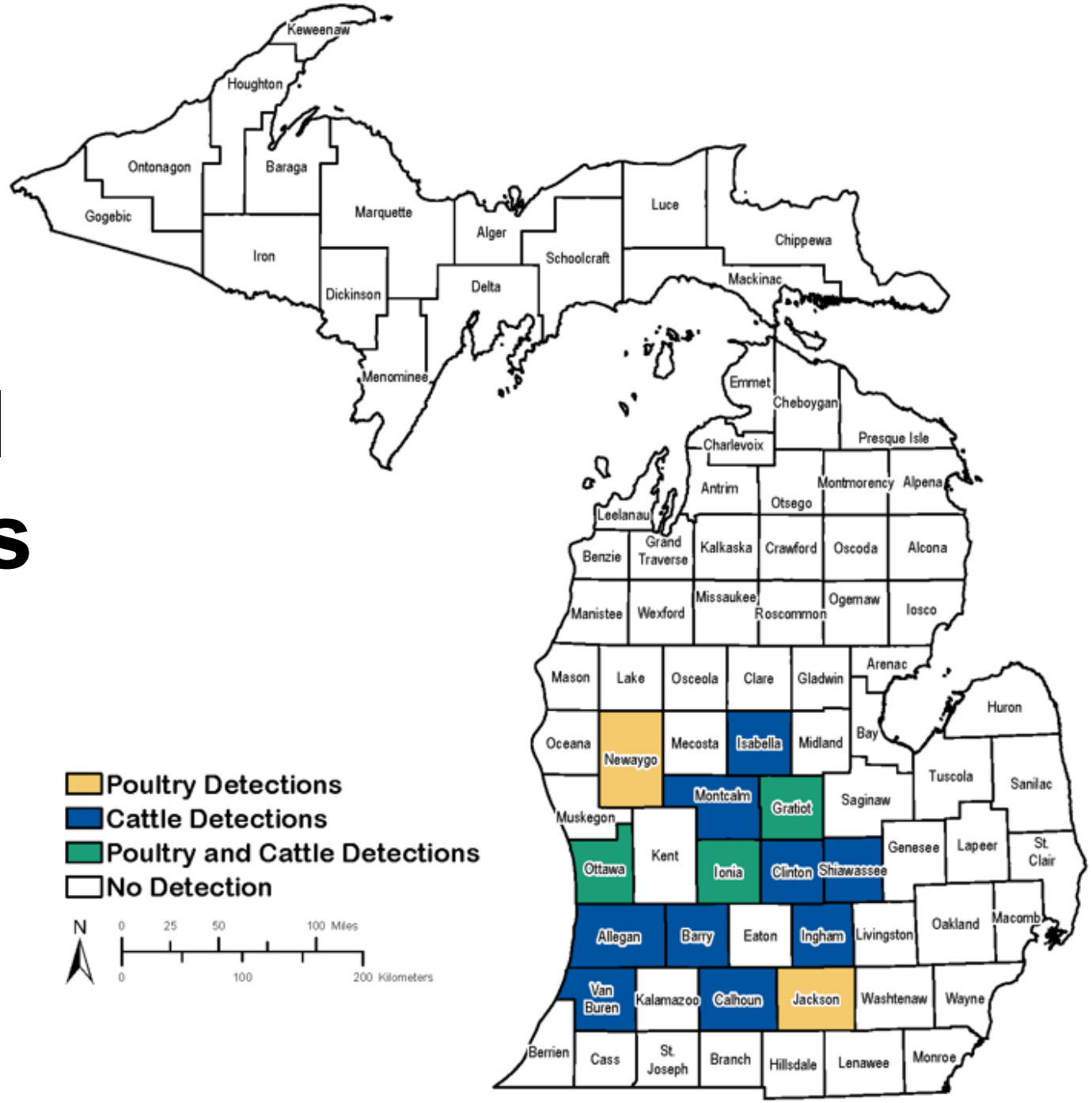
Milk truck routes may include multiple dairies

