IDSA Clinician Call: Update on Avian Flu

January 23, 2025

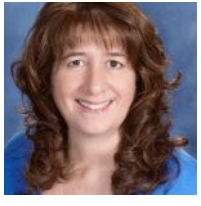
Dana Wollins, DrPH, MGC
Senior Vice President, Strategy
Infectious Diseases Society of America

This webinar is being recorded and can be found online at www.idsociety.org/cliniciancalls.

1. Update on Avian Flu

Carlos del Rio, MD, FIDSA
Distinguished Professor of Medicine, Division of Infectious Diseases
Emory University School of Medicine
Professor of Epidemiology and Global Health
Rollins School of Public Health of Emory University

2. Perspectives from the Field



California Perspective
Julie Vaishampayan, MD, MPH, FIDSA
Office of Infectious Disease Preparedness
& Response, Center for Infectious Diseases
California Department of Public Health

Louisianna Perspective
Julio E. Figueroa, MD
Professor of Medicine
Chief of Infectious Diseases
Louisianna State University, Health Sciences Center

Farmworker Health Perspective
Bethany Boggess Alcauter, PhD, MPH
Director of Research and Public Health Programs
National Center for Farmworker Health

3. Where Are We Headed?

Richard Webby, PhD
Director, World Health Organization Collaborating Center for Studies on the Ecology of Influenza in Animals and Birds
Faculty Member, St. Jude Children's Research Hospital

Question?
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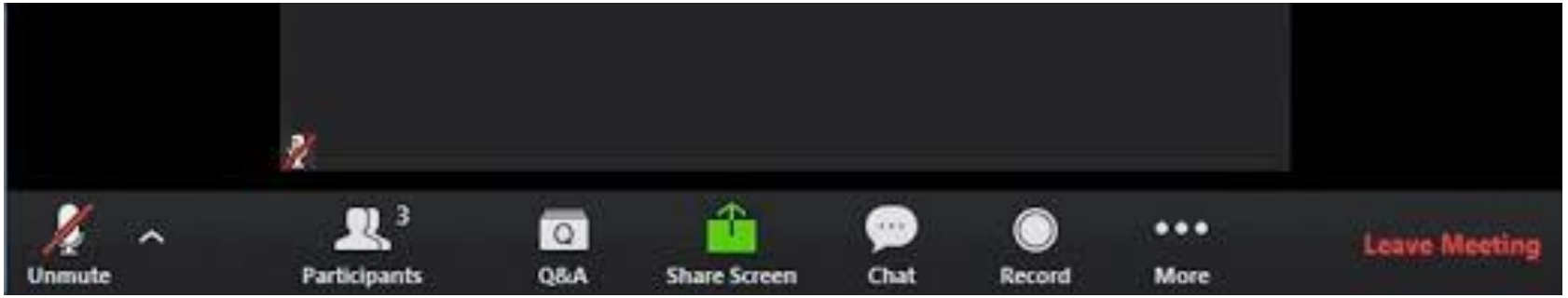

Avian Flu Update

Carlos del Rio, MD, FIDSA
Rollins School of Public Health of Emory University

Avian Flu (H5N1) Update

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IDSA Infectious Diseases Society of America

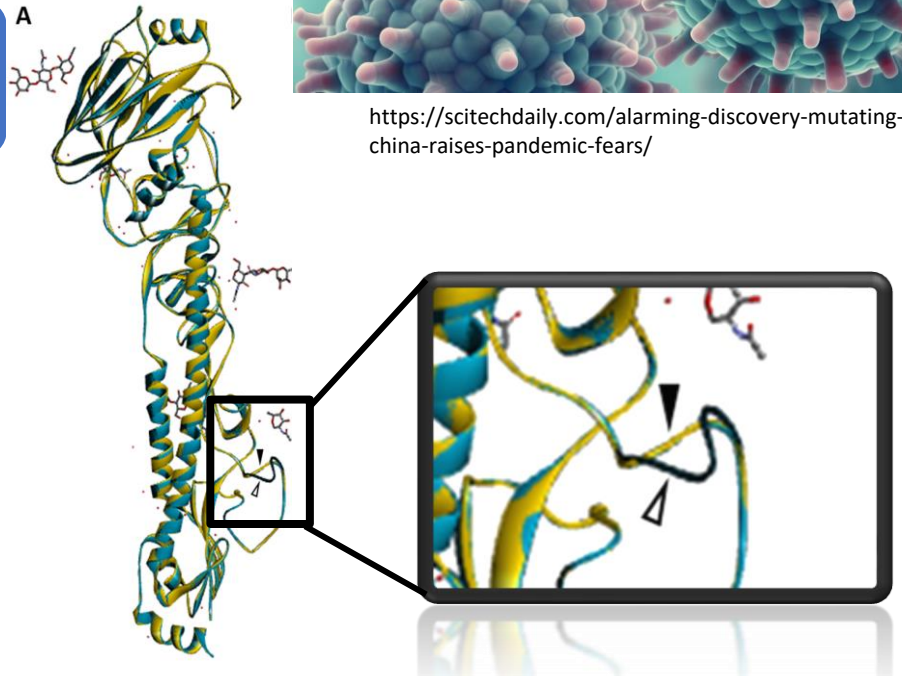
Avian Influenza Background

Isolated as early as 1959 (A/chicken/Scotland/59)

Exists as two different versions:

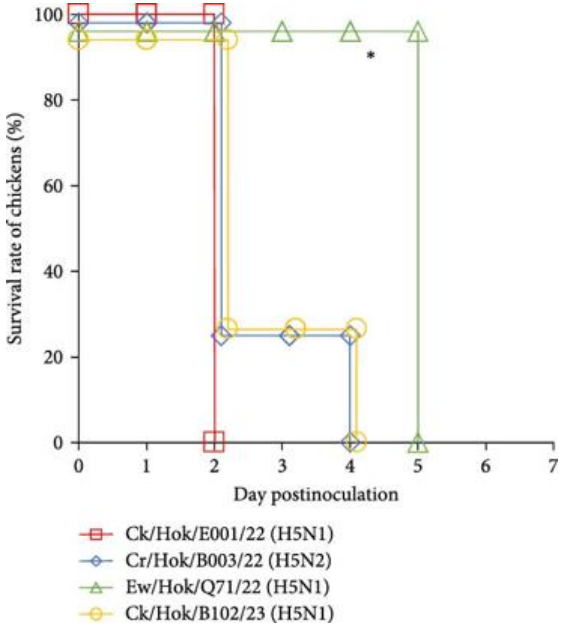
- Low Pathogenic Avian Influenza (LPAI) H5N1
- Highly Pathogenic Avian Influenza (HPAI) H5N1
- HPAI strains have a polybasic cleavage site in the HA which allows cleavage by furin-like proteases enabling the virus to grow outside of the GI and respiratory tract (other virulence factors may contribute as well)

https://scitechdaily.com/alarming-discovery-mutating-bird-flu-in-china-raises-pandemic-fears/



HPAI H5 Viruses are Highly Virulent in many Avian Species

White Leghorn Chicken, 10^6 EID_{50}

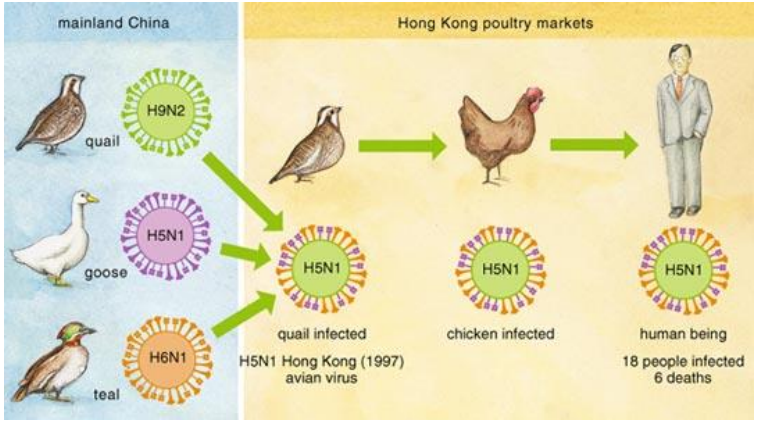


Djurdjević *et al.*, Animals 2023

Hew *et al.*, TED, 2024

First Human H5N1 cases in 1997 in Hong Kong

18 human H5N1 cases in Hong Kong, seven deaths, linked to HPAI H5N1 of the **A/goose/Guangdong/1/1996** lineage



https://people.scs.carleton.ca/~soma/biosec/readings/influenza/influenza-fig5.html

The Lancet
Volume 351, Issue 9101, 14 February 1998, Pages 472-477

Articles

Human influenza A H5N1 virus related to a highly pathogenic avian influenza virus

Dr Eric CJ Claas PhD [o], Prof Albert DME Osterhaus DVM [o], Ruud van Beek MS [o], Jan C De Jong PhD [b], Guus F Rimmelzwaan PhD [o], Dennis A Senne MS [c], Scott Krauss MS [e], Prof Kennedy F Shortridge PhD [d], Prof Robert G Webster PhD [e]

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https://doi.org/10.1016/S0140-6736(97)11212-0

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The Lancet
Volume 351, Issue 9101, 14 February 1998, Pages 467-471

Articles

Clinical features and rapid viral diagnosis of human disease associated with avian influenza A H5N1 virus

Prof KY Yuen MRCPath [o], PKS Chan MRCPath [b], Dr M Peiris FRCPath [o], DNC Tsang MRCPath [c], TL Que MRCPath [c], KF Shortridge PhD [o], PT Cheung FRCP [o], WK To FRCA [c], ETF Ho FRCA [c], R Sung FRCP [b], Prof AFB Cheng FRCPath [b], Members of the H5N1 study group

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https://doi.org/10.1016/S0140-6736(98)01182-9

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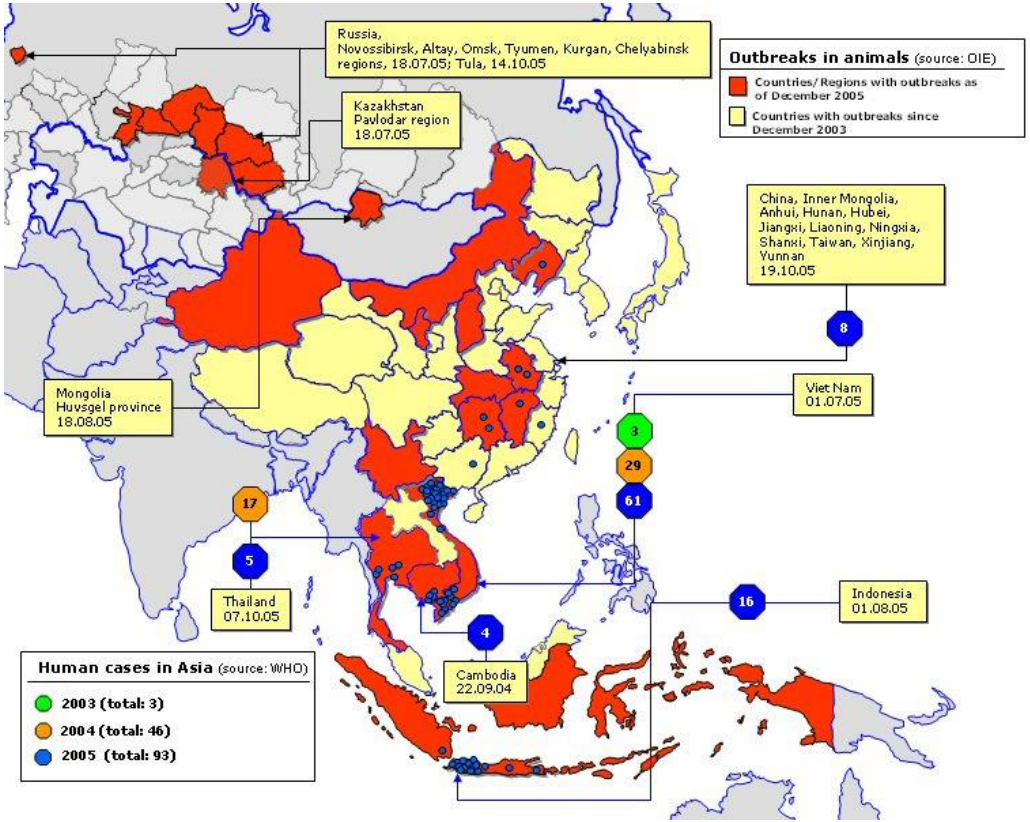
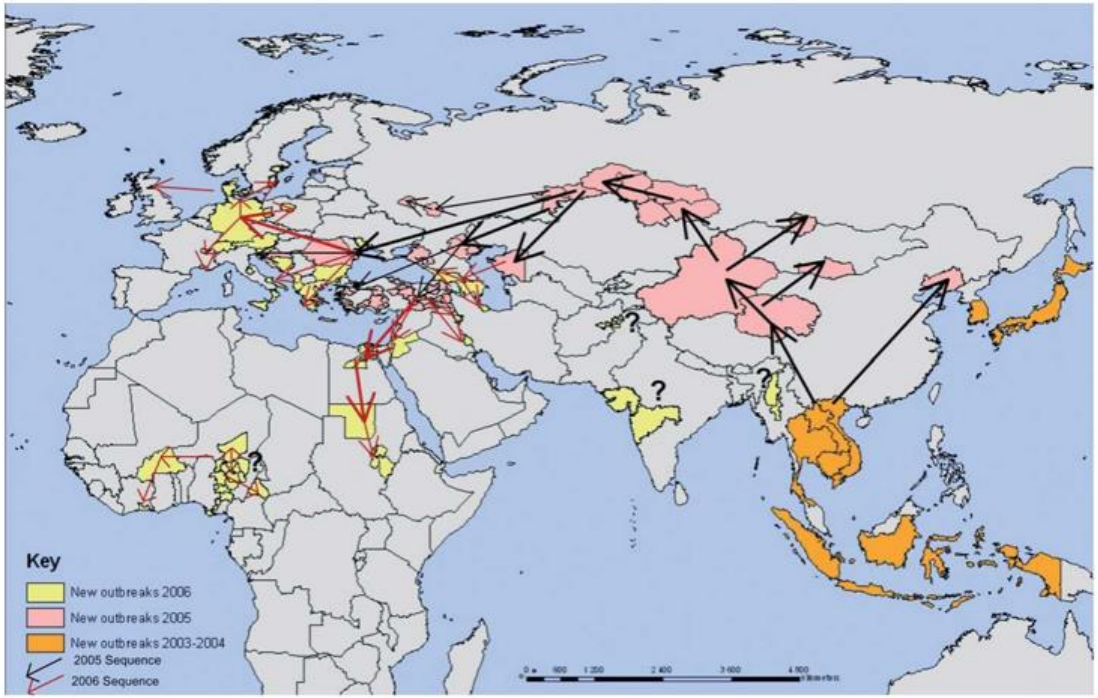
Return of HPAI H5N1 in 2003



https://en.wikipedia.org/wiki/Global_spread_of_H5N1

Spread across Eurasia and Africa via flyways



EMERGING INFECTIOUS DISEASES

Emerg Infect Dis. 2008 Apr; 14(4): 600–607.
doi: 10.3201/eid1404.071016

RESEARCH

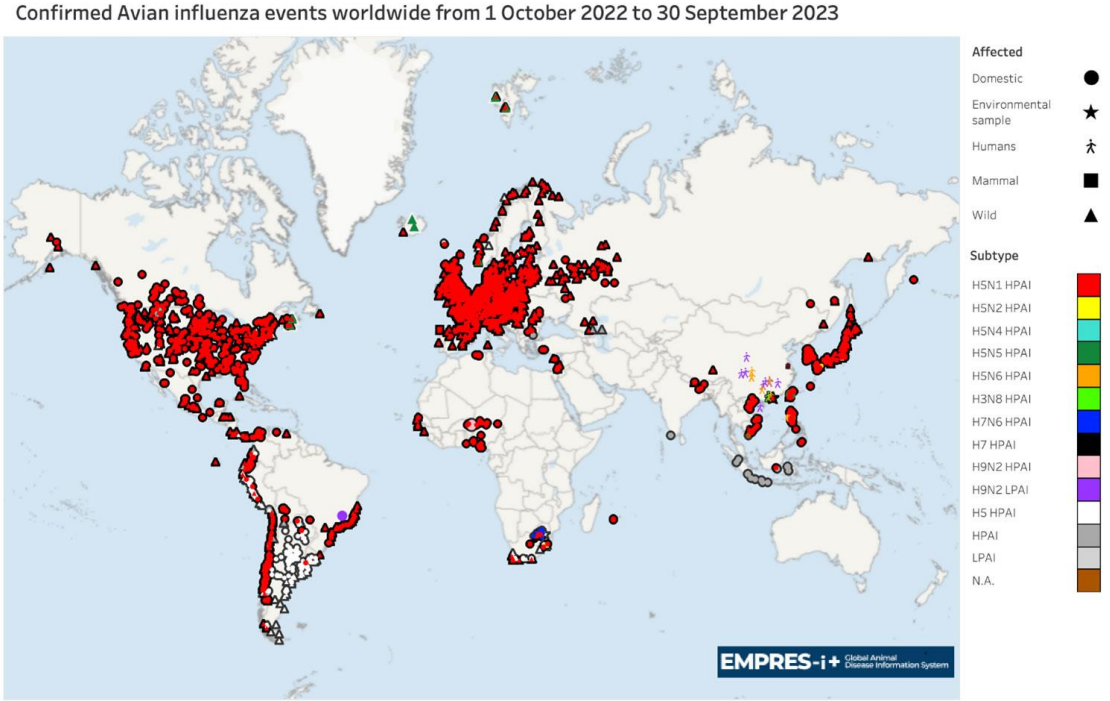
Wild Ducks as Long-Distance Vectors of Highly Pathogenic Avian Influenza Virus (H5N1)

