Respiratory Illnesses in Arizona

2025 Arizona Immunization Conference

April 15th-16th, 2025

ARIZONA DEPARTMENT OF HEALTH SERVICES

Speaker Info

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Financial Disclosures

- Priscilla Lauro/ Joel Terriquez, faculty for this CE activity, has no relevant financial relationship(s) with ineligible companies to disclose.
- None of the planners for this activity have relevant financial relationships to disclose with ineligible companies.
- The Arizona Alliance for Community Health Centers is accredited by the Arizona Medical Association to provide medical education for physicians.
- The Arizona Alliance for Community Health Centers designated the 2025 Arizona Immunization Conference educational activity for a maximum of 11 hours AMA PRA Category 1 Credits Physicians should only claim credit commensurate with the extent of their participation in the activity.
- The Arizona Pharmacy Association is accredited by the Accreditation Council for Pharmacy Education (ACPE) as a provider of continuing pharmacy education.

Learning Objectives:

1. Learn the current Arizona respiratory trends and clinical decision making.
2. Learn about emerging infections in Arizona such as avian influenza.
3. Learn about returning infections in Arizona as we navigate the post-pandemic era.

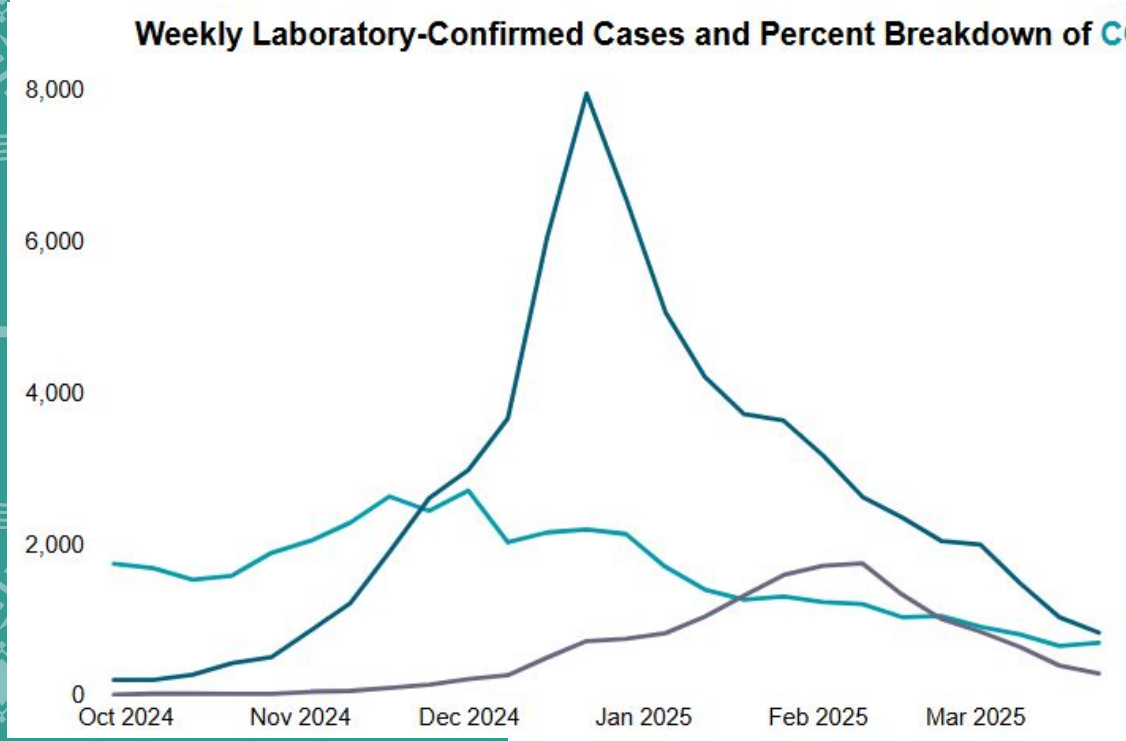
Learning Objectives:

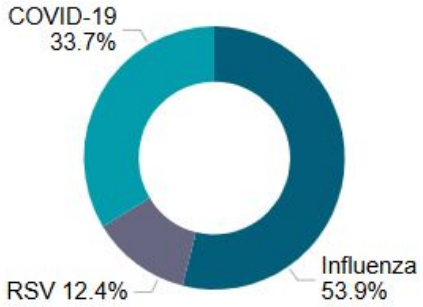
Learn the current Arizona respiratory trends and clinical decision making.