Dairies visited by same deadstock hauler



Dairies visited by numerous visitors, most with access to cattle

2024 HPAI Detections



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Multifactorial Spread: Shared Workers

Workers from six affected dairies worked on other dairies

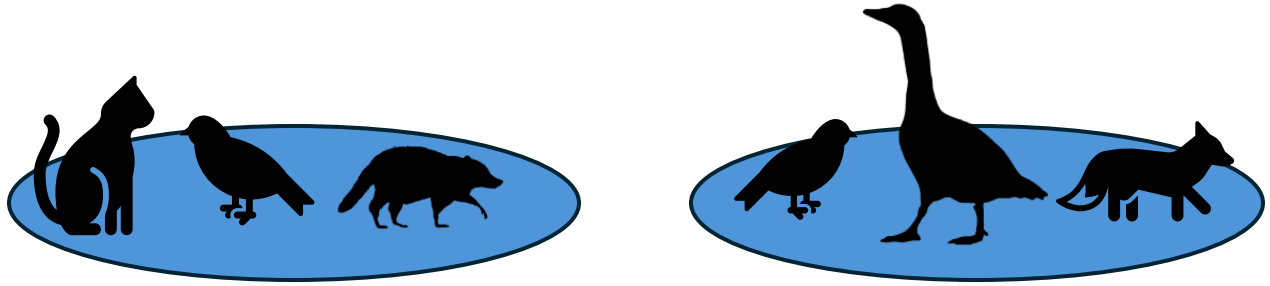
Workers from three affected flocks and two affected dairies had shared housing

Workers from three affected flocks worked on two affected dairies

Multifactorial Spread:
Local Wildlife and Peri-Domestic Species

This virus strain has not been found in migratory waterfowl in Michigan

Virus confirmed in wildlife and peri-domestic species



Beyond the Initial Response

- USDA issued a Federal Order, which went into effect on April 29, 2024
    - Requires lactating dairy cattle to test negative for Influenza A before interstate movement
- MDARD issued a Determination of Extraordinary Emergency, HPAI Risk Reduction Response Order, which went into effect on May 8, 2024
- MDARD amended the HPAI Risk Reduction and Response Order on June 26, 2024, which went into effect on July 1, 2024

2024 HPAI Risk Reduction Response Order

- **For Poultry:**
  - Suspended the exhibition of poultry until Michigan went 30 consecutive days without a new detection of HPAI in poultry
  - Suspension was able to be lifted on June 8, 2024
  - Order also required recordkeeping
    - Name and address of exhibitor
    - Cell phone number (of parent if under 18)
    - Email address (of parent if under 18)