Juthatip Keawcharoen,* Debby van Riel,* Geert van Amerongen,* Theo Bestebroer,* Walter E. Beyer,* Rob van Lavieren,* Albert D.M.E. Osterhaus,* Ron A.M. Fouchier,* and Thijs Kuiken*

https://doc.woah.org/dyn/portal/index.xhtml?page=alo&aloId=30872

Current spread of clade 2.3.4.4b H5N1

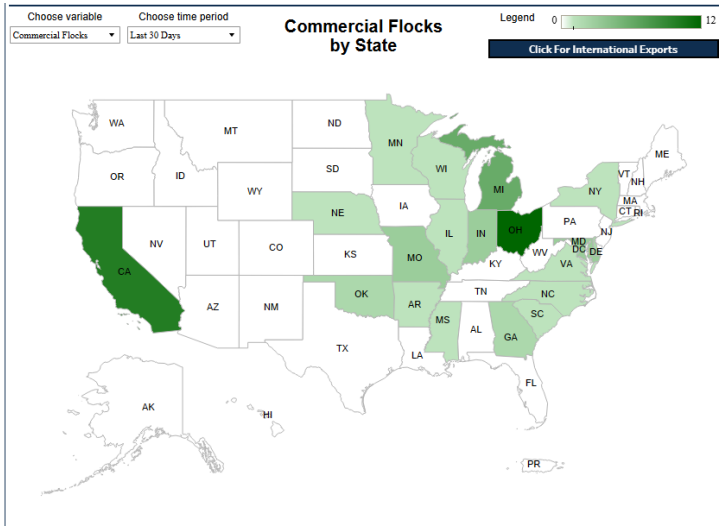
- Starting in 2020, H5N1 of the 2.3.4.4b clade spread across Europe
- In December 2021, H5N1 arrived in North America via wild birds
- Throughout 2022, H5N1 spread across North America, and later South America and has now reached Antarctica
- Frequent dead-end infections in mammals that feed on birds
- Suspected mammal to mammal transmission in fur farms in Europe and in marine mammals in South America
- A handful human cases, mostly mild, with two exceptions

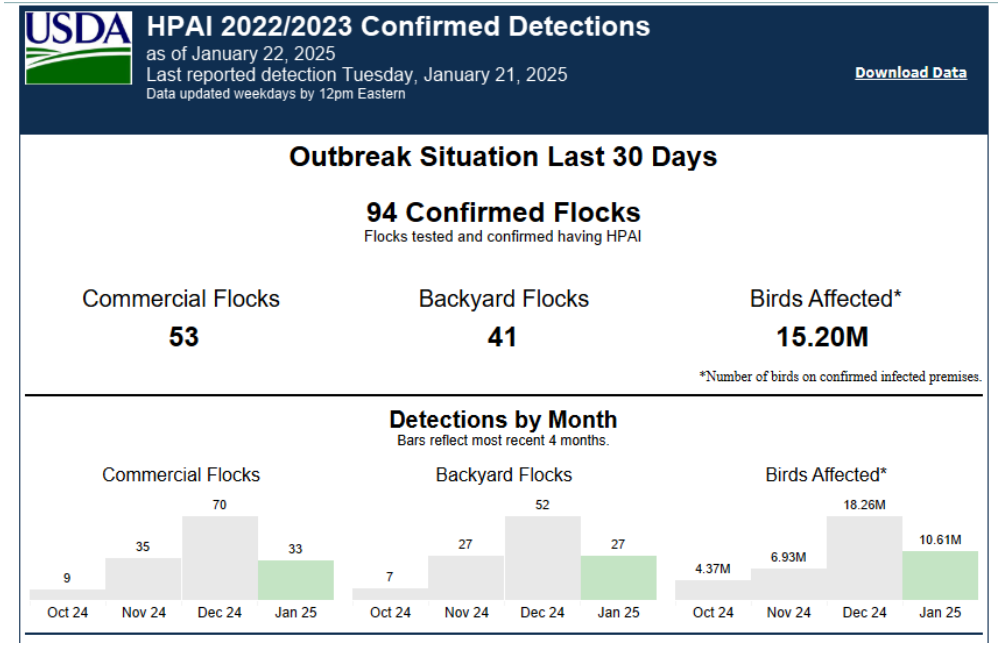


Emergency Prevention System (EMPRES-i); Food and Agriculture Organization of the United States (FAO)

H5N1 Flu in Commercial and Backyard Flocks

- **136,327,394** poultry affected as of 1/17/2024
- **51** states with outbreaks in poultry





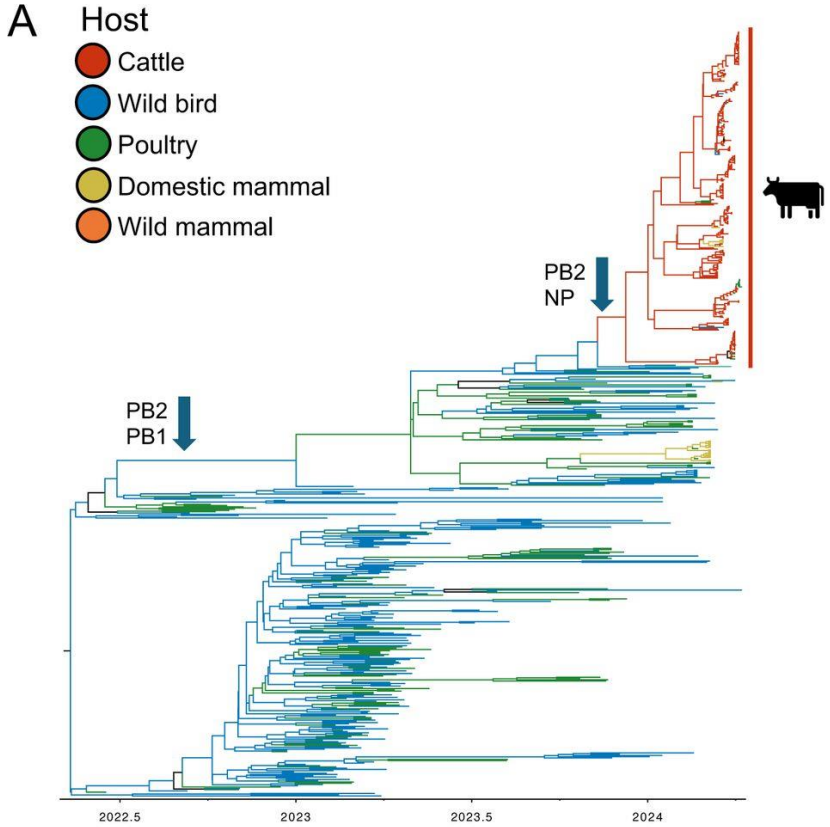
https://www.aphis.usda.gov/livestock-poultry-disease/avian/avian-influenza/hpai-detections
https://www.cdc.gov/bird-flu/situation-summary/index.html

H5N1 spread into US dairy cattle herds

The New York Times

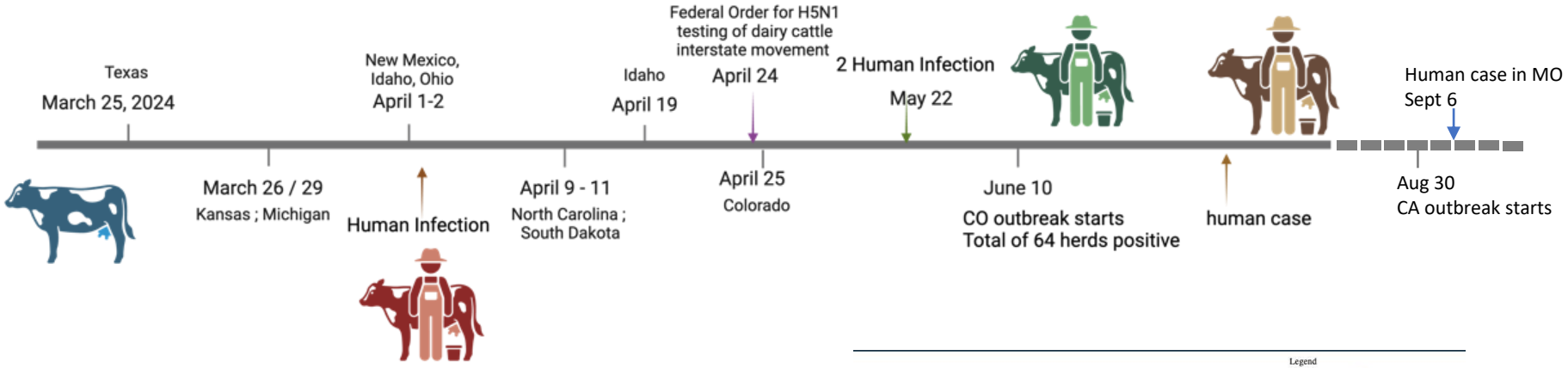
Bird Flu Spreads to Dairy Cows

U.S. regulators confirmed that sick cattle in Texas, Kansas and possibly in New Mexico contracted avian influenza. They stressed that the nation's milk supply is safe.



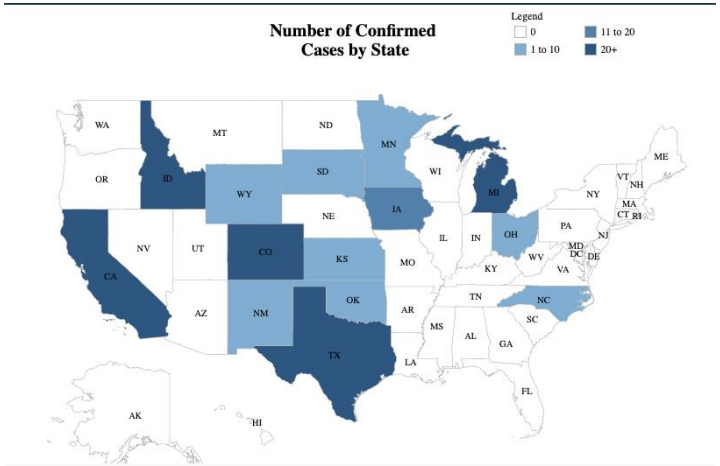
https://www.biorxiv.org/content/10.1101/2024.05.01.591751v1.full.pdf

Highly Pathogenic Avian H5N1 Influenza Virus in Cattle



Ongoing, multi-state outbreak

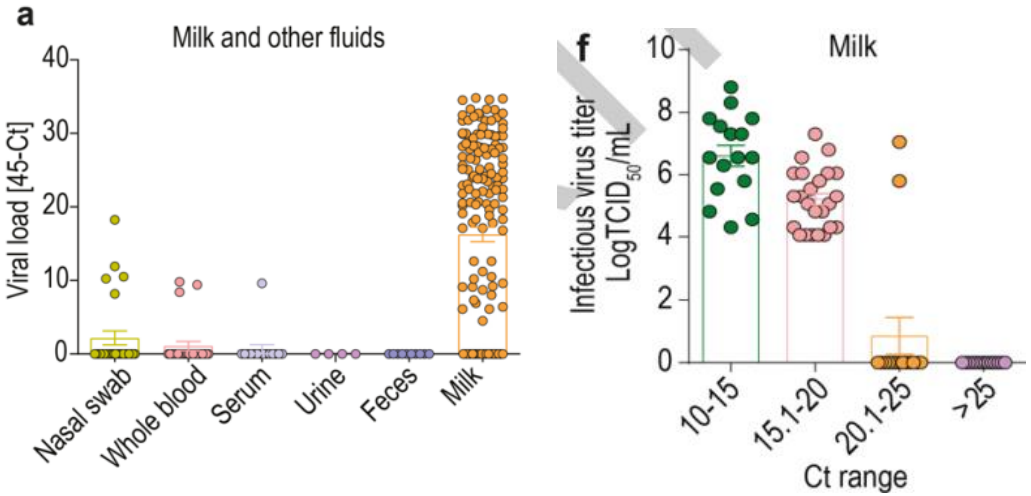
- **928** dairy herds affected as of 1/16/2024
- **16** states with outbreaks in dairy cows
- Last 30 days: 49 new confirmed cases in 2 states



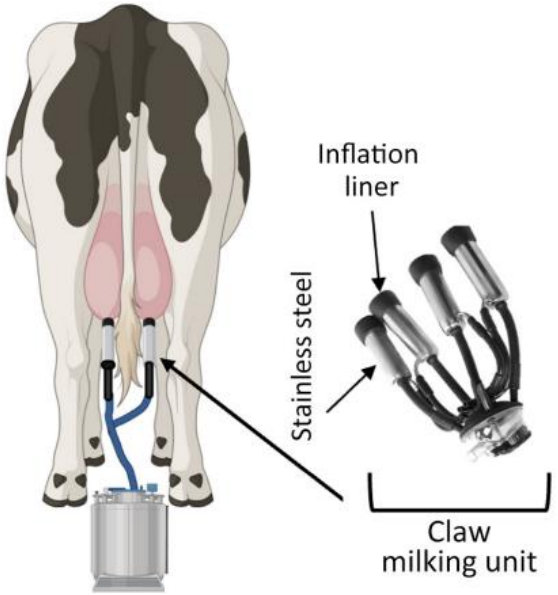
https://www.aphis.usda.gov/livestock-poultry-disease/avian/avian-influenza/hpai-detections/hpai-confirmed-cases-livestock