- Respiratory Illnesses to Examine:
  - Influenza
  - COVID-19
  - RSV

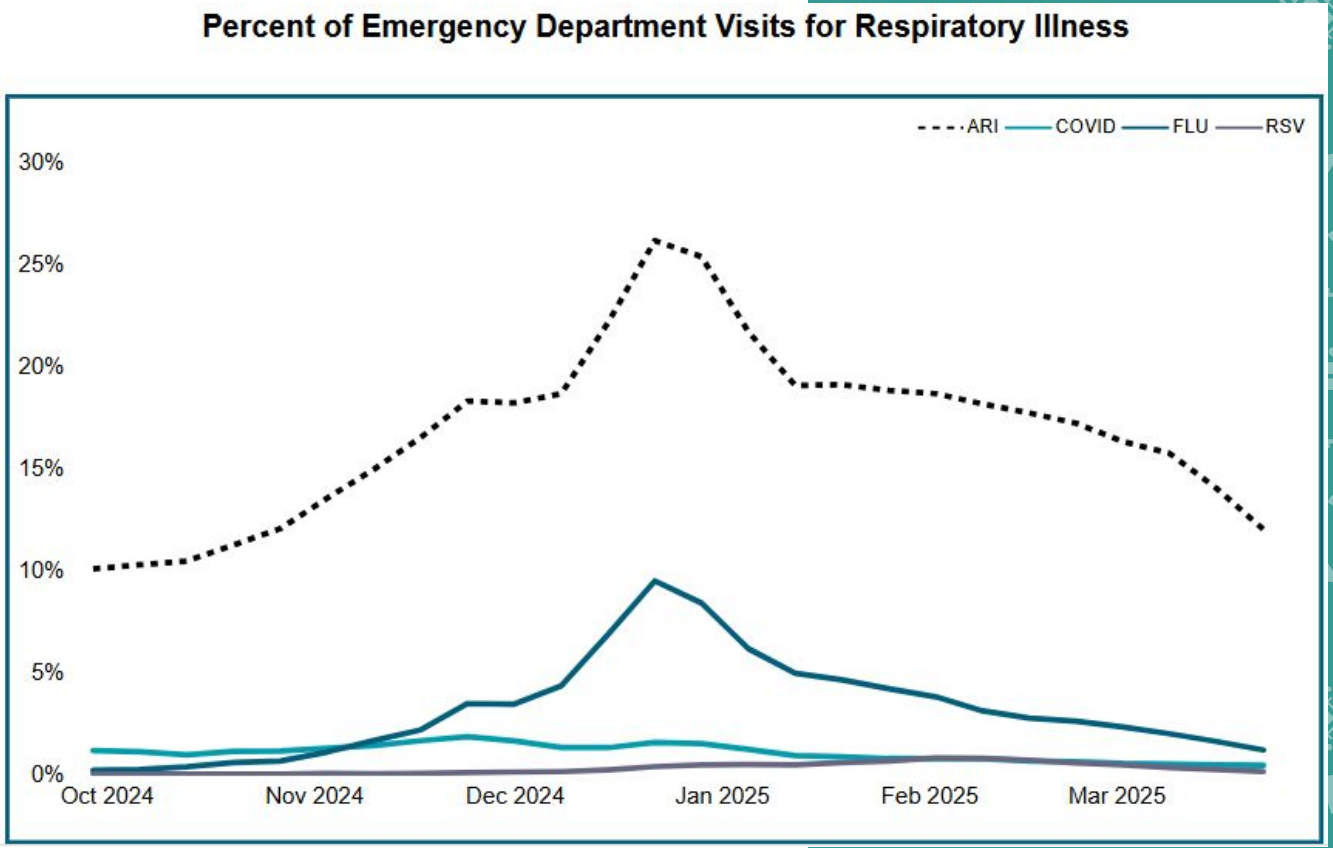
2024-2025 Respiratory Season

(9/29/2024-9/27/2025)



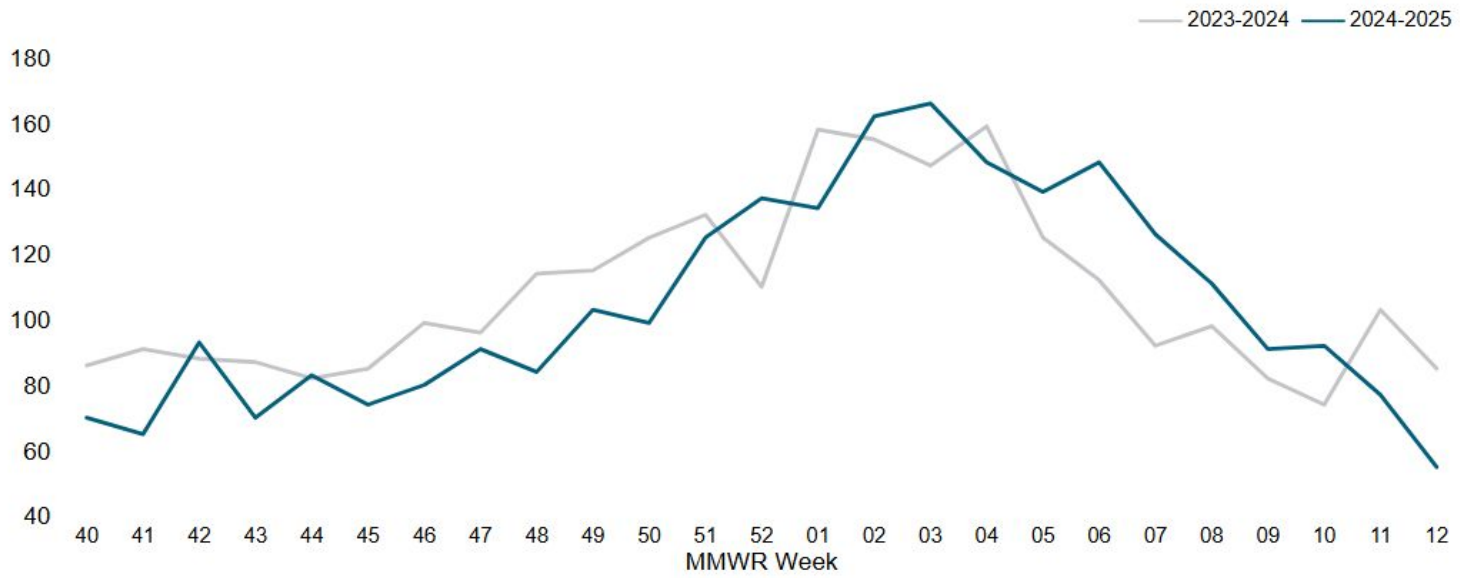


24-25 Respiratory Season



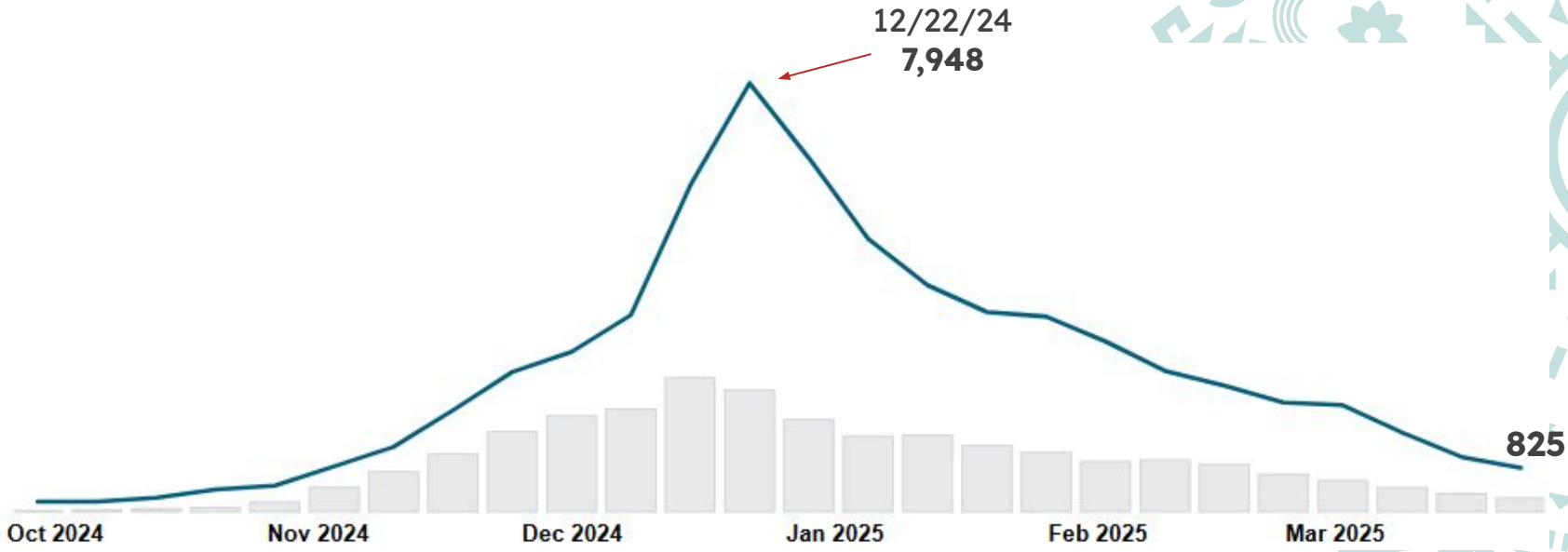
24-25 Respiratory Season

Respiratory Related Deaths in Arizona: 2024-2025 respiratory season weekly deaths due to pneumonia, influenza, RSV, or COVID-19 compared to the 2023-2024 season.