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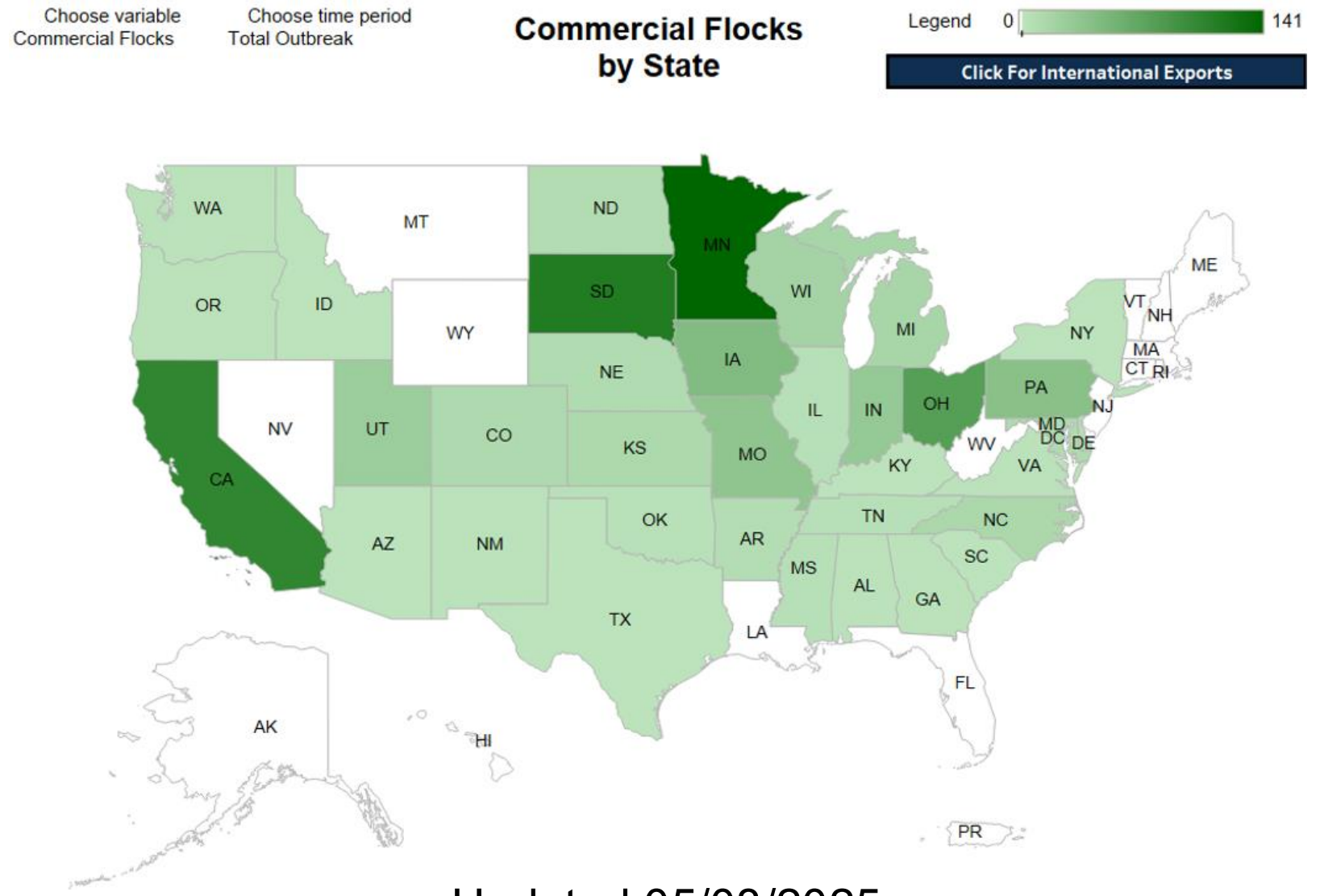
2024 HPAI Risk Reduction Response Order

- **For Cattle:**
  - No exhibition of lactating dairy cattle or dairy cattle in the last two months of pregnancy until the state had no new outbreaks for 60 days
  - No exhibition of cattle of any age from an affected dairy
  - Later amendment to the order required testing non-lactating cattle originating from a licensed dairy or a premises connected to/affiliated with a licensed dairy for HPAI before moving for exhibition
    - 27 bulk tank samples
    - 691 nasal swabs