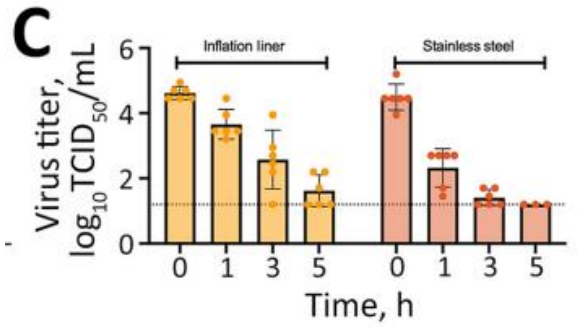
H5N1 is present in high titers in milk

- **H5N1 infection reduces milk production**
- **Virus replicates in mammary glands**
- **Infectious virus is secreted into milk at high titers**
- **Raw milk from infected cow causes infections in mice**
- **Pasteurization kills of infectious virus but genome is now widely present in the US milk supply**
- **Cow-to-cow transmission likely mostly through milking equipment**



Caserta *et al.*, Nature, 2024





Le Sage *et al.*, EID, 2024

Human H5N1 infections 2003-2023 – case fatality rate (CFR) approximately 52%

Cumulative number of confirmed human cases† for avian influenza A(H5N1) reported to WHO, 2003-2023

Country	2003-2009*		2010-2014*		2015-2019*		2020		2021		2022		2023		Total	
	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths
Azerbaijan	8	5	0	0	0	0	0	0	0	0	0	0	0	0	8	5
Bangladesh	1	0	6	1	1	0	0	0	0	0	0	0	0	0	8	1
Cambodia	9	7	47	30	0	0	0	0	0	0	0	0	6	4	62	41
Canada	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1
Chile	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
China	38	25	9	5	6	1	0	0	0	0	1	1	1	0	55	32
Djibouti	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Ecuador	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
Egypt	90	27	120	50	149	43	0	0	0	0	0	0	0	0	359	120
India	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1
Indonesia	162	134	35	31	3	3	0	0	0	0	0	0	0	0	200	168
Iraq	3	2	0	0	0	0	0	0	0	0	0	0	0	0	3	2
Lao People's Democratic Republic	2	2	0	0	0	0	1	0	0	0	0	0	0	0	3	2
Myanmar	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Nepal	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1
Nigeria	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Pakistan	3	1	0	0	0	0	0	0	0	0	0	0	0	0	3	1
Spain	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0
Thailand	25	17	0	0	0	0	0	0	0	0	0	0	0	0	25	17
Turkey	12	4	0	0	0	0	0	0	0	0	0	0	0	0	12	4
United Kingdom of Great Britain and Northern Ireland	0	0	0	0	0	0	0	0	1	0	0	0	4	0	5	0
United States of America	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
Viet Nam	112	57	15	7	0	0	0	0	0	0	1	0	0	0	128	64
Total	**468**	**282**	**233**	**125**	**160**	**48**	**1**	**0**	**2**	**1**	**6**	**1**	**12**	**4**	**882**	**461**

Source: WHO at https://cdn.who.int/media/docs/default-source/influenza/h5n1-human-case-cumulative-table/cumulative-number-of-confirmed-human-cases-for-avian-influenza-a(h5n1)-reported-to-who--2003-2023071d9f0c-49c7-43ef-bf36-4ae01252b29a.pdf?sfvrsn=d9a96d9_3&download=true

Human Cases of H5N1 in the United States

- 67 confirmed total reported human cases, 1 death
  - 40 linked to dairy cattle
  - 34 associated with poultry farms and culling operations
  - 4 source unknown

- No human-to-human spread identified to date

Exposure Source

State	Exposure Associated with Commercial Agriculture and Related Operations		Other Animal Exposure[†]	Exposure Source Unknown[‡]	State Total
	Dairy Herds (Cattle)	Poultry Farms and Culling Operations			
California	36	0	0	2	38
Colorado	1	9	0	0	10
Iowa	0	1	0	0	1
Louisiana	0	0	1	0	1
Michigan	2	0	0	0	2
Missouri	0	0	0	1	1
Oregon	0	1	0	0	1
Texas	1	0	0	0	1
Washington	0	11	0	0	11
Wisconsin	0	1	0	0	1
Source Total	**40**	**23**	**1**	**3**	**67**

Source: https://www.cdc.gov/bird-flu/situation-summary/index.html

[†]Exposure was related to other animals such as backyard flocks, wild birds, or other mammals
[‡]Exposure source was not able to be identified

H5N1 Transmission to Numans

- On September 6, 2024, it was reported that an H5N1 infection was detected in a hospitalized patient in Missouri without exposure to animals, now we have an additional case in Canada and in California
- No human-to-human spread so far but risk of re-assortment of H5N1 with seasonal human influenza viruses increases as we go into the influenza season
- One case in California with potential raw milk to human spread

CDC Confirms Human H5 Bird Flu Case in Missouri

STATEMENT

For immediate release: September 6, 2024

CDC Media Relations
(404) 639-3286
media@cdc.gov

Case Information

Missouri DHSS reports that the patient, who was hospitalized, had underlying medical conditions, was treated with influenza antiviral medications, subsequently discharged, and has recovered. There is no immediate known animal exposure. No ongoing transmission among close contacts or otherwise has been identified.

This is the 14th human case of H5 reported in the United States during 2024 and the first case of H5 without a known occupational exposure to sick or infected animals. H5 outbreaks in cattle have not been reported in Missouri, but outbreaks of H5 have been reported in commercial and backyard poultry flocks in 2024. H5N1 bird flu has been detected in wild birds in that state in the past.

ESPAÑOL

CDC Confirms First Severe Case of H5N1 Bird Flu in the United States

STATEMENT

For immediate release: December 18, 2024

CDC Media Relations
(404) 639-3286
https://www.cdc.gov/media/

December 18, 2024-- A patient has been hospitalized with a severe case of avian influenza A(H5N1) virus ("H5N1 bird flu") infection in Louisiana. This marks the first instance of severe illness linked to the virus in the United States. The case was confirmed by the Centers for Disease Control and Prevention (CDC) on Friday, December 13. Since April 2024, there have been a total of 61 reported human cases of H5 bird flu reported in the United States.

Partial viral genome data of the H5N1 avian influenza virus that infected the patient in Louisiana indicates that the virus belongs to the D1.1 genotype related to other D1.1 viruses recently detected in wild birds and poultry in the United States and in recent human cases in British Columbia, Canada, and Washington state. This H5N1 bird flu genotype is different than the B3.13 genotype detected in dairy cows, sporadic human cases in multiple states, and some poultry outbreaks in the United States. Additional genomic sequencing and efforts to isolate virus from clinical specimens from the patient in Louisiana are underway at CDC.

While an investigation into the source of the infection in Louisiana is ongoing, it has been determined that the patient had exposure to sick and dead birds in backyard flocks. This is the first case of H5N1 bird flu in the U.S. that has been linked to exposure to a backyard flock. A sporadic case of severe H5N1 bird flu illness in a person is not unexpected; avian influenza A(H5N1) virus infection has previously been associated with severe human illness in other countries during 2024 and prior years, including illness resulting in death. No person-to-person spread of H5 bird flu has been detected. This case does not change CDC's overall assessment of the immediate risk to the public's health from H5N1 bird flu, which remains low.

This case underscores that, in addition to affected commercial poultry and dairy operations, wild birds and backyard flocks also can be a source of exposure. People with work or recreational exposures to infected animals are at higher risk of infection and should follow CDC's recommended precautions when around animals that are infected or potentially infected with H5N1 avian influenza virus. This means that backyard flock owners, hunters

RELATED PAGES

Articles

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First H5 Bird Flu Death Reported in United States

CDC warns of a *Salmonella* outbreak linked to cucumbers

CDC warns of Listeria linked to ready-to-eat meat and poultry products

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CDC Newsroom

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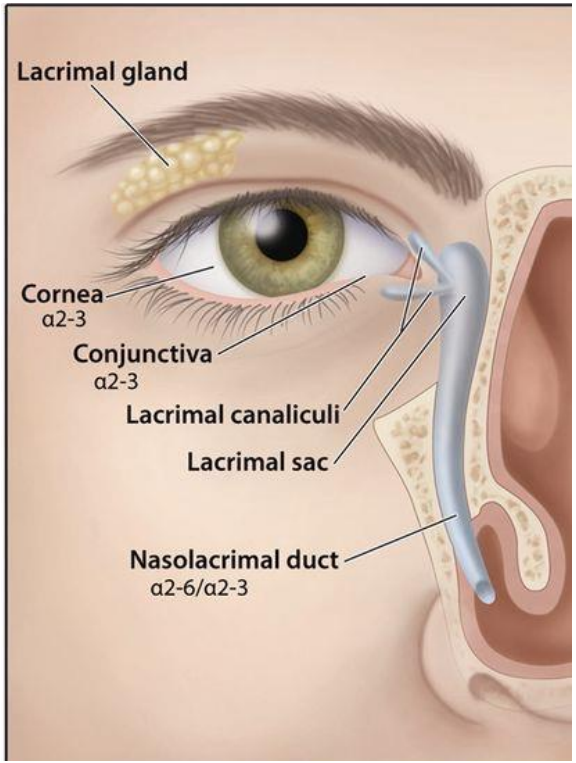
Signs and Symptoms of H5N1 in People

- Most human cases have been mild and in people who had known exposure to sick or infected animals.
- Severity of illness has ranged from mild to severe, including death.
- Reported signs and symptoms of bird flu in humans have varied. Conjunctivitis has been the predominant symptom among recent U.S. cases. Respiratory symptoms and fever were also reported.
- Possibility of human infections that result in severe illness remains and underscores the importance of ongoing prevention and surveillance efforts.

https://www.cdc.gov/bird-flu/signs-symptoms/index.html

Multiple influenza subtypes have been documented to infect ocular surfaces



- Over 80% of documented human infections from H7 subtype (HPAI and LPAI) have been associated with ocular symptoms
- not typically reported with seasonal influenza infections

Belser, J.A., Rota, P.A., and Tumpey, T.M. (2013). Microbiol. Mol. Biol. Rev.

Belser, J.A., et al. (2018). Lancet Infect. Dis.

Creager, H.M., et al. (2018). J. Virol.

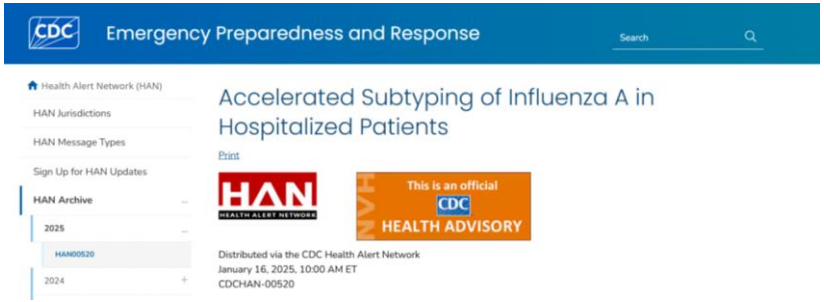
Testing Guidance for Suspected Human Cases

- Testing is recommended for individuals with:
  - Severe acute respiratory infection and recent exposure to potentially infected birds.
  - Occupational risk (e.g., poultry workers) and compatible symptoms.

- Testing should include respiratory specimens for RT-PCR.

- CDC recommends accelerated subtyping of influenza A in hospitalized patients to promptly identify potential H5N1 cases.

https://www.cdc.gov/bird-flu/php/severe-potential/index.html



- Test for seasonal influenza A in hospitalized patients with suspected seasonal influenza or novel influenza A virus infection such as avian influenza A virus infection, using whatever diagnostic test is most readily available for initial diagnosis.
  - If the initial diagnostic test does not subtype [e.g., identify A(H1) and A(H3)], order an influenza A subtyping diagnostic test within 24 hours of hospital admission for patients who tested positive for influenza A.
  - Subtyping should be performed with assays available to the testing laboratory, as follows:
    - Subtyping tests should be performed in the hospital clinical laboratory, if available.
    - Alternatively, specimens should be sent to a commercial clinical laboratory.
    - If influenza A virus subtyping is not available through one of these routes, arrangements can made for influenza A virus-positive specimens to be subtyped at a public health laboratory.

Questions about appropriate clinical management or testing of hospitalized patients can be directed to the CDC Influenza Division for consultation with a medical officer via the CDC Emergency Operations Center at 770-488-7100.

Antiviral Treatment & Prophylaxis

Treatment:

- Prompt initiation of antivirals (e.g., oseltamivir) is critical for confirmed or suspected cases.
- Severe cases may benefit from higher doses or extended treatment duration.

CDC antiviral treatment guidance: https://www.cdc.gov/bird-flu/hcp/novel-av-treatment-guidance/index.html

Post-Exposure Prophylaxis:

- Recommended for individuals exposed to infected birds or confirmed cases.
- Dosage and duration depend on exposure type and individual risk factors.

CDC post-exposure prophylaxis guidance (after exposure to birds/animals): https://www.cdc.gov/bird-flu/hcp/guidance-exposed-persons/index.html

CDC follow-up of close contacts of cases and antiviral post-exposure prophylaxis guidance: https://www.cdc.gov/bird-flu/php/novel-av-chemoprophylaxis-guidance/index.html

Follow-Up of Close Contacts

- Monitor close contacts of confirmed cases for symptoms during the 10-day post-exposure period.
- Provide antiviral prophylaxis if indicated.

CDC guidance on follow-up of close contacts of cases and antiviral post-exposure prophylaxis: https://www.cdc.gov/bird-flu/php/novel-av-chemoprophylaxis-guidance/index.html

Key Prevention Strategies

- Avoid direct contact with sick or dead birds.
- Report unusual bird deaths to local health or agricultural authorities.
- Educate the public and at-risk populations about minimizing exposure risks—including consuming uncooked poultry, eggs and beef and unpasteurized milk

https://www.cdc.gov/bird-flu/prevention/hpai-interim-recommendations.html

For infection prevention and control guidance, see: https://www.cdc.gov/bird-flu/hcp/novel-flu-infection-control/index.html

Countermeasures

- Many of the approved influenza virus therapeutics (neuraminidase inhibitors, ion channel inhibitors and endonuclease inhibitors) work well against H5N1
- H5N1 vaccines have been developed and candidate vaccine viruses (CVVs) for current clade 2.3.4.4b viruses are available
- H5 vaccines are often only weakly immunogenic and need good adjuvants and at least a two-dose regimen
- Heterologous prime-boost regimens (LAIV followed by inactivated vaccines) work well to induce neutralizing antibodies too
- mRNA vaccines against avian influenza viruses (H7, H10) have so far also only been weakly immunogenic despite outstanding performances in animal models
- USDA is now starting to test H5N1 vaccines in dairy cattle

H5N1: Current Situation

- H5N1 is widespread in wild birds worldwide and is causing outbreaks in poultry and U.S. dairy cows with several recent human cases in U.S. dairy and poultry workers.