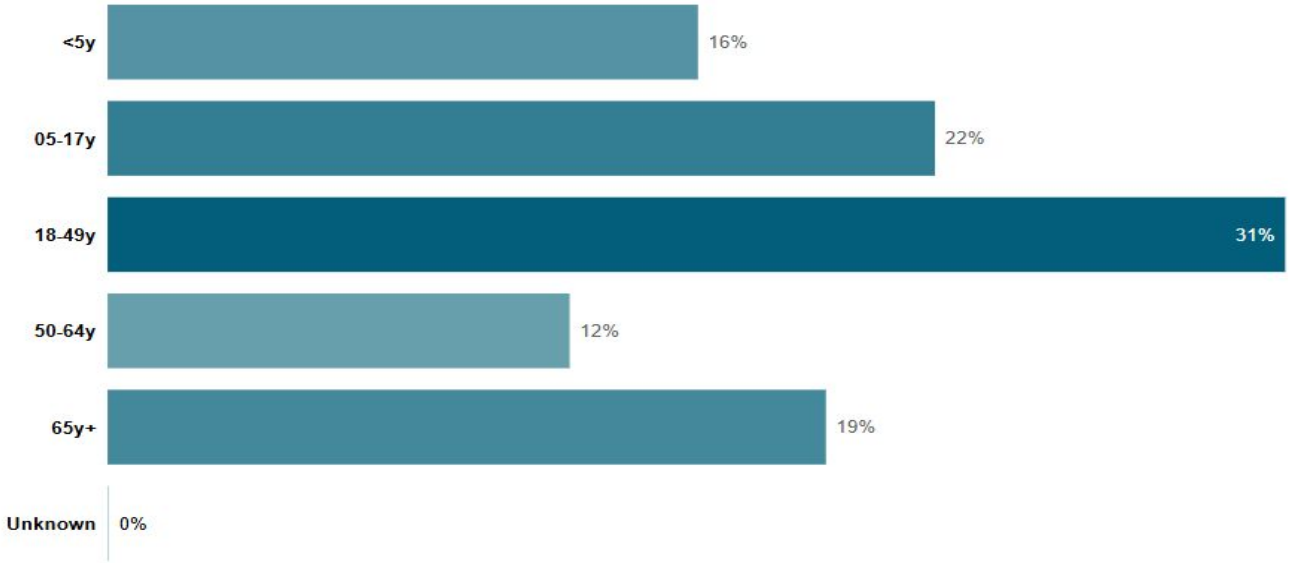
Influenza in Arizona

As of 3/23/25, there have been 67,470 cumulative cases of flu in Arizona.

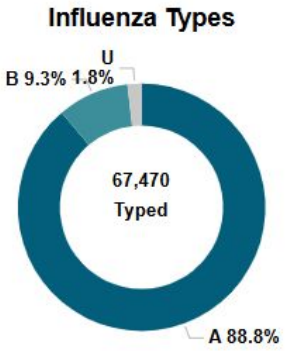


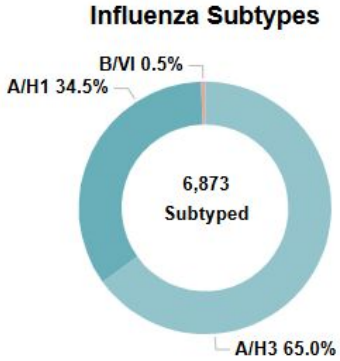
Influenza in Arizona

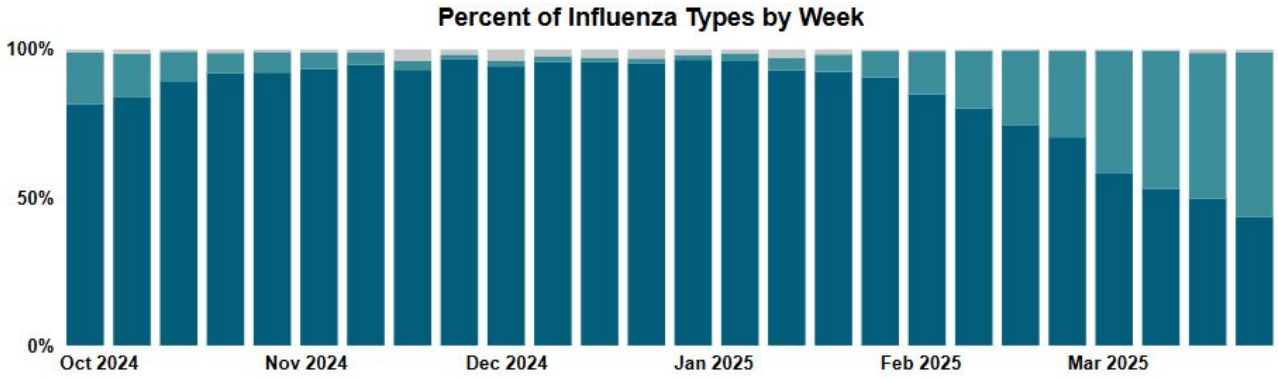
Adults 18-49 years of age are most affected this current season.



Influenza in Arizona







Influenza in Arizona

- Acute respiratory illness transmitted by droplets from coughing/sneezing
- Incubation Period: 1-4 days
- Peak contagious period 1 day before to 3 days after onset of symptoms

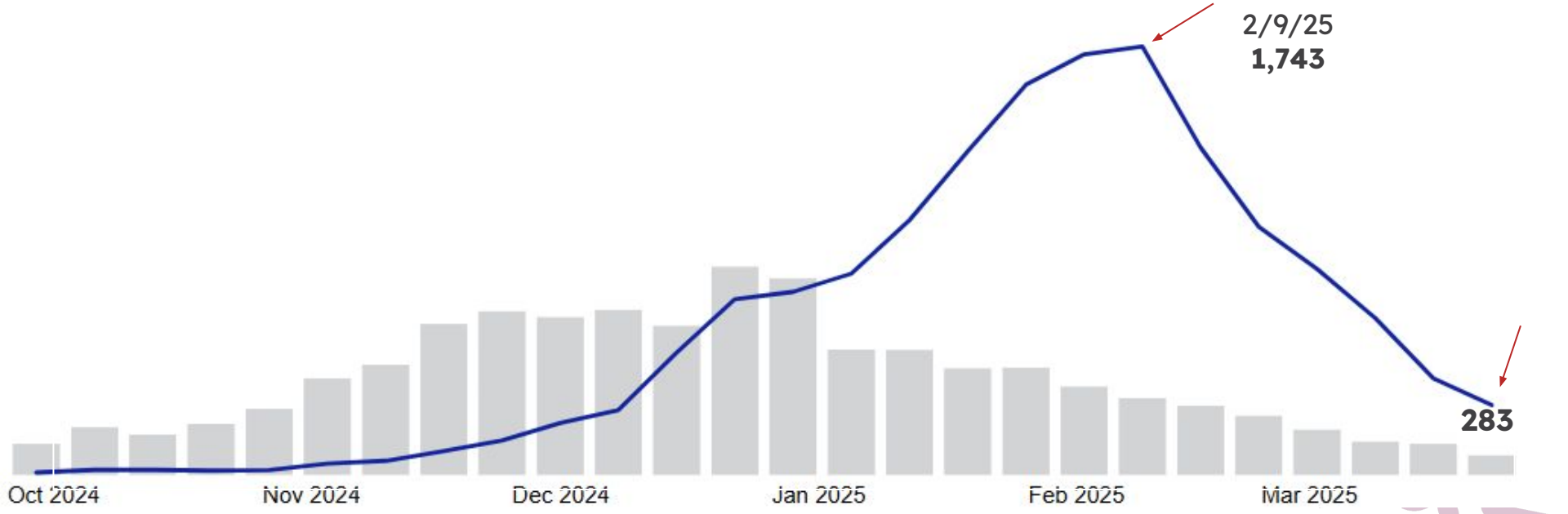
Special considerations:

- “Flumps” (Looks like mumps - could be flu…)

https://www.google.com/url?sa=i&url=https%3A%2F%2Fkids.nationalgeographic.com%2Fanimals%2Fmammals%2Ffacts%2Fchipmunk&psig=AOvVaw3IFh35jCR72Ea-qYqWaR_S&ust=1742062753525000&source=images&cd=vfe&opi=89978449&ved=0CBQQjRxqFwoTCODp0c-XiowDFQAAAAAdAAAAABAE

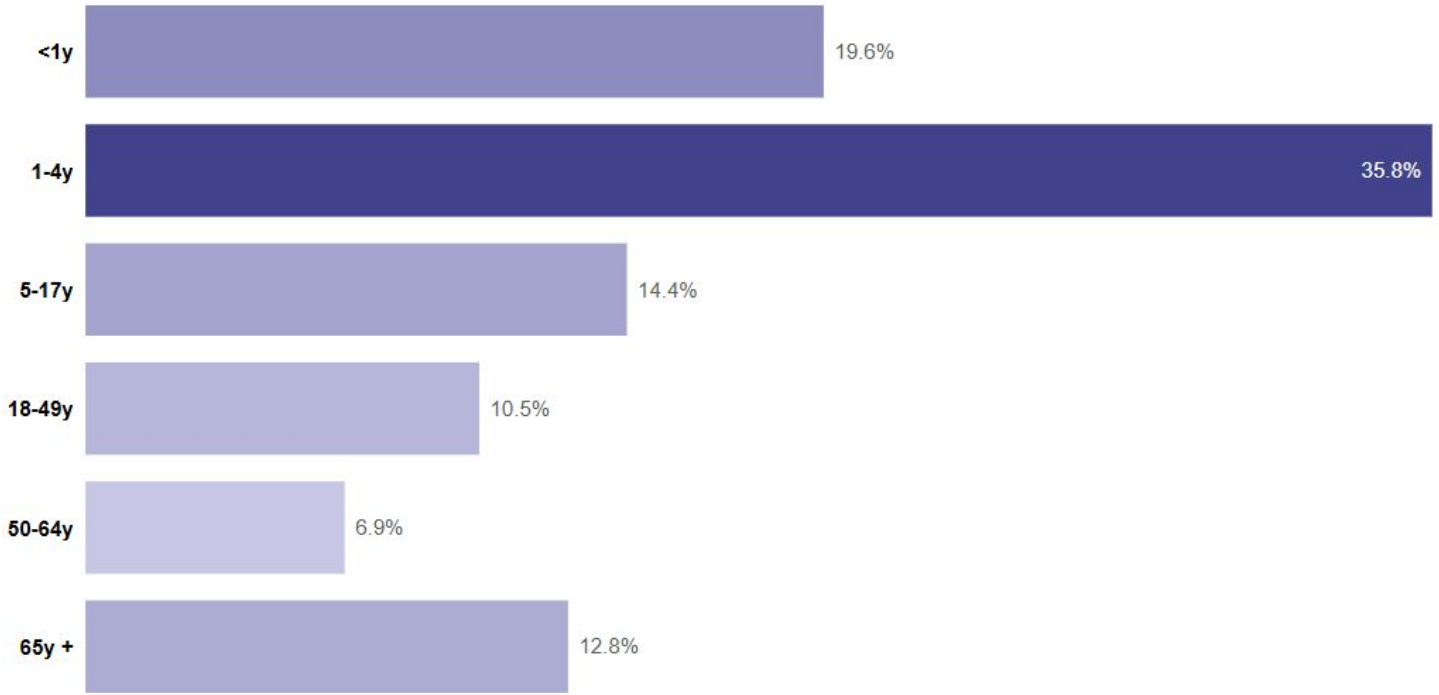
RSV in Arizona

As of 3/23/25, there has been 15,543 cumulative cases of RSV in Arizona.



RSV in Arizona

Children aged 1-4 are most affected by RSV this season, followed by infants.



RSV in Arizona

- Acute respiratory illness transmitted by droplets from coughing/sneezing
- Incubation Period: 4-6 days
- People infected with RSV are usually contagious for 3 to 8 days and may become contagious a day or two before they start showing signs of illness.
    - Infants & people with weakened immune systems, can continue to spread the virus even after they stop showing symptoms, for up to 4 weeks.

Special Considerations:

- With every new season, ADHS recommends use of nirsevimab for infants with the first sign of a 3 consecutive week increase of cases in Arizona.
    - CDC recommends administration during Oct-Mar
- RSV Vaccine is recommended for 75+ OR individuals 60-74 who are at increased risk
    - Maternal Vaccine recommended if between 32-36 weeks of pregnancy during Sep-Jan