Current Situation: Poultry, Total Outbreak



Updated 05/08/2025

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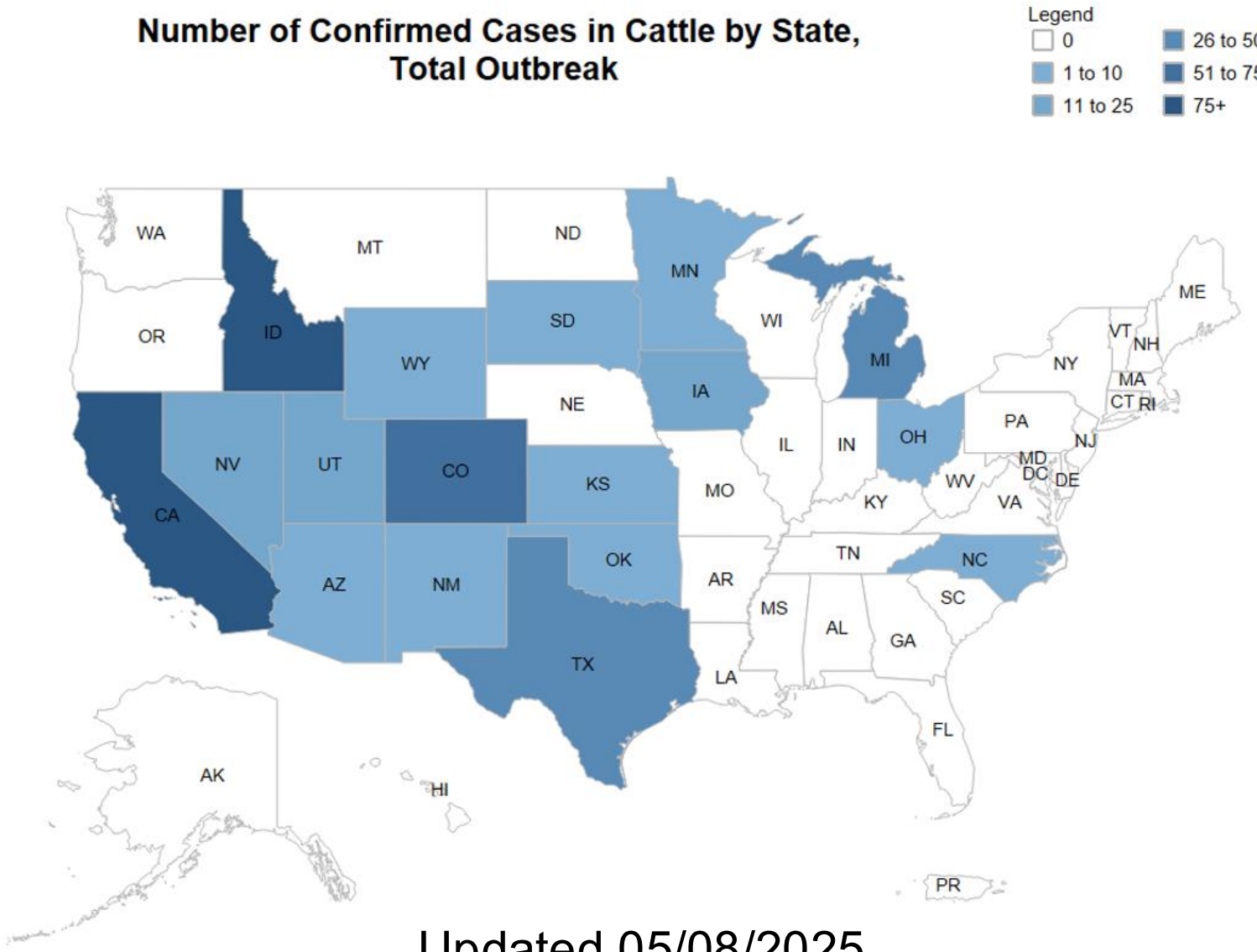
Current Situation: Dairy Cattle, Total Outbreak



Updated 05/08/2025

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Surveillance in Dairy Cattle

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USDA's National Milk Testing Strategy

Stage 1: Standing Up Mandatory USDA National Plant Silo Monitoring

Stage 2: Determining a State's H5N1 Dairy Cattle Status

Stage 3: Detecting and Responding to the Virus in Affected States

Stage 4: Demonstrating Ongoing Absence of H5 in Dairy Cattle in Unaffected States

Stage 5: Demonstrating Freedom from H5 in U.S. Dairy Cattle

National Milk Testing Strategy

- Michigan is participating in this federal program
- Working with the state's dairy industry milk laboratories to get the necessary monthly samples
- Samples go to the Michigan State University Veterinary Diagnostic Laboratory, and if confirmation is needed, samples go to the National Veterinary Services Laboratories
- Stage 4 (state freedom) requires three consecutive negative monthly tests
- Table of response actions on web for four possible categories: Negative, Recovered, Recovering, and Affected