- While the current public health risk is low, CDC is watching the situation carefully and working with states to monitor people with animal exposures.

https://www.cdc.gov/bird-flu/situation-summary/index.html

Acknowledgements

- Florian Krammer, PhD
- Seema Lekdawala, PhD

Thank you

IDSA Infectious Diseases Society of America

Perspectives from the Field

California Perspective

• Julie Vaishampayan, MD, MPH, FIDSA - California Department of Public Health Office of Infectious Disease Preparedness & Response

Louisianna Perspective

• Julio E. Figueroa, MD - Louisianna State University, Health Sciences Center

Farmworker Health Perspective

• Bethany Boggess Alcauter, PhD, MPH - National Center for Farmworker Health

CDPH
California Department of Public Health

H5N1 in California

January 23, 2025

Dr. Julie Vaishampayan, MD, MPH, FIDSA

Office of Infectious Disease Preparedness and Response,
Center for Infectious Diseases
California Department of Public Health

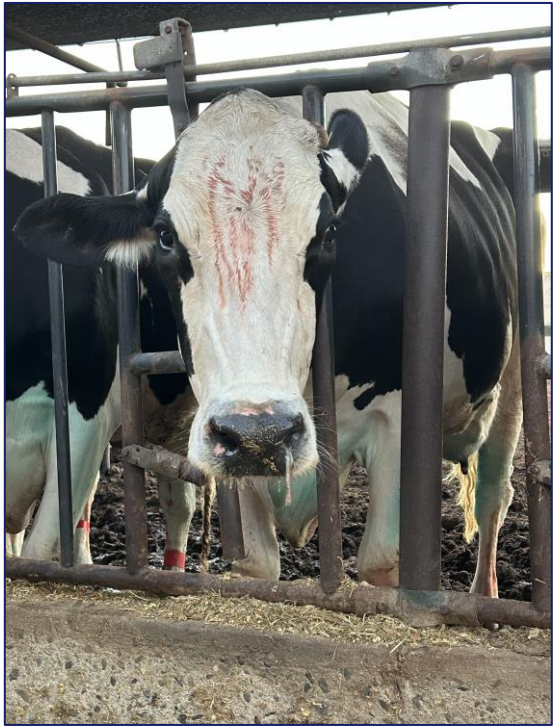
Disclosures

- Nothing to disclose

CDPH

H5N1 Detections in CA Dairy Cows and Poultry

- Over 1000 dairy farms in California with >1.7M cows
- H5N1 has been confirmed in dairy cows in 712 dairies in 11 California counties;
  - 143 dairies have been released from quarantine
- 58 infected commercial poultry flocks, and 10 infected backyard flocks have been identified in California since September 2024

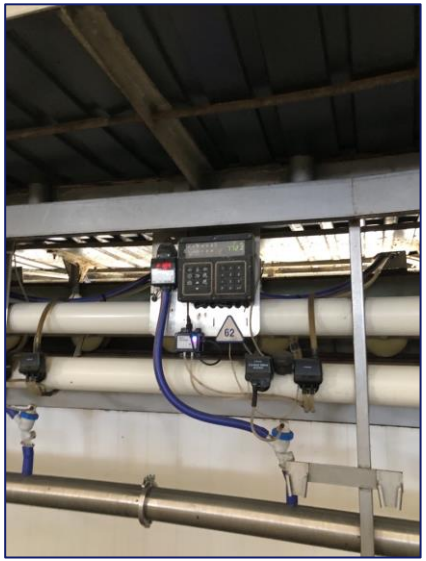


CDPH

Managing Affected Herds (CA Department of Food and Agriculture)

All affected dairies are quarantined with enhanced biosecurity practices, movement restrictions, surveillance testing implemented

- Symptomatic cows are tested and affected herds are monitored clinically
- After ill cows have recovered, herds are tested weekly
  - After 3 consecutive negative tests, herds are released from quarantine
- When infected cows are identified, all dairies and poultry flocks within a 10 km radius of the affected farm are tested weekly
- Testing of barn cats and peri-domestic wildlife is also occurring
- Support for financial impacts on producers is provided



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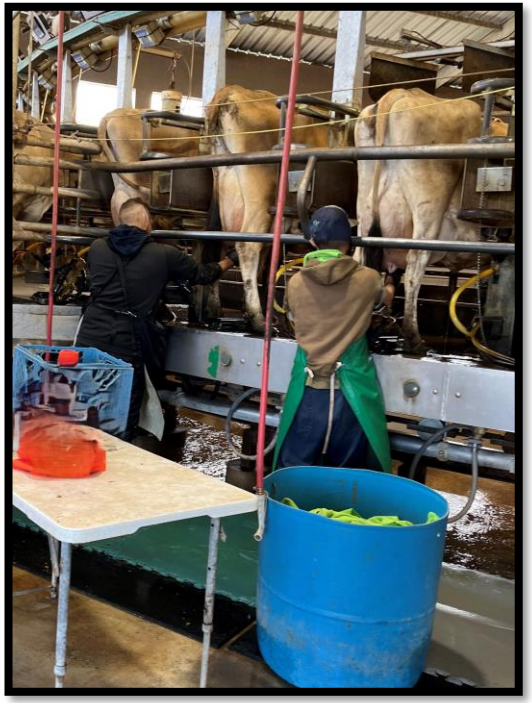
Dairy Farm



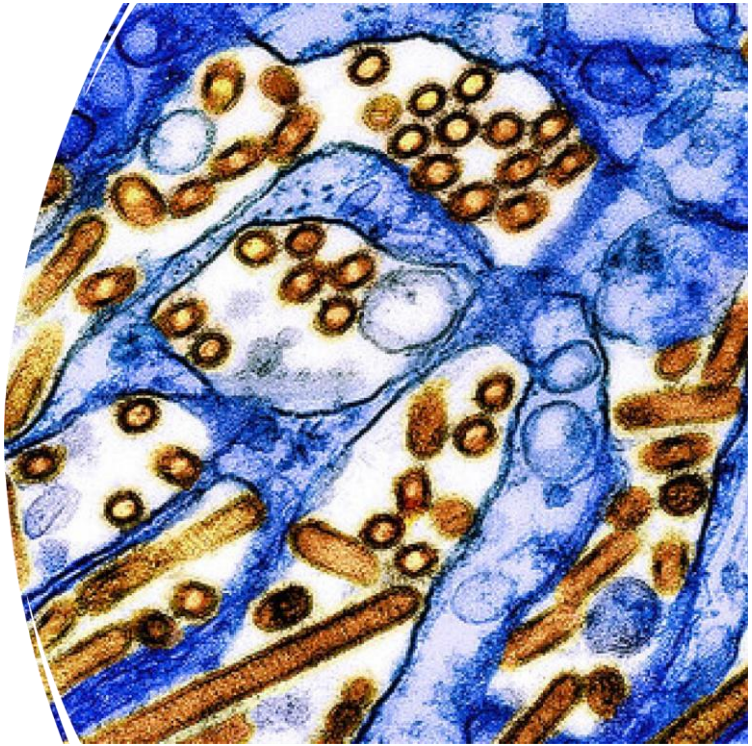
CDPH

H5N1 Infections in California Dairy Workers

- 37 (36 confirmed cases and 1 probable case) in dairy workers at 29 dairies
- All have been male; age range = 19-62 years
- Of the 28 cases with job information; 23 (82%) were milkers and 3 (11%) took care of sick cows
  - Presumed exposure in milkers continues to be raw milk in eyes by splashes/sprays or by touching eyes with contaminated hands
- All have been mildly ill with conjunctivitis; 11 (30%) reported fever, 13 (35%) reported muscle aches and some had other mild symptoms
- Test results
  - 36/37 (97%) had positive conjunctival swabs (the 1 case with a negative conjunctival swab had a positive nasal swab)
  - 8/29 (28%) had positive nasal/OP swabs
  - 4/36 (11%) had positive NP swabs

Additional H5N1 Infections in California

- Two children, both exposure unknown
- Both dairy genotype B3.13
- Both identified through routine flu surveillance



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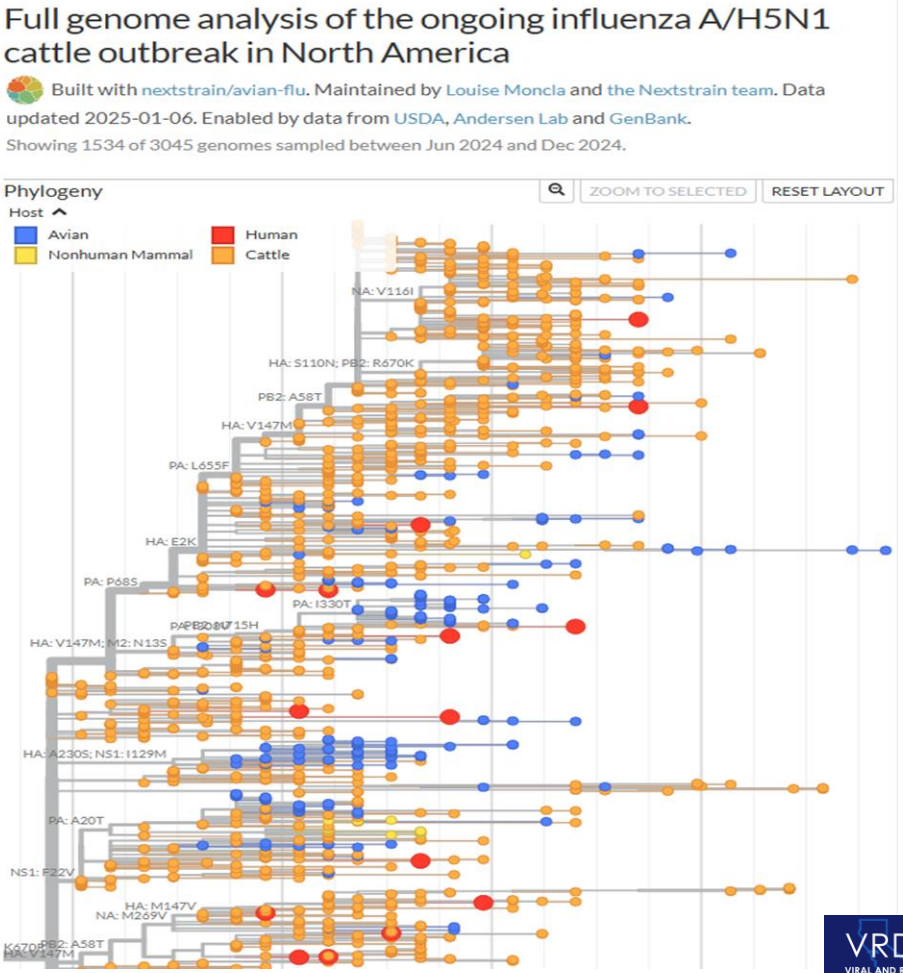
Influenza Surveillance

- Influenza positive results have been lab reportable since October 1, 2019
  - Negative results became lab reportable in 2023
- This flu season:
  - 123,145 flu A have been reported
  - 16,747 (13.6%) reports of influenza A subtype have been received
  - 2 cases of H5N1 have been detected through this system
- We are working to capture all data on subtyping and to encourage additional subtyping, including in hospitalized patients, but also in community.

Overview of CA Human Sequences

- **California Human Influenza A(H5N1) Sequences**
  - All B3.13 genotype
    - 16 whole genomes
    - 14 partial genomes
- **Phylogeny suggests independent cattle-to-human infections**
- **Only ONE case had concerning mutation**
  - PA-I38M (A/California/150/2024)
    - Associated with decreased susceptibility to baloxavir marboxil



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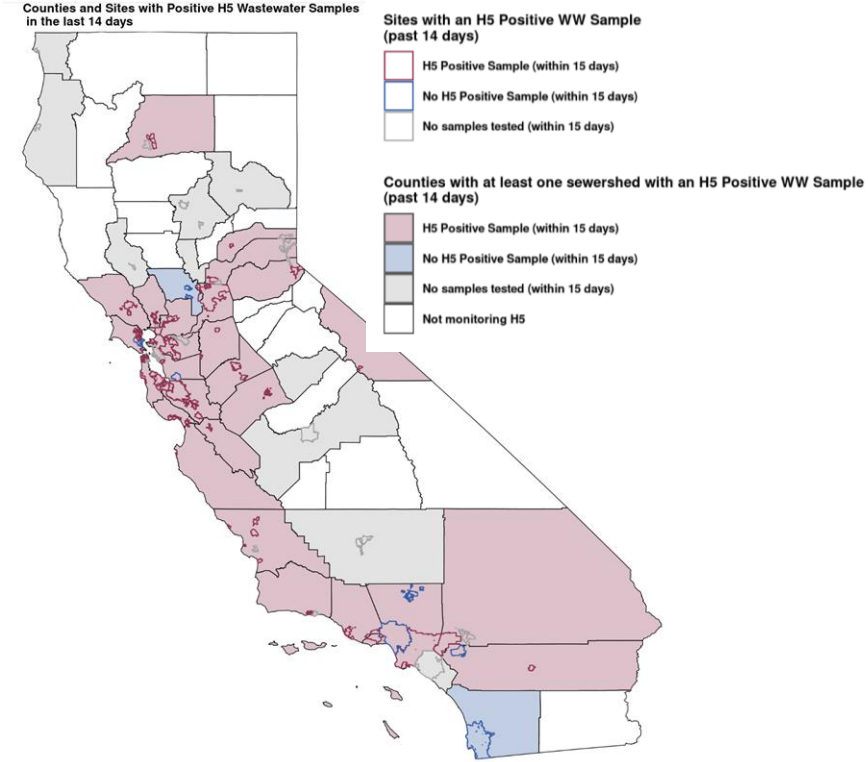
VRDL VIRAL AND RICKETTSIAL DISEASE LABORATORY

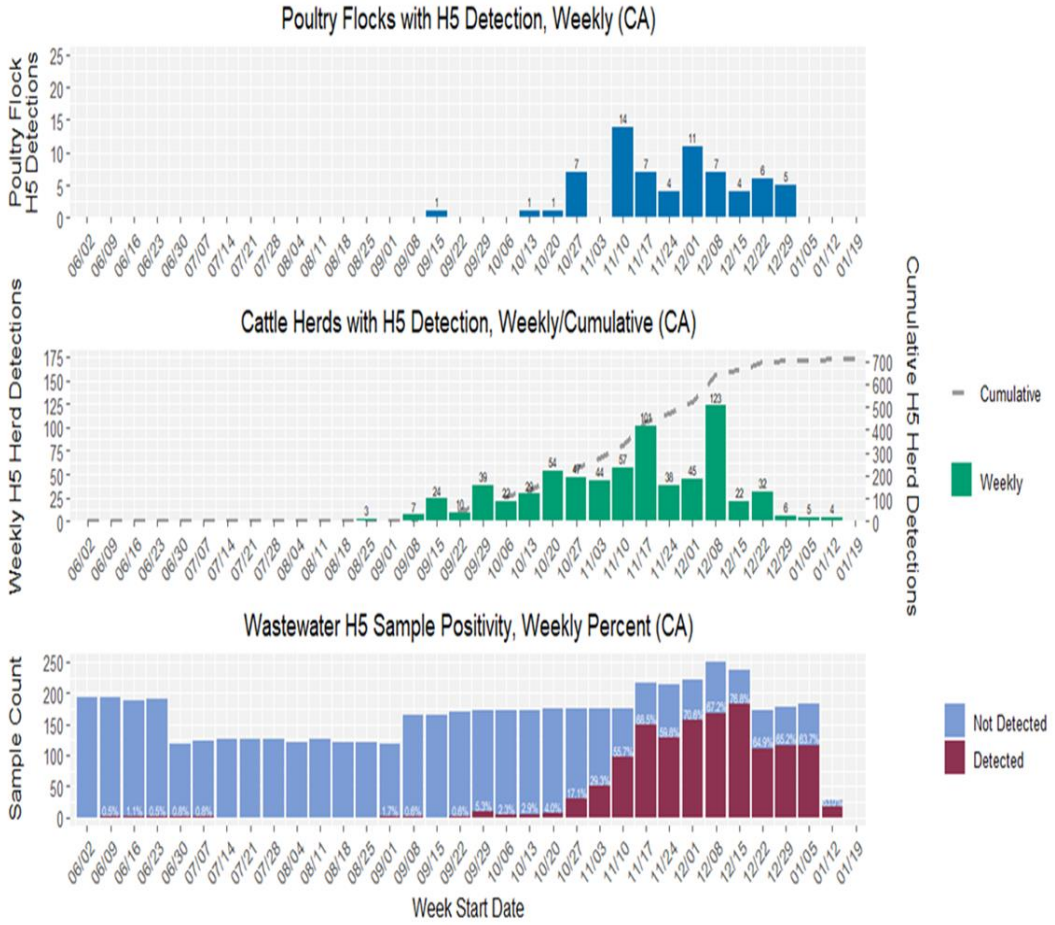
H5 Wastewater Surveillance



- H5 detections in wastewater are driven by dairy/milk products dumped/discharged into WW system
- 85% of all sites in CA with a positive detection in the past 3 weeks, similar since mid-November
- However, percent of samples that are positive is decreasing
- Especially true in the Central Valley and Southern California
- Support idea that Central Valley impacted herd situation is improving

CDPH

Wastewater Detections with Dairy and Poultry Detections



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H5N1 in Cats California, 2024

LA County

- Total of 9 positive cats

Santa Barbara County

2 positive cats

San Bernardino, Tulare, Fresno, and Riverside Counties

1 cat each

Northern CA

- Exotic/large cats in 2 zoo/sanctuaries
  - 1st Premise: 3 affected (2 tigers, 1 liger), two died. One confirmed with H5N1.
  - 2nd Premise: 3 affected (1 caracal, 2 servals), two died. One presumptive H5N1 positive.