COVID-19 in Arizona

First case identified Jan 2020

VX publicly available Jan 2021

2019-2020*	2020-2021	2021-2022
220,818	885,744	1,185,811

2022-2023	2023-2024	2024-2025*
227,759	144,715	39,989

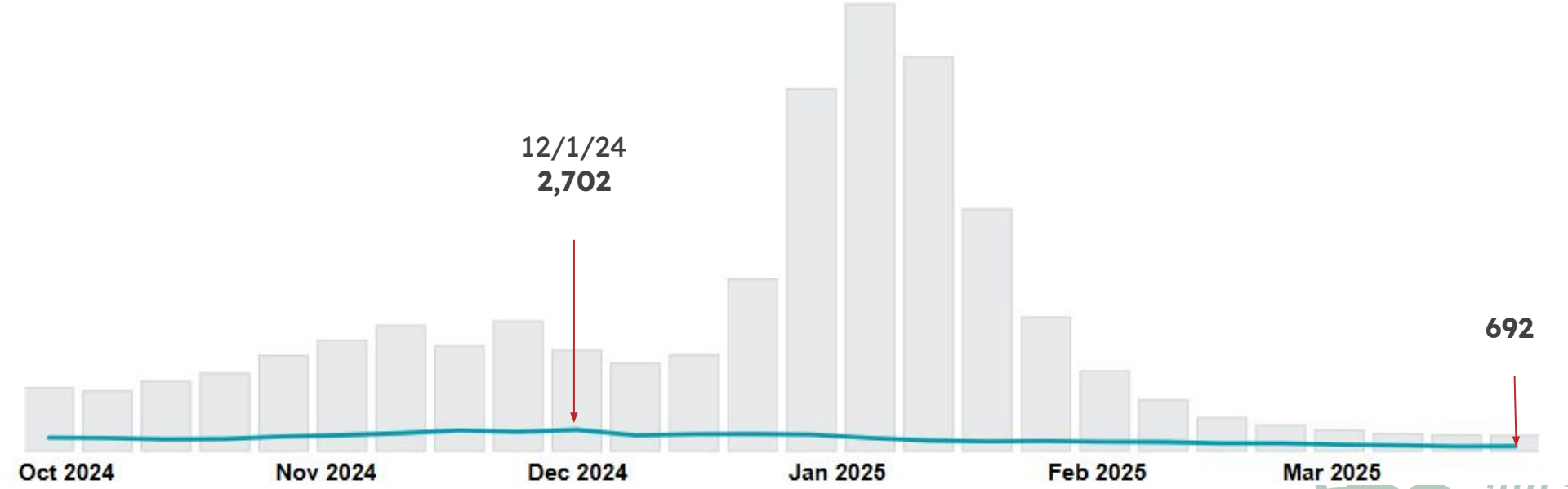
State of Emergency ended March 2022

Return of other respiratory diseases

*Not complete season

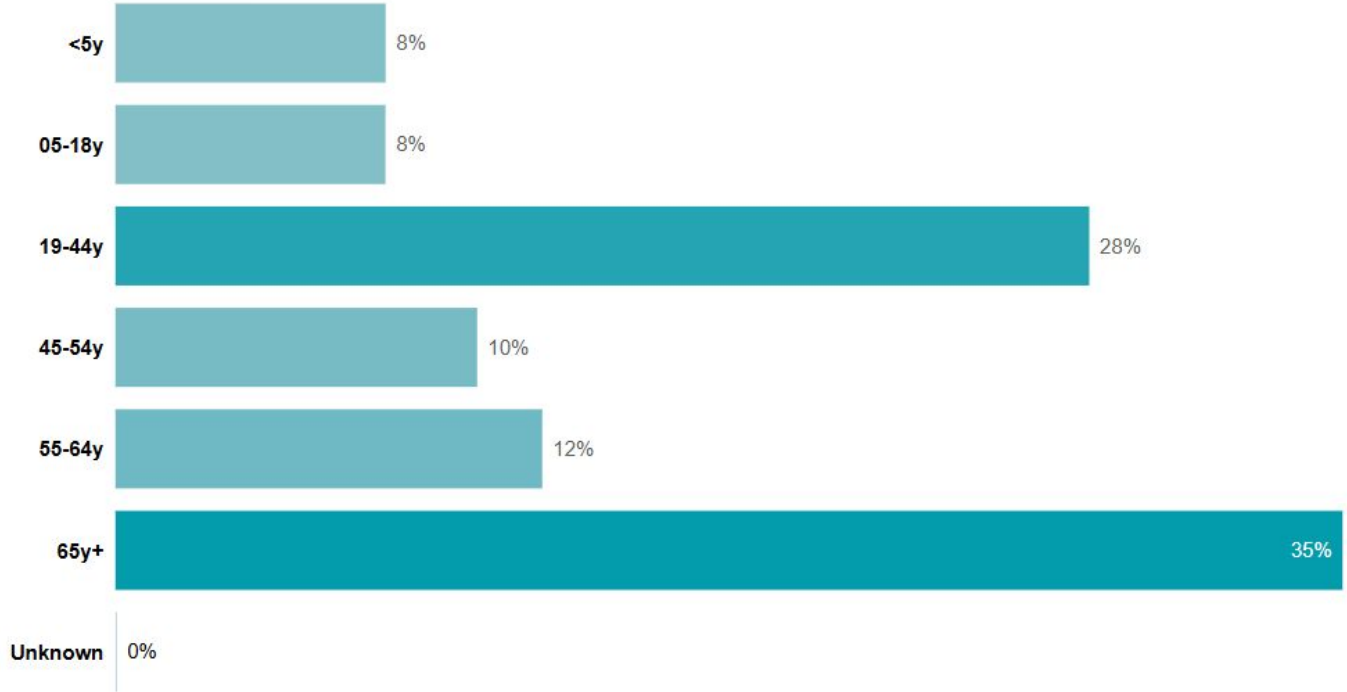
COVID-19 in Arizona

As of 3/23/25, there have been 42,177 cumulative cases of COVID-19 in Arizona.



COVID-19 in Arizona

Those aged 65 years and older have been most affected by COVID-19 this season, followed by adults aged 19-44.



COVID-19 in Arizona

- Acute respiratory illness transmitted by droplets from coughing/sneezing
- Incubation Period: **Mean=6.5 days**, but studies show varies by variant (e.g. Delta, Omicron, etc.)
- People with COVID-19 can be infectious from 1–2 days before and up to 10 days after infection. The majority of transmission appears to occur during the early periods of infection.

Special Considerations:

- mAb/ antivirals are still available for prep/treatment for high risk individuals
- Arizona has had 125 cases of MIS-C
- Long-COVID is not a reportable condition for public health, but researchers use Arizona data for ongoing studies.

Learning Objectives

2. Learn about emerging infections in Arizona.

- Avian Influenza in Arizona

Bird Flu: Virus detected in Maricopa County wastewater samples

By Kenneth Wong | **Updated** December 30, 2024 12:17pm MST | Health | FOX 10 Phoenix |

The Brief

- Maricopa County Department of Public health say they have detecte influenza subtype associated with avian flu" in wastewater within th
- The A(H5) influenza subtype was found in wastewater samples colle Phoenix, Surprise, and Tempe.
- "No human cases of avian flu have been detected in Maricopa Coun

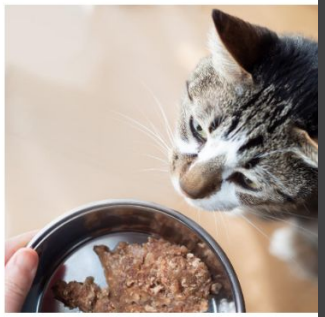
H5N1 confirmed in more cats as probe into raw pet food widens

Lisa Schnirring, January 14, 2025

Topics: Avian Influenza (Bird Flu)

SHARE

The Los Angeles County Department of Public Health (LACDPH) yesterday **reported** three more H5 avian flu infections in pet cats after exposure to raw food or raw milk.



In other avian flu developments, federal officials confirmed those and several more H5N1 detections in domestic cats from California and other states.