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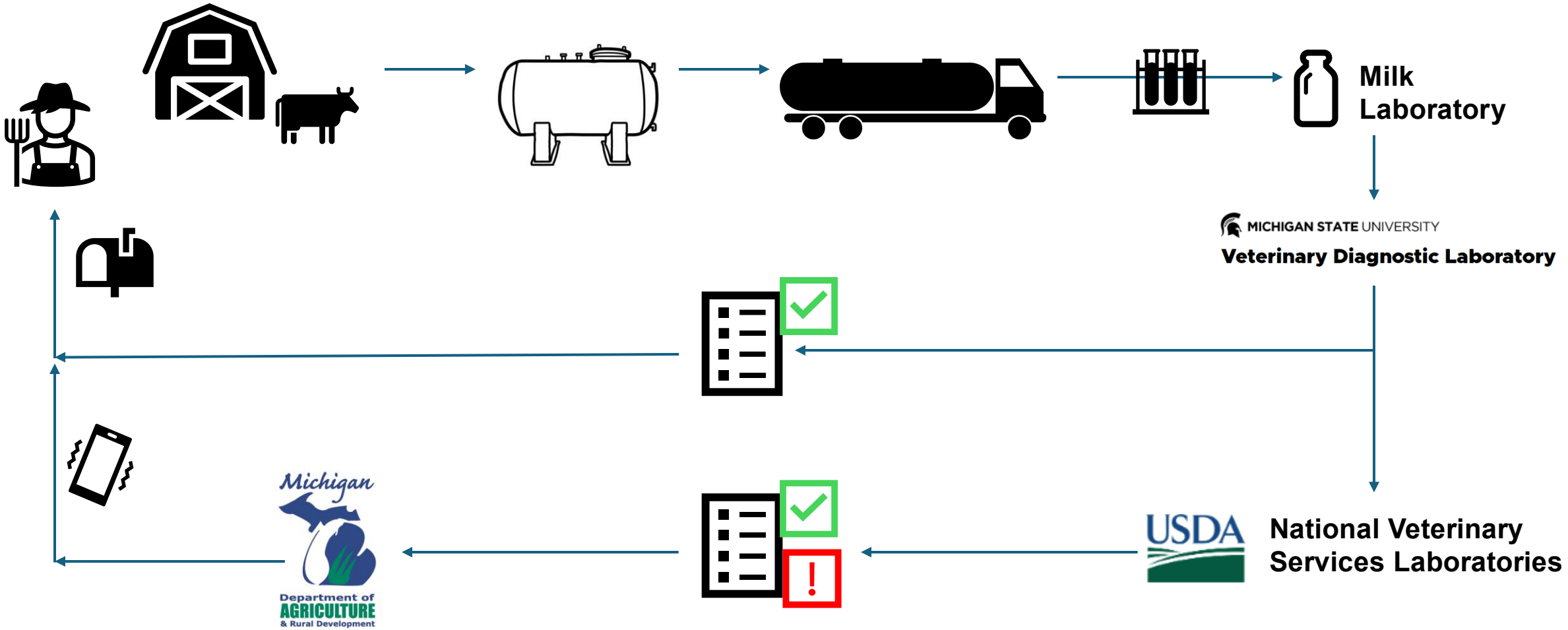
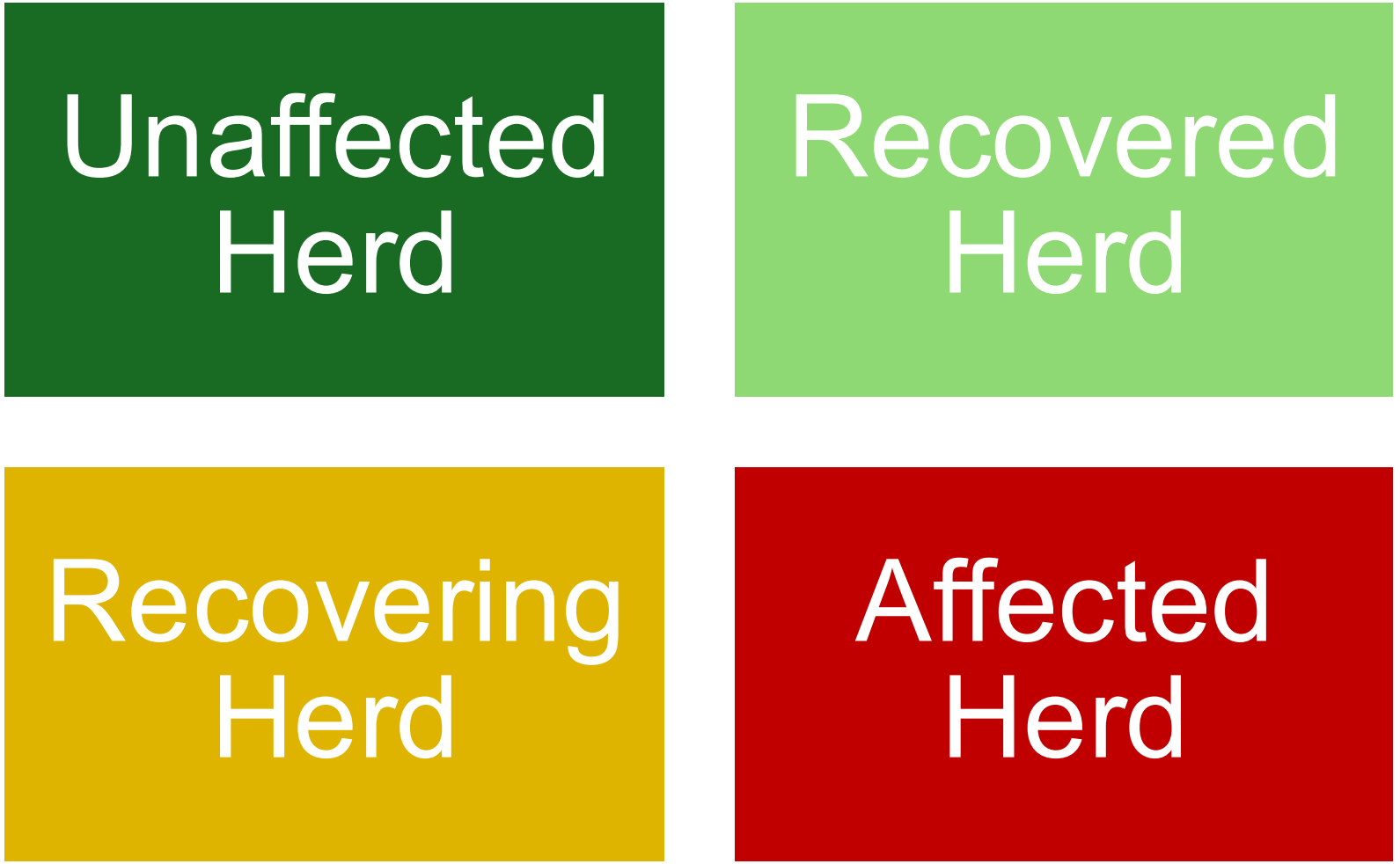
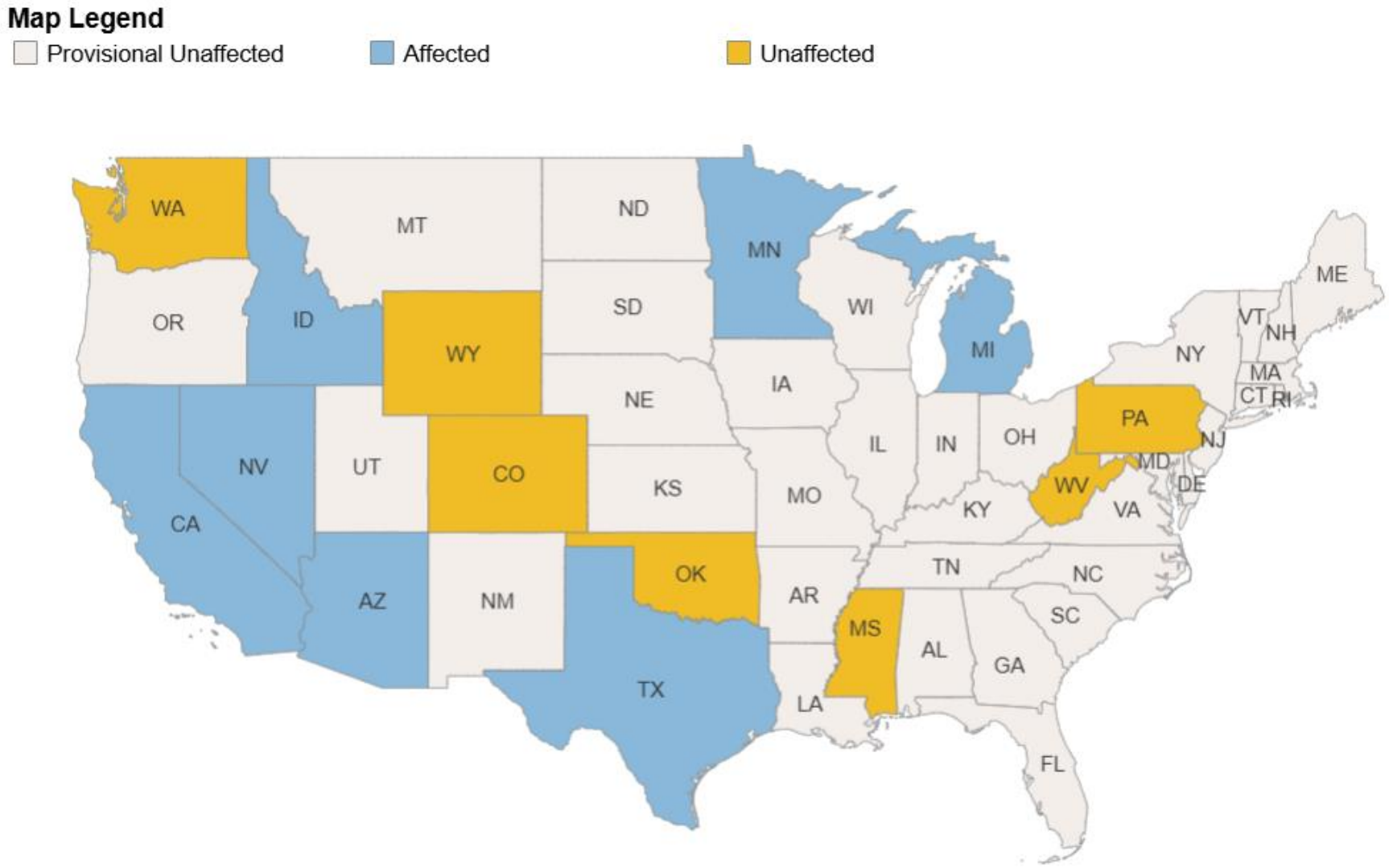
Flow of Surveillance Samples



Herd Test Results



National Milk Testing Strategy State Status,
as of May 8, 2025



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Concluding Remarks

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Concerns with Current HPAI Outbreak

- The current outbreak is unique

- Animal health concerns:
  - Single spillover event based on genomics for B3.13
    - Will it happen again? D1.1 in Arizona and Nevada
  - Movement from dairy to poultry
  - Mechanism of spread within cattle is multi-factorial

- Public health concerns:
  - HPAI is a zoonotic disease
  - Human exposure happens at affected livestock facilities

Biosecurity is Critically Important

Biosecurity remains essential to protect flocks and herds from HPAI

- Limit non-essential visitors to your farm and animals
- Limit introduction of new animals
- Require clean clothing and footwear (especially footwear)
- Wash hands before and after caring for animals
- Monitor animal health
- Isolate sick animals
- Contact a veterinarian if there are questions or concerns regarding animal health

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Thank you!

@MichDeptofAg

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