CDPH

Outreach & Education

Bi-directional

- Farmworker organizations
  - University labor center
  - University agricultural health & safety center
  - Community-based organizations
  - National Center for Farmworker Health (NCFH)
  - United Farm Workers
- Healthcare
  - Healthcare Collaborative
  - Hospital Association
  - Occupational Health Provider
    - Providing resources for evaluation and management of workers exposed to H5N1
- Dairy associations
- Dairy owners and workers
- Public

CDPH

Challenge: Missing work for Testing and for Isolation

CDPH Modified Work Isolation Recommendations

- Suspect, probable and confirmed cases may work if they are well enough to work and if they and their coworkers:
  - Wear appropriate recommended PPE while working; and
  - Wash hands frequently with soap and water or if soap and water aren't available, a 60% alcohol-based hand sanitizer to clean hands; and
  - Wear well-fitting facemasks while together in breakrooms or other areas where PPE is typically not worn, including shared transportation to and from work

Challenge: Difficulty Contacting the Dairy for Monitoring

- Ensured all calls made from the local area code
- Each county provided up to three names of local health department staff who would contact the dairy
- Implemented a text message system
  - Have monitored more than 6,500 workers

CDPH

One Health Response to H5N1 in California

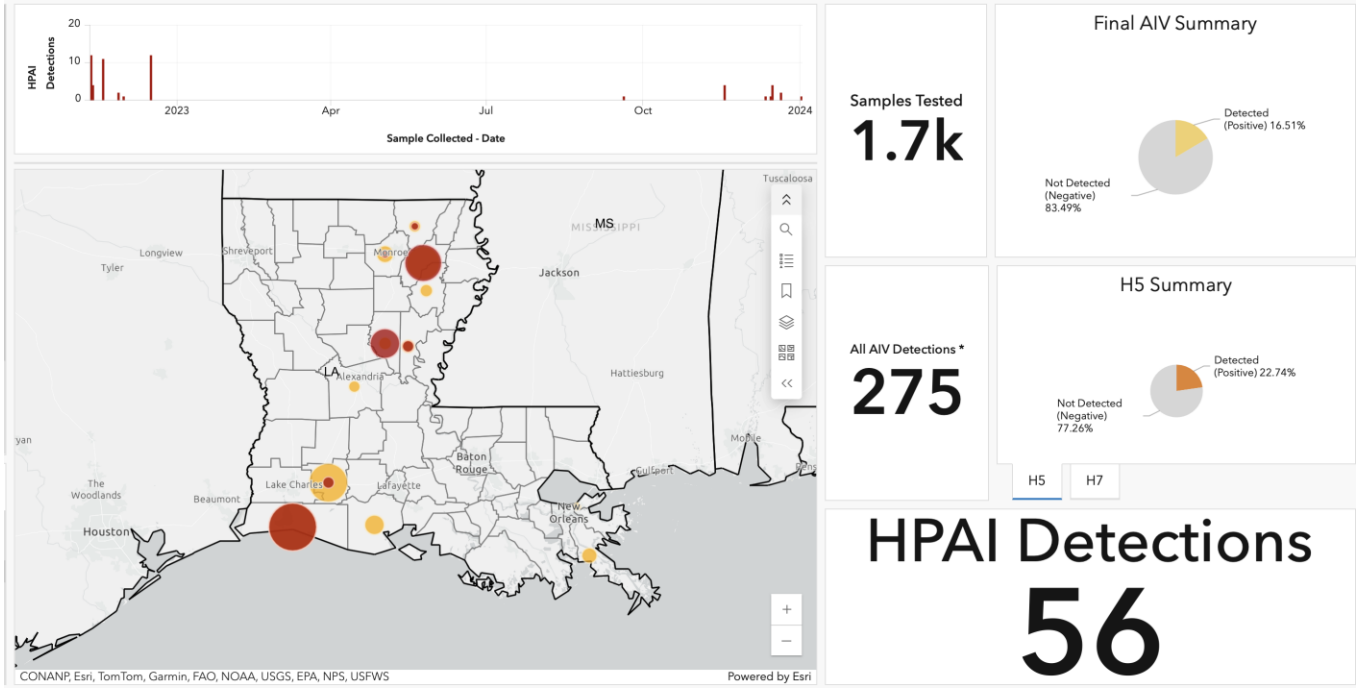
IDSA Clinician Call

H5 influenza in LA

Julio E. Figueroa, MD
Professor of Medicine
Chief of Infectious Diseases
Louisianna State University, Health Sciences Center

Background

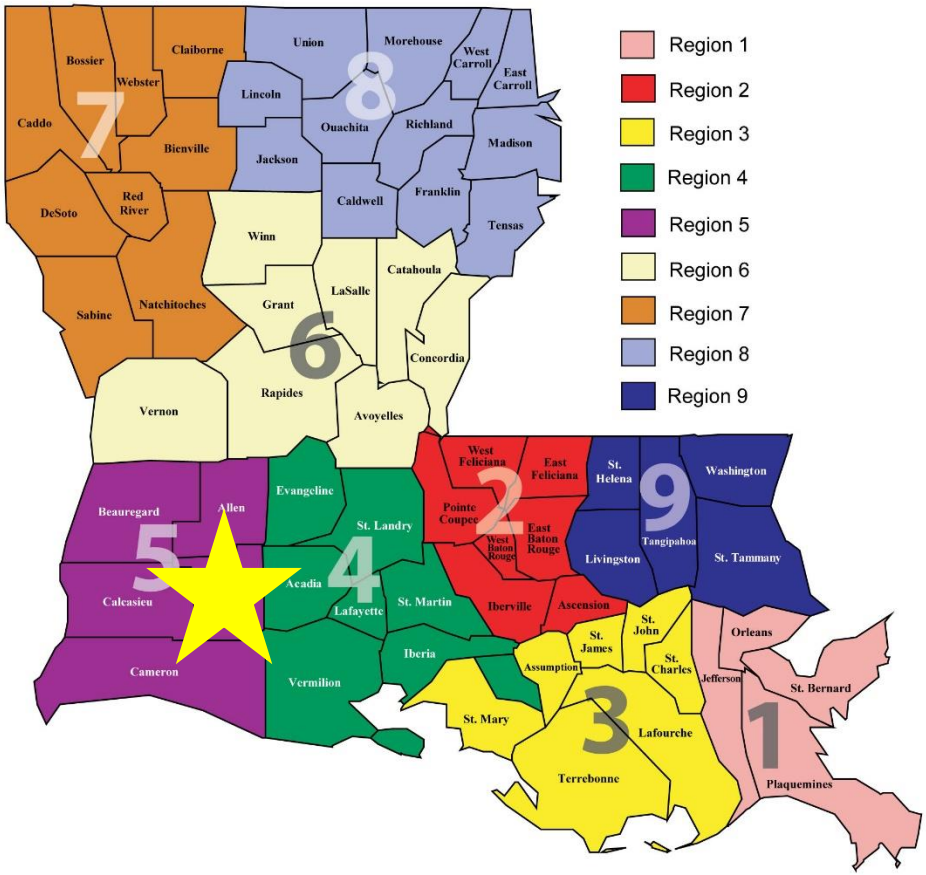
- 12-10-24 →LA Wildlife and Fisheries sent alert that H5 had returned in wild birds



https://www.aphis.usda.gov/livestock-poultry-disease/avian/avian-influenza/wild-bird-surveillance-dashboard

Background

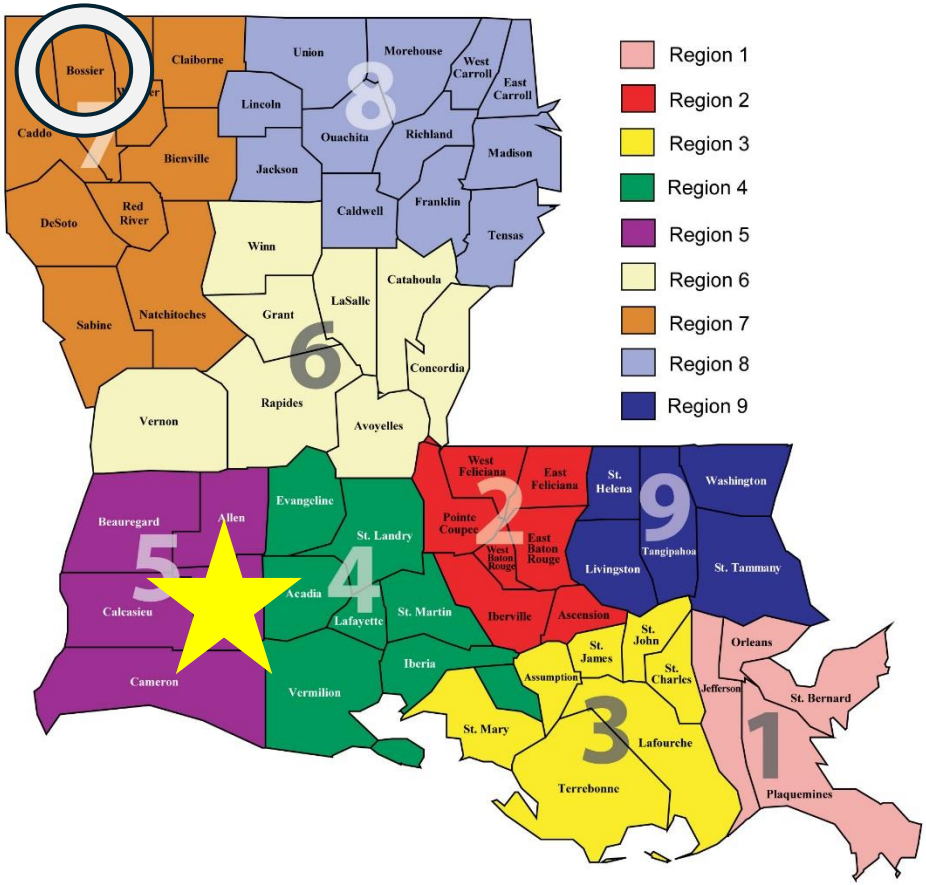
- 12-13-24 → CDC confirms first severe human case in US; LA resident living in SW LA



Background

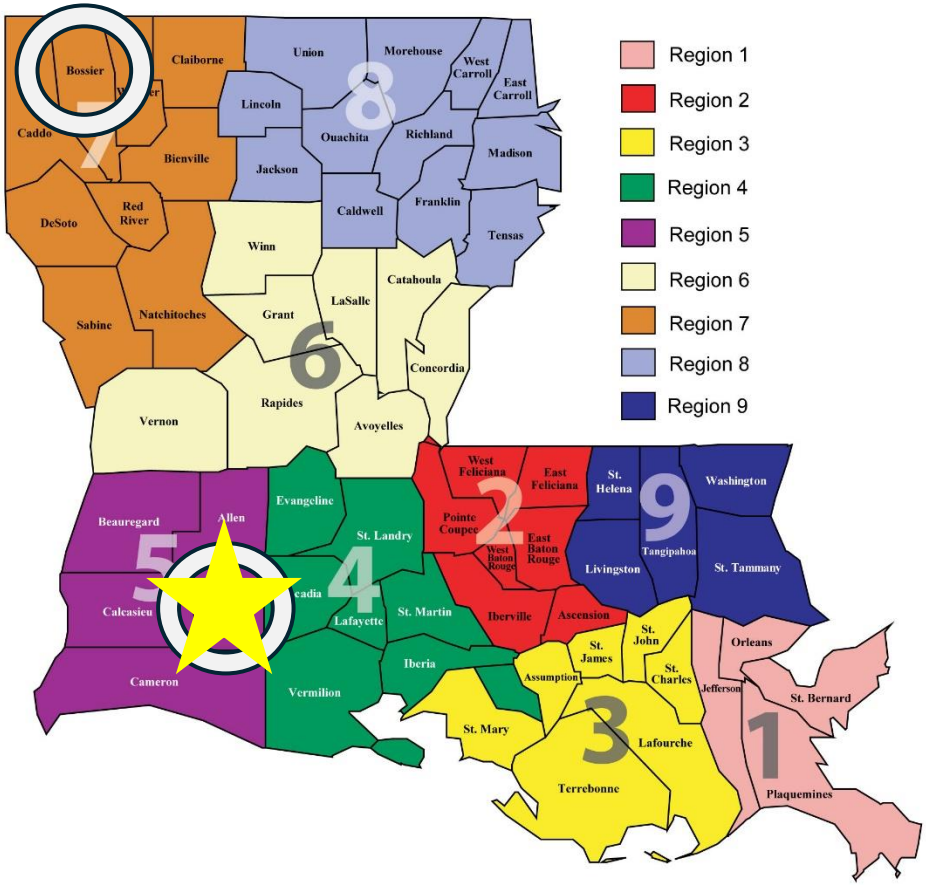
- 12-13-24 → CDC confirms first severe human case in US; LA resident living in SW LA

- 12-14-24 → Backyard flock positive for H5 in Bossier



Background

- 12-13-24 → CDC confirms first severe human case in US; LA resident living in SW LA
- 12-14-24 → Backyard flock positive for H5 in Bossier
- 12-18-24 → Backyard flock positive in Jefferson Davis