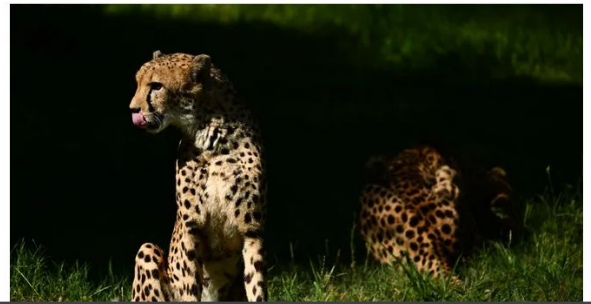
Tests under way for multiple raw pet food brands

With the latest cases noted in an alert to veterinarians yesterday, the LACDPH has now reported seven H5N1 infections in pet cats. Officials had earlier reported four other illnesses, including two that died after drinking recalled raw milk. They also said they were investigating other possible cases in cats that weren't exposed to raw milk, with raw food as a potential culprit.

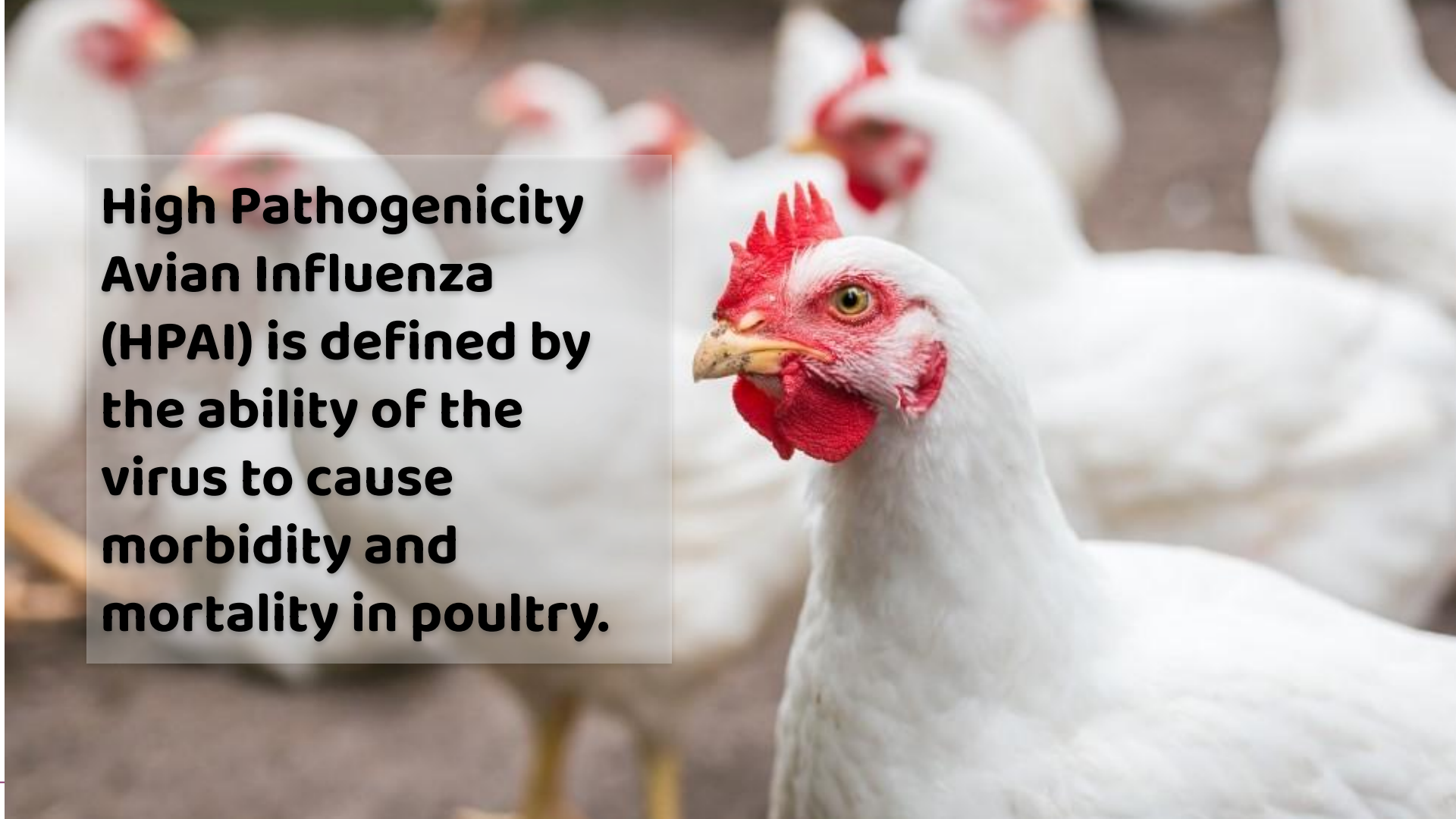
5 animals die after bird flu exp at Arizona zoo; 25 employees exposed to virus

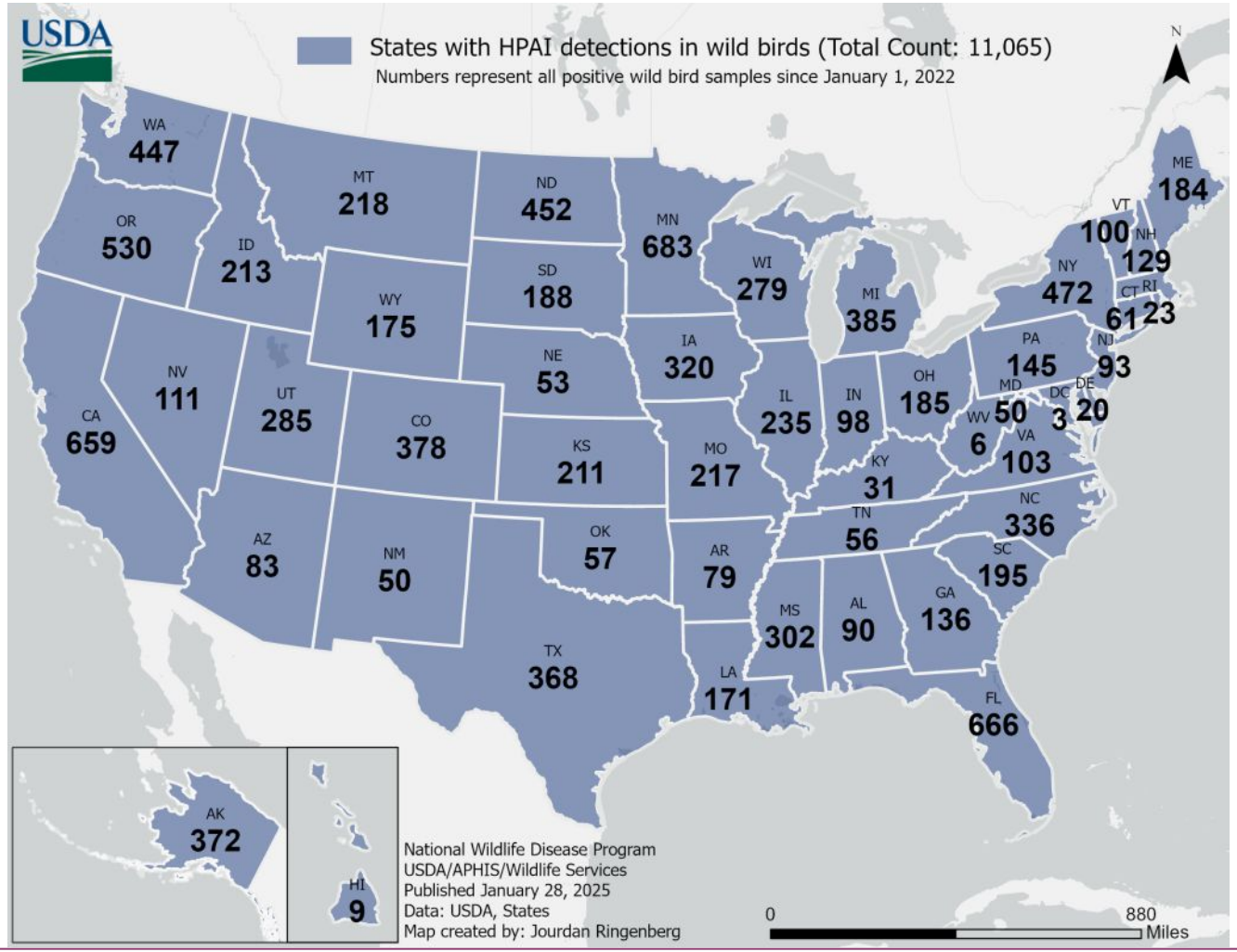
Natalie Neysa Alund
USA TODAY

Published 3:57 p.m. ET Dec. 13, 2024

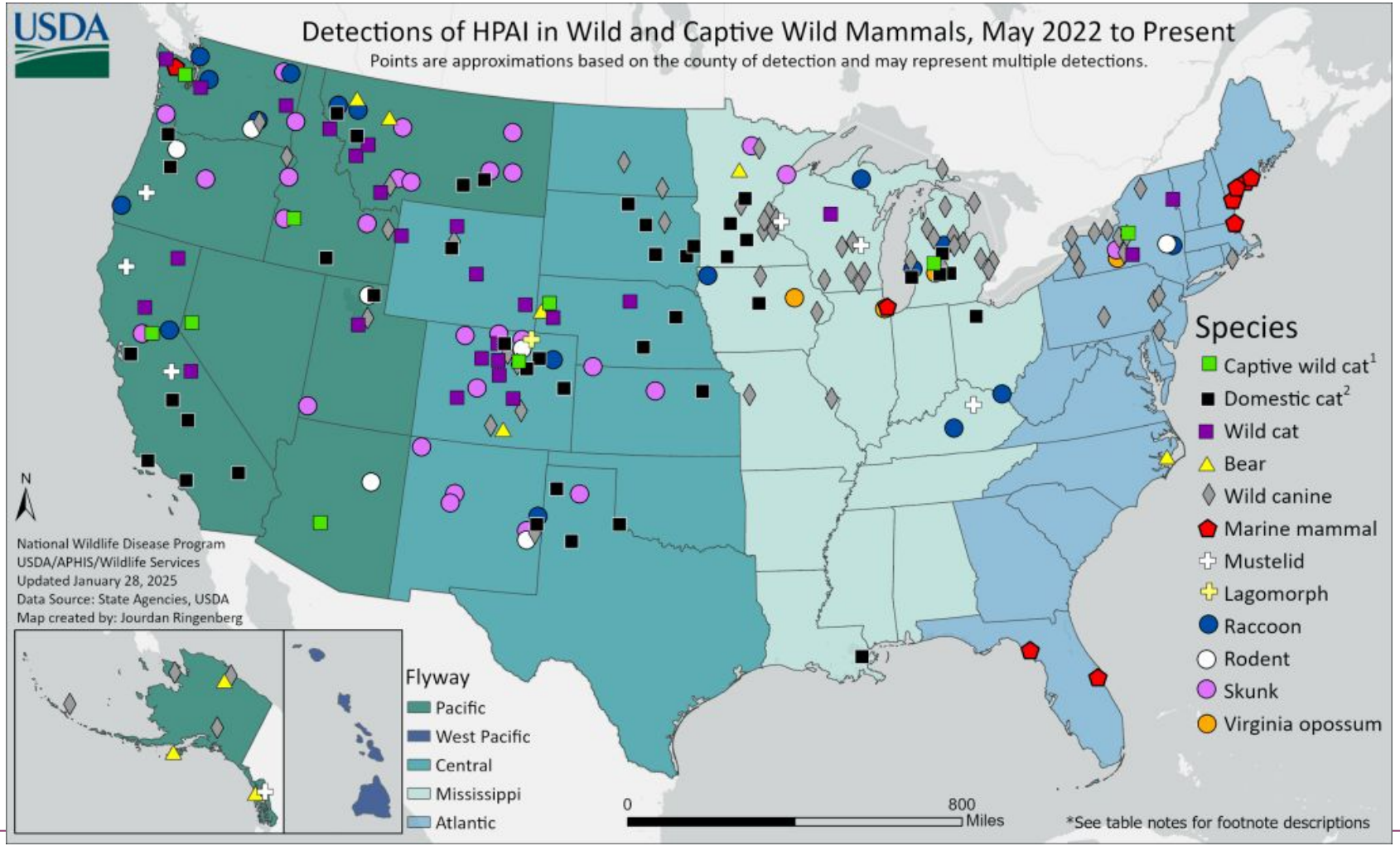


Wild waterfowl are hosts for Influenza A viruses.


High Pathogenicity Avian Influenza (HPAI) is defined by the ability of the virus to cause morbidity and mortality in poultry.