LA human case details

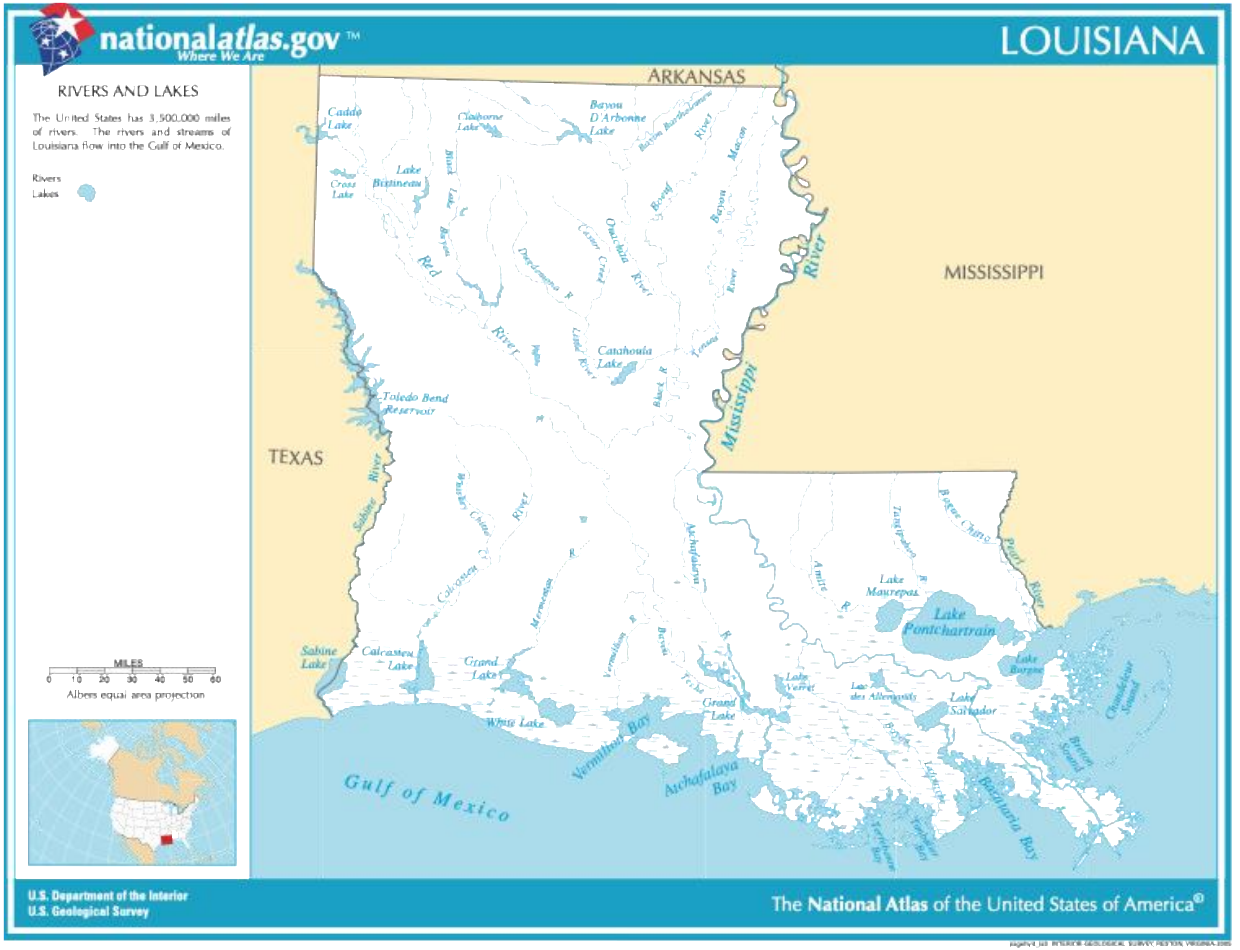
- Patient details
  - >65 years of age
  - Underlying medical conditions
  - Associated with a mixture of wild birds and backyard flock with ill birds noted
  - Pt demise announced 1-6-25
- No person-to-person transmission

- Viral details of human isolate
  - D1.1 genotype
  - Nearly identical to genotype found in birds found in backyard
  - Different than B3.13 strain in diary cows in CA

https://ldh.la.gov/news/H5N1-death
https://www.cdc.gov/media/releases/2024/m1218-h5n1-flu.html

https://www.cdc.gov/bird-flu/spotlights/h5n1-response-12232024.html

Louisiana factors



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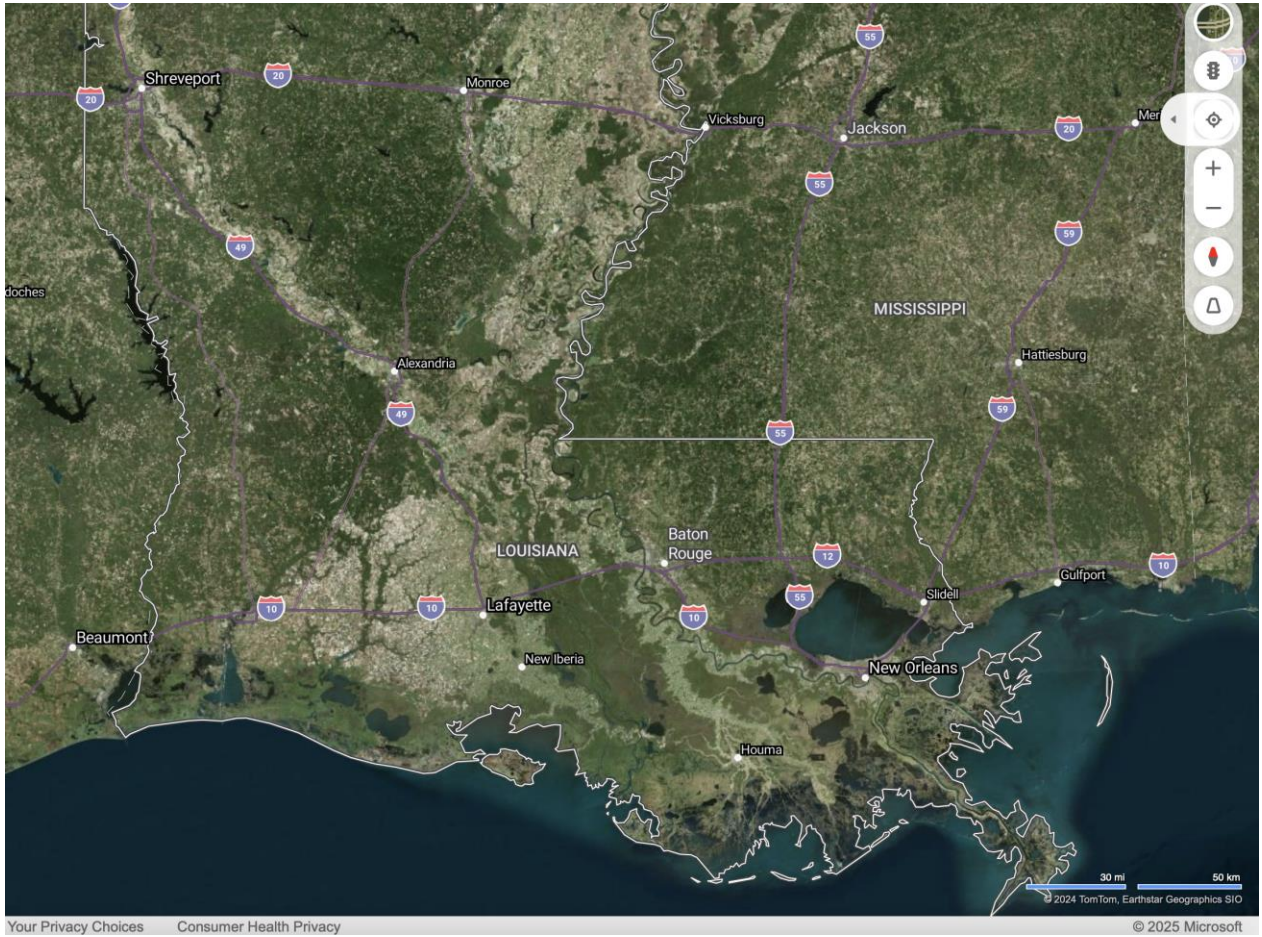

https://www.princeton.edu/~rpascal/la_wild_index.html

Louisiana factors

- Lots of wild birds
  - Especially marine birds that are susceptible
  - Hunting of ducks and geese

Backyard flocks in rural and urban settings

Challenges

- No H5 specific test readily available
  - Public health labs
  - LabCorp commercial test
- Abbott influenza assay does detect A strains including H5; unclear sensitivity
- Cepheid influenza assay does detect A strains including H5
- Neither assay differentiates H5 from other influenza A strains

Challenges

- No H5 specific test readily available
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- Multiplex PCR assays can detect influenza A types including H5 and subtype H1 and H3 influenza strains.
  - If not able to subtype, possible H5 or other subtype or low level of virus in sample
  - Expensive
    - Not paid for by LA Medicaid for outpatient testing
    - Other insurers may also deny payment

Challenges

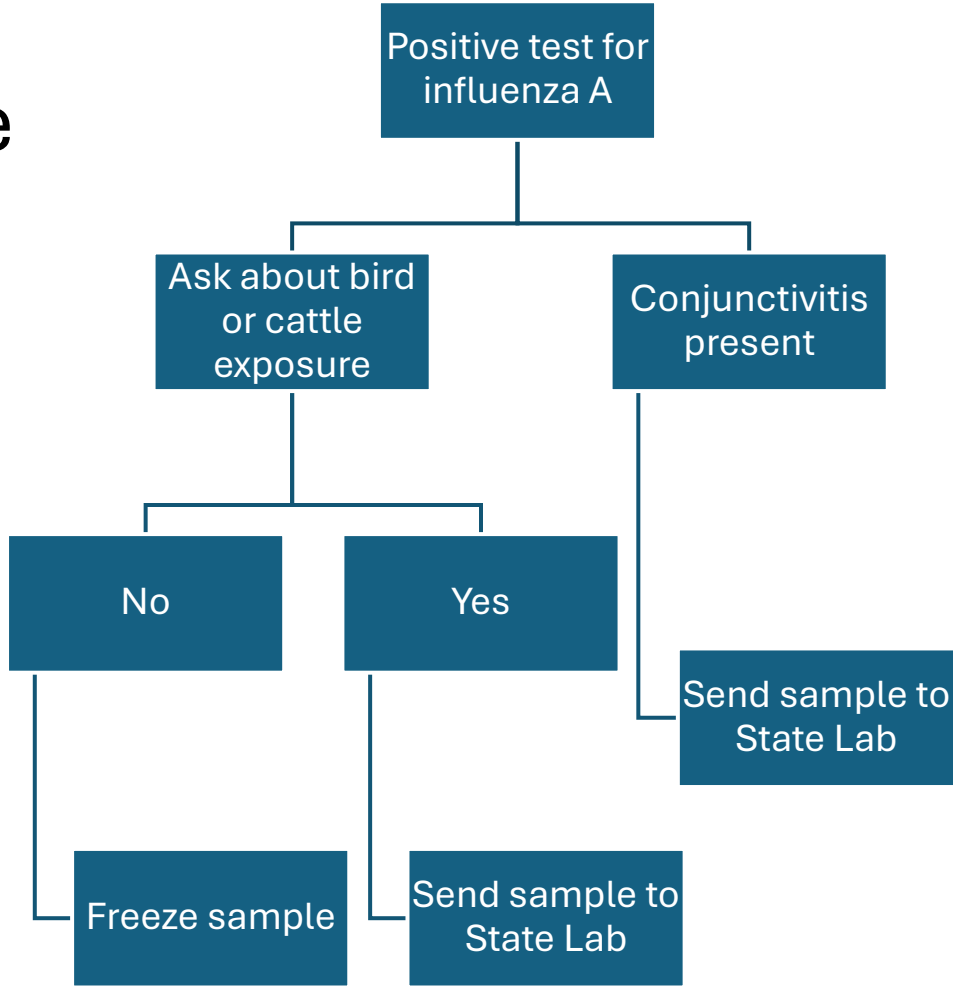
- Outpatient screening
  - Abbott assay used primarily at point of care
  - Better assays only available in central lab
  - Multiplex assay not paid for

Challenges

- Outpatient screening
  - Abbott assay used primarily at point of care
  - Better assays only available in central lab
  - Multiplex assay not paid for
- Inpatient screening
  - Multiplex assay available but expensive
  - Need to assure that IP and ID are informed of any possible cases

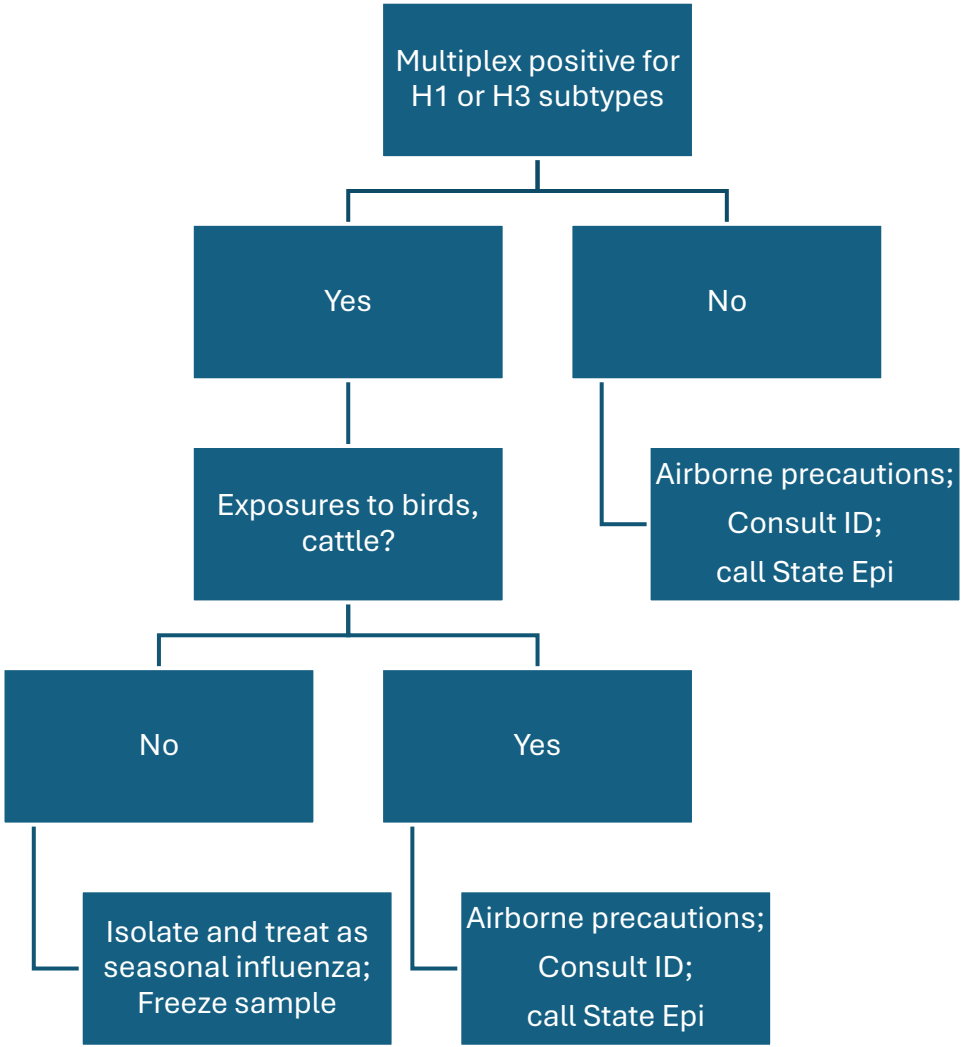
Outpatient surveillance

- Switching to more sensitive assay for Influenza A that detects H5
- Education to providers about H5 risk factors; if testing positive, ask about exposures
- Lab to freeze samples from molecular testing in case



Inpatient surveillance

- All influenza A positive patients will have multiplex panel performed
- All non-subtypeable samples to be tested for H5



Lab testing surveillance

- Weekly report from Bio-Merieux re: multiplex PCR panel results
- Built in EHR to review testing daily
- Lab to call IP if nontypeable influenza A

	2024-11-02	2024-11-09	2024-11-16	2024-11-23	2024-11-30	2024-12-07	2024-12-14	2024-12-21	2024-12-28	2025-01-04	2025-01-11	2025-01-18	Subtotal
Total Runs	114	131	142	161	76	129	140	165	101	89	97	86	1431
Influenza A (no subtype)	0	0	0	0	0	0	2	0	0	1	0	0	3
Influenza A H1	0	0	0	0	0	0	0	0	0	0	0	0	0
Influenza A H1-2009	0	0	1	1	1	0	2	3	5	4	4	2	23
Influenza A H3	2	2	2	10	1	7	13	25	19	9	5	7	102
Influenza B	0	0	0	1	0	0	2	0	0	0	0	0	3

Conundrum

Conjunctivitis in chickens and humans

- In Garg et al., 93% of the 46 cases described had conjunctivitis
  - 33% had only conjunctivitis
    - 20% poultry exposure
    - 44% dairy cow exposure
  - Specimen positivity differ
    - 88% conjunctival source
    - 34% NP source
    - 41% NP+OP source
  - No admissions

USDA Plum Island Animal Disease Center

Garg S, et al. Highly Pathogenic Avian Influenza A(H5N1) Virus Infections in Humans. N Engl J Med. 2024 Dec 31. doi: 10.1056/NEJMoa2414610.

So what to do with patients with conjunctivitis and negative NP testing?

Current commercial platforms do NOT have conjunctival source as an approved specimen type

Ending 1-11-25

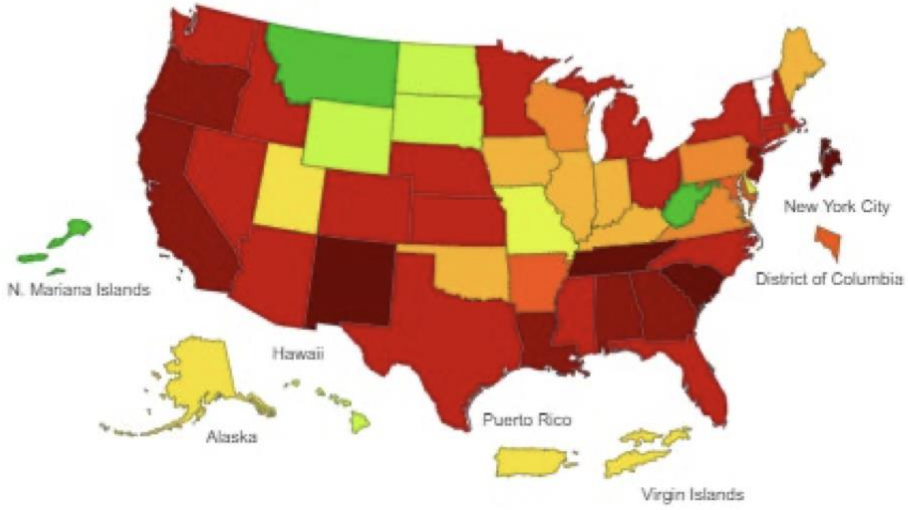
Viral Respiratory Disease Surveillance Program

Infectious Disease Epidemiology

LOUISIANA DEPARTMENT OF HEALTH

ILI Activity

Minimal			Low		Moderate		High			Very High		
1	2	3	4	5	6	7	8	9	10	11	12	13



Key Updates:

ILI: 7.1% (*above baseline*) ↓

Flu Percent Positivity: 12.9% ↓

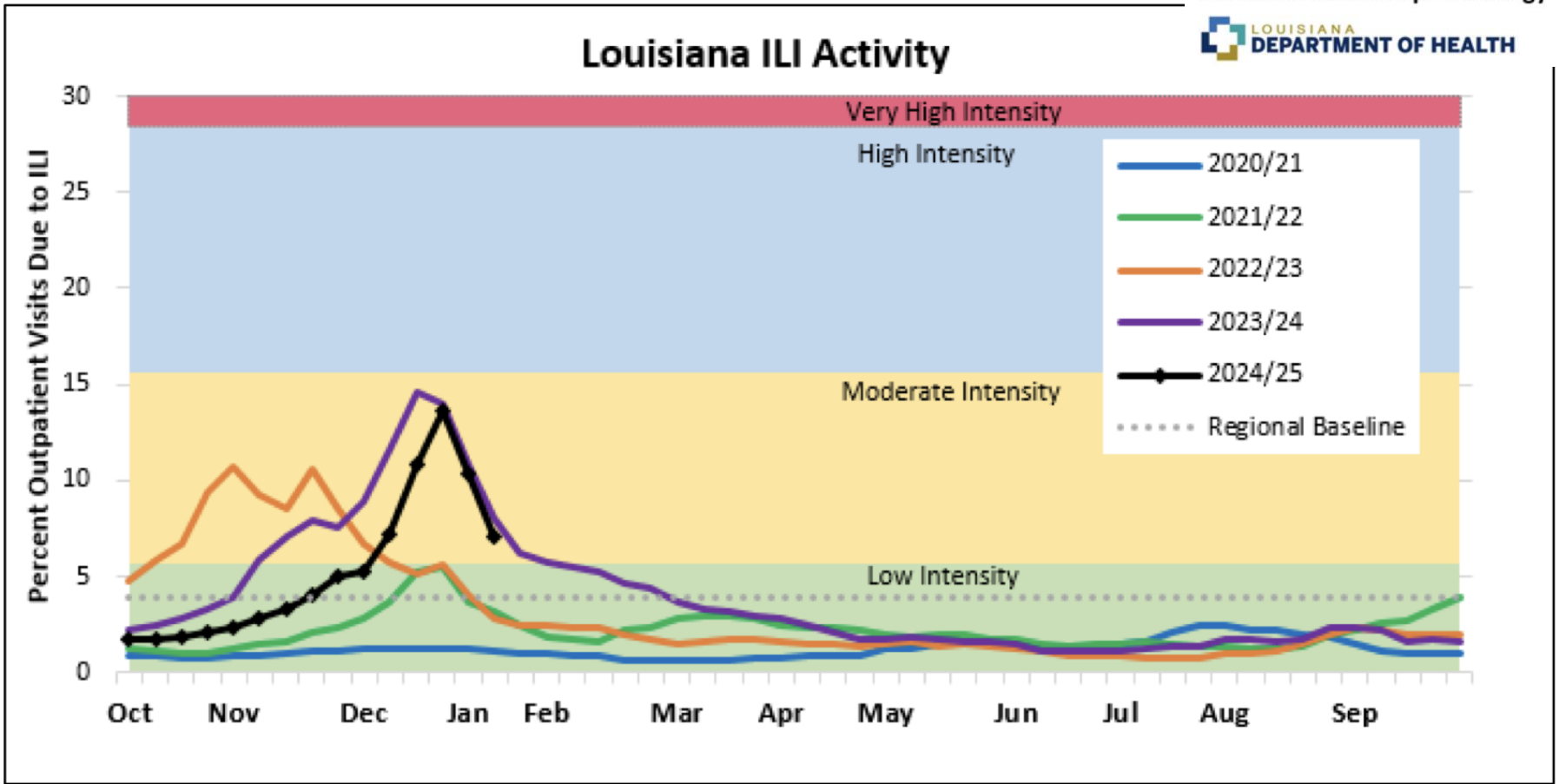
Flu-associated Mortality: ↑

Twenty-seven pediatric influenza-associated deaths have been reported in the U.S. this season; one of these occurred in Louisiana.

RSV Season: ON

Ending 1-11-25

Viral Respiratory Disease Surveillance Program
Infectious Disease Epidemiology
LOUISIANA DEPARTMENT OF HEALTH

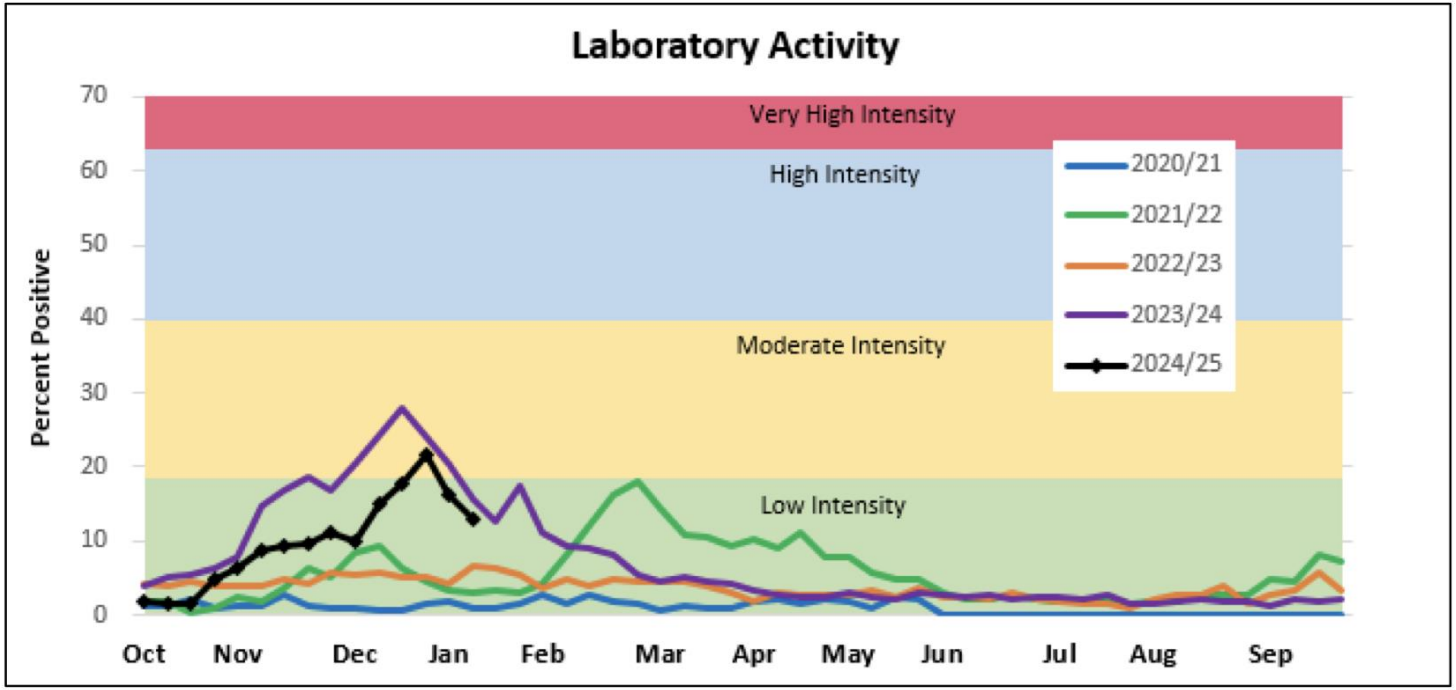


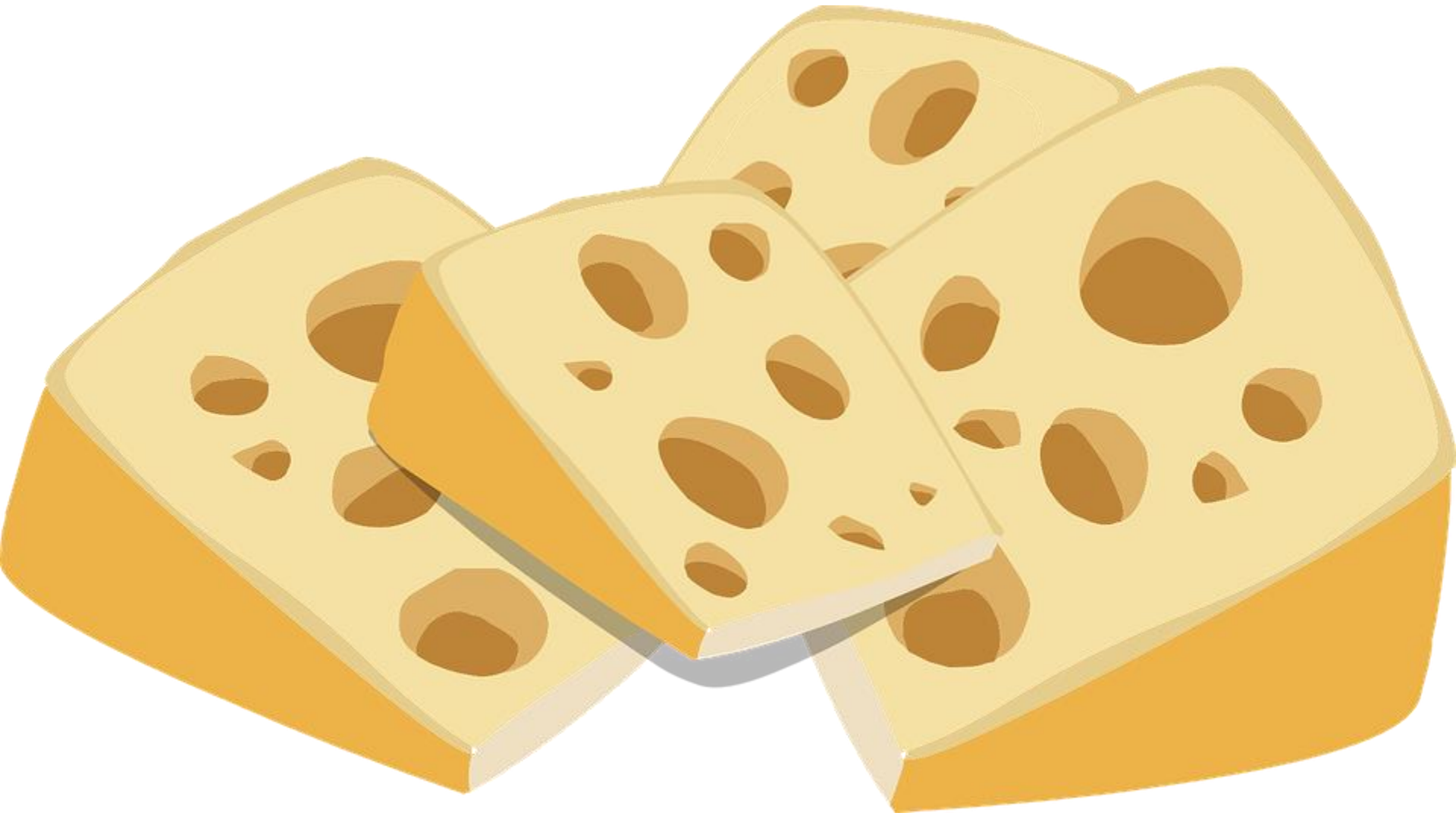
Ending 1-11-25

Viral Respiratory Disease Surveillance Program
Infectious Disease Epidemiology
LOUISIANA DEPARTMENT OF HEALTH

Virologic Surveillance:

	% influenza positive tests	Trend
Louisiana	12.9%	Decreasing
U.S.	18.8%	Increasing





NCFH
National Center for Farmworker Health, Inc.

1770 967 FM | Buda, TX
www.ncfh.org

H5N1 & Farmworkers

Bethany Boggess Alcauter, PhD
Director of Research & Public Health Programs
National Center for Farmworker Health

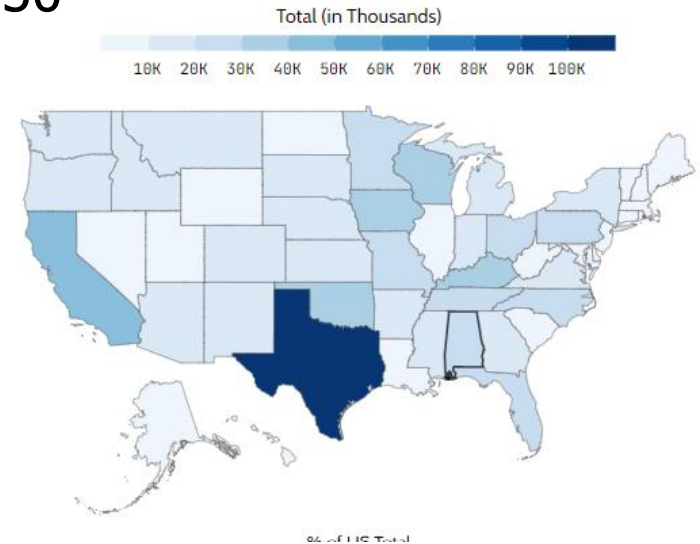
January 23, 2025

Animal production workers

- Cattle Ranching and Farming: NAICS 1121 (beef and dairy)
- Hog and Pig Farming: NAICS 1122
- Poultry and Egg Production: NAICS 1123
- Sheep and Goat Farming: NAICS 1124
- Animal Aquaculture: NAICS 1125
- Other Animal Production: NAICS 1129

National estimates

- 2017 Census of Agriculture: Estimated 813,636 animal production workers in the 50 U.S. states (conservative estimate)
- Top 5 states:
  - Texas: 104,000+
  - California: 40,000+
  - Wisconsin: 35,000+
  - Iowa: 34,000+
  - Oklahoma: 34,000+



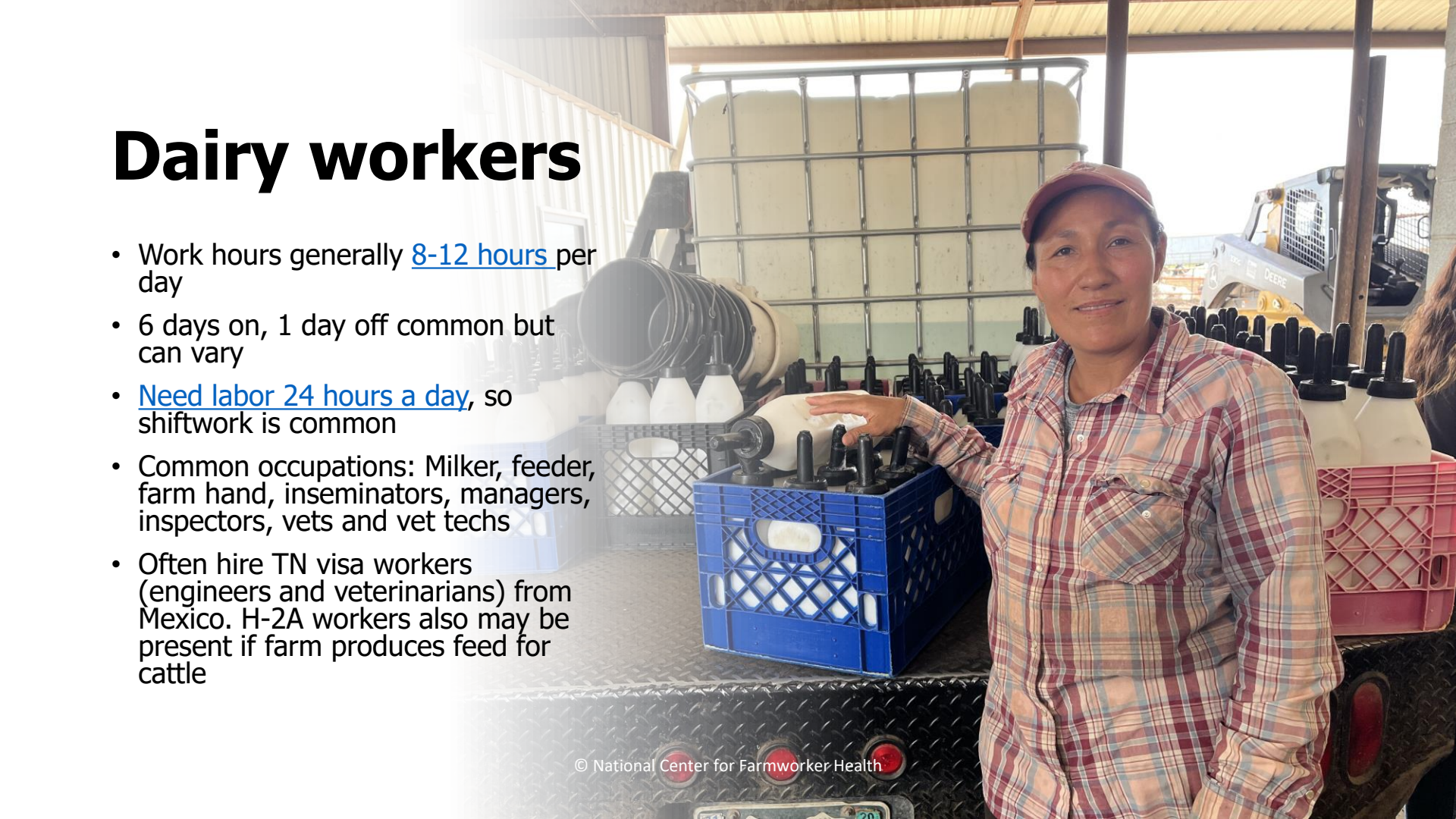
Source: NCFH Farm Labor Data Dashboard, using 2017 USDA Census of Agriculture data.

Labor

- Generally no right to overtime wages, although can get complex as to what is ag and what isn't in this industry
- OSHA has very limited jurisdiction on animal production farms due to a budget rider: 96% of meat, dairy and poultry farms are exempted from OSHA oversight
- Based on NCFH observations and data, and data from other organizations, much higher proportion of workers are from Mexican and Guatemalan Indigenous communities compared to crop agriculture

Dairy workers

- Work hours generally 8-12 hours per day
- 6 days on, 1 day off common but can vary
- Need labor 24 hours a day, so shiftwork is common
- Common occupations: Milker, feeder, farm hand, inseminators, managers, inspectors, vets and vet techs
- Often hire TN visa workers (engineers and veterinarians) from Mexico. H-2A workers also may be present if farm produces feed for cattle



Transporters

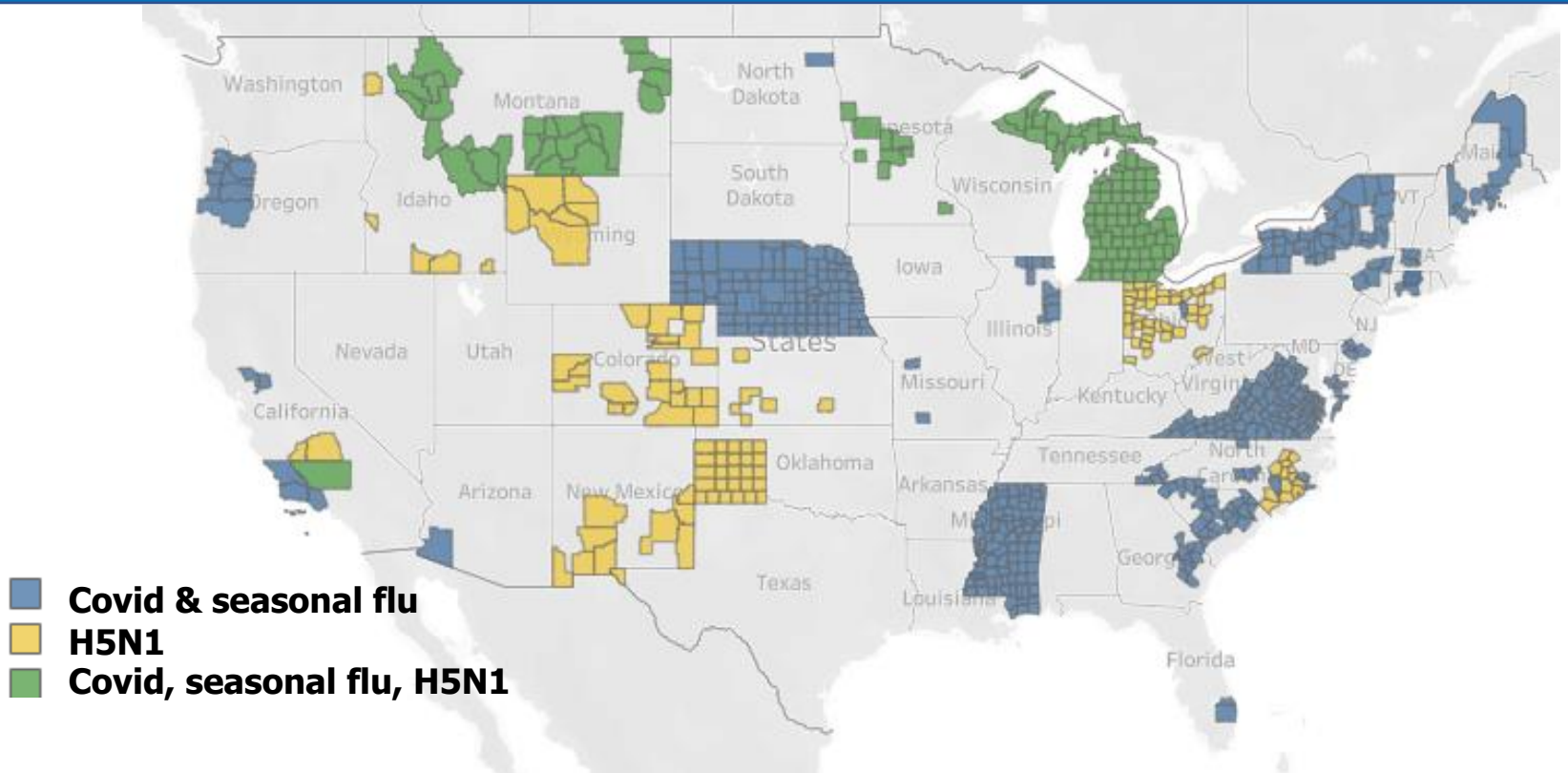
- Three key groups among transporters in this industry. All three groups are HIGHLY migratory and mobile and work 80-100+ hours per week:
- Sileage harvesters/transporters (South Africa, Ukraine, Mexico)
- Milk haulers (Cuba, PR, Mexico)
- Livestock haulers (Mostly U.S.-born)

Poultry workers

- Production is usually contracted (high pressure to produce)
- Irregular work schedules, often at night or very early in the morning
- Considered a "3D" job = dirty, demanding, dangerous
- Turnover very high: around 100% annually; more than 50% leave in first 90 days
- Common occupations: Poultry workers, chicken catchers/transporters, depopulators
- Visa workers less common; primarily undocumented workers

NCFH Farmworker Outreach Network

42 organizations contracted to do outreach on H5N1 influenza, seasonal influenza, and COVID-19. Service areas include 21% of all U.S. counties (n = 657)



NCFH Farmworker Outreach Network

- NCFH focuses on **building public health capacity for farmworker-serving organizations** at local and regional levels
- Capacity building efforts include trainings, assessments, distribution of actionable data & health education, and funds through contracts
- 42 organizations reached over 143,000 farmworkers Oct-Dec (usually slowest quarter)
  - H5N1 organizations reached over 15,000 workers & administration of 1,500 vaccine doses

Farmworkers & H5N1

- See NCFH summary of focus groups with 27 dairy workers from MI, TX, CO
  - Workers aware of virus and common symptoms
  - PPE usage rare, challenging to implement
  - Workers often must buy their own PPE
  - Lack of handwashing stations, clean water, and soap reported as a common frustration
  - Concerns about health and wellbeing of cattle

Immigration enforcement actions are complicating outreach efforts in CA

Thank you!
Alcauter@ncfh.org

Where Are We Headed?

Richard Webby, PhD
St. Jude Children's Research Hospital

Where Are We Headed? Virology of H5N1.

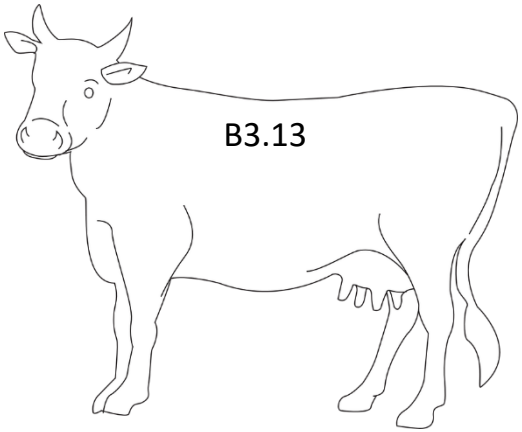
Richard Webby, PhD
St Jude Children's Research Hospital
Memphis, US

The good news, H5 viruses still have avian virus properties

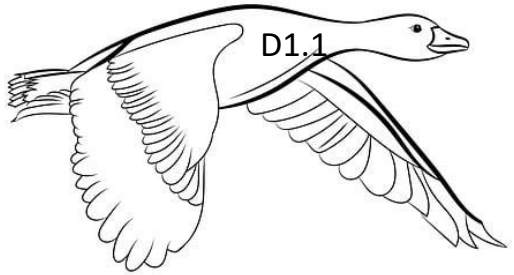
Property	Avian virus-like	Mammalian virus-like
Receptor binding	x	
pH of HA activation	x	
pH of HA inactivation	x	
General genomic characteristics	x	
Transmission in ferret models	x	(x)

- Antiviral and antigenic “resistance” signatures absent
- Single amino acid changes can switch some of these

Two current major viral fronts in North America



- No evidence of reassortment
- Remained remarkable stable genetically
- Evidence suggests they are not being driven towards mammalian adaptation



- Have a new NA
- Exploded through the MS flyway
- No smoking gun in terms of virulence markers
- Severe human cases all had minor populations with changes in receptor binding sites. But not present in bird D1.1 samples

We are giving the H5 viruses far too many opportunities

Acknowledgements

St. Jude Children's Research Hospital/ALSAC
Andy Bowman, The Ohio State
Jim Lowe, U Illinois

Becky Poulson, Dave Stallknecht, UGA
Mia Torchetti, USDA
Yohannes Berhane, National Centre for Foreign Animal Disease, Canada
Michael Walsh, Andrew Allison, Allison Murawski, U Florida
Many others

GISRS
GLOBAL INFLUENZA SURVEILLANCE & RESPONSE SYSTEM

CEIRR
CENTERS OF EXCELLENCE FOR INFLUENZA RESEARCH AND RESPONSE

Q&A/ Discussion

Selected Resources

Program Links:

- This webinar is being recorded and can be found with the slides online at https://www.idsociety.org/cliniciancalls

Carlos del Rio, MD

- https://scitechdaily.com/alarming-discovery-mutating-bird-flu-in-china-raises-pandemic-fears/
- https://people.scs.carleton.ca/~soma/biosec/readings/influenza/influenza-fig5.html
- https://en.wikipedia.org/wiki/Global_spread_of_H5N1
- https://doc.woah.org/dyn/portal/index.xhtml?page=alo&aloId=30872
- https://www.aphis.usda.gov/livestock-poultry-disease/avian/avian-influenza/hpai-detections
- https://www.aphis.usda.gov/livestock-poultry-disease/avian/avian-influenza/hpai-detections
- https://www.cdc.gov/bird-flu/situation-summary/index.html
- https://www.biorxiv.org/content/10.1101/2024.05.01.591751v1.full.pdf
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Julio E. Figueroa, MD

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THANK YOU

We want to hear from you!

Please complete the post-call survey.

A recording of this call, slides and the answered Q&A will be posted at
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-- library of all past calls available --

Contact Us:

Dana Wollins (dwollins@idsociety.org)
Deirdre Lewis (dlewis@idsociety.org)