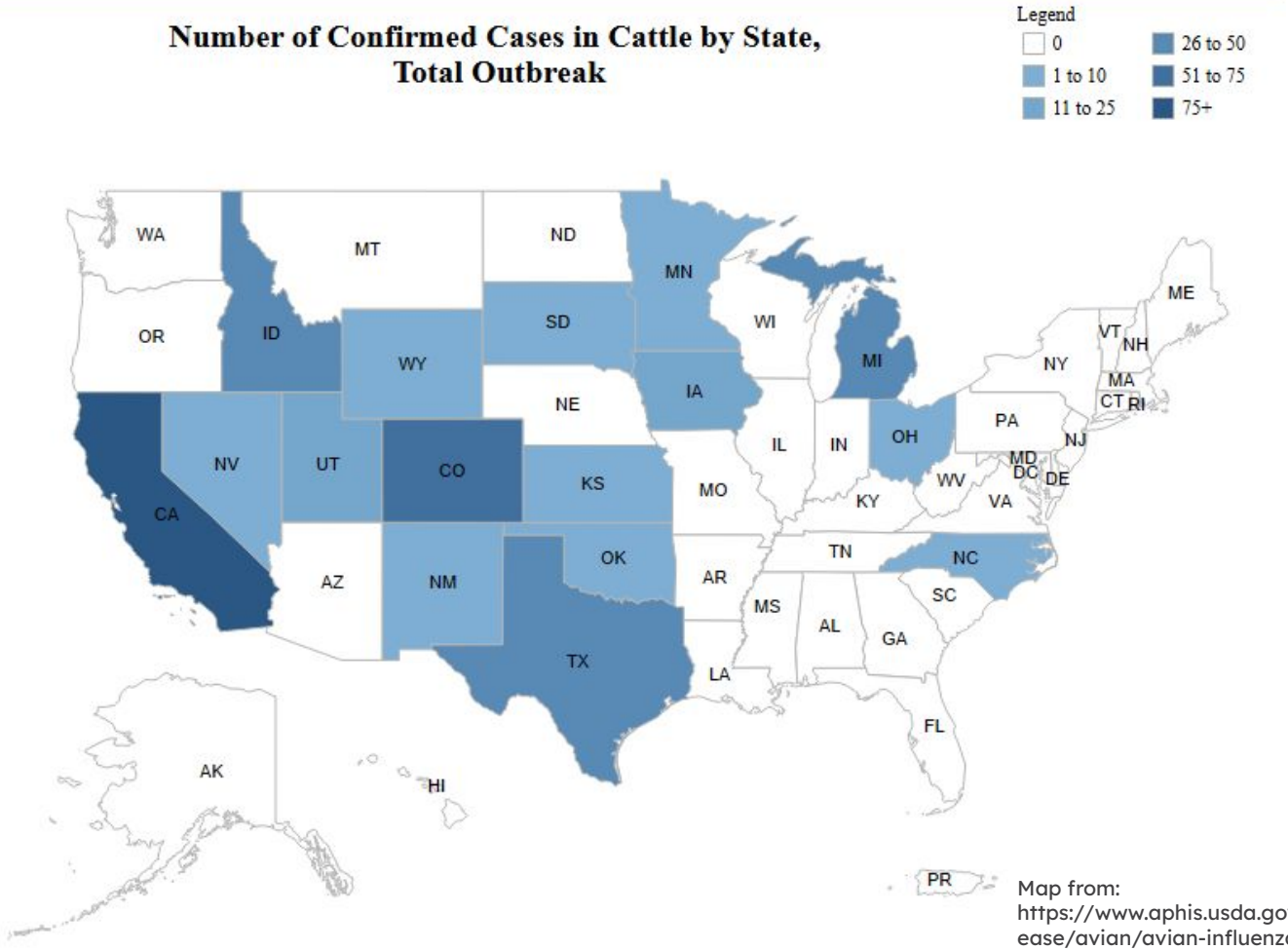


Currently, there is widespread circulation of Influenza A(H5N1) in wild bird populations.


USDA
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.
N
National Wildlife Disease Program
USDA/APHIS/Wildlife Services
Updated January 28, 2025
Data Source: State Agencies, USDA
Map created by: Jourdan Ringenberg
Flyway
Pacific
West Pacific
Central
Mississippi
Atlantic
0
800
Miles
Species
Captive wild cat[1]
Domestic cat[2]
Wild cat
Bear
Wild canine
Marine mammal
Mustelid
Lagomorph
Raccoon
Rodent
Skunk
Virginia opossum
*See table notes for footnote descriptions

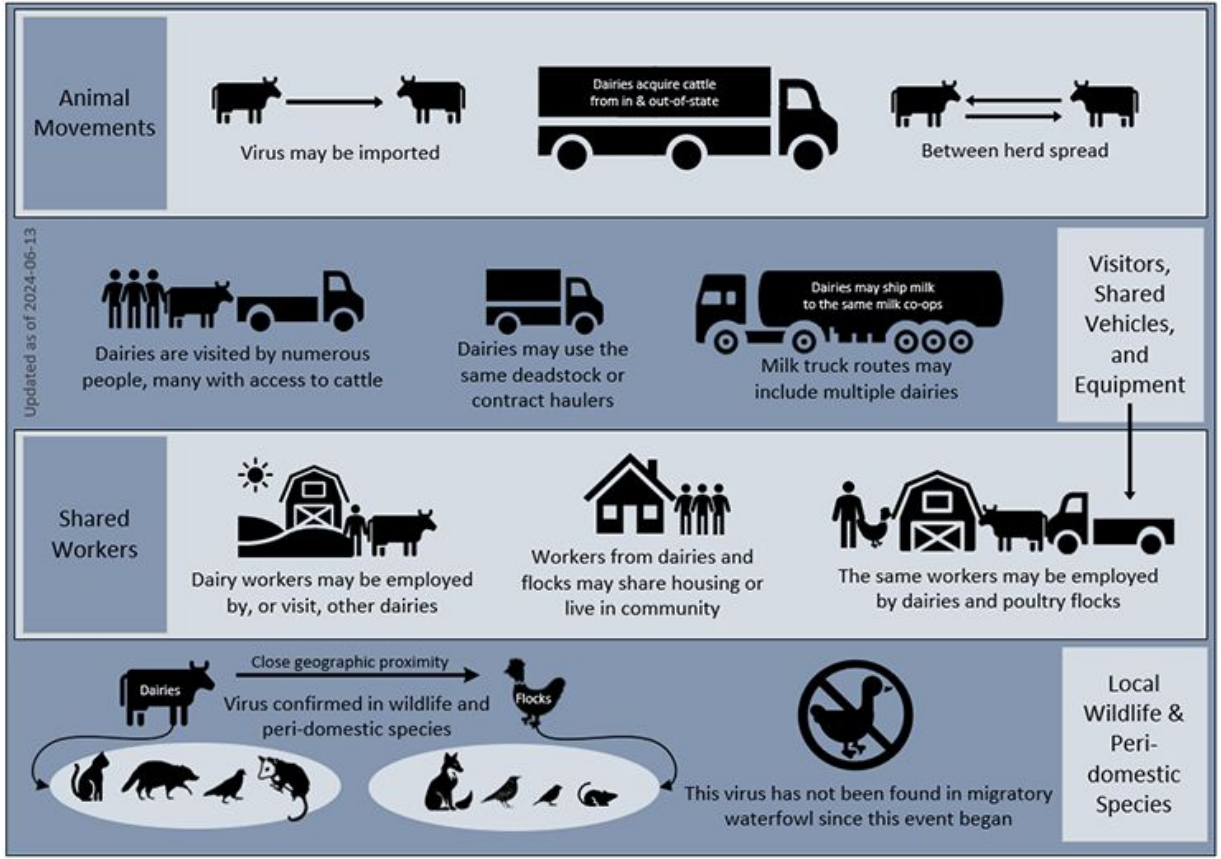
A virus mutation after a single introduction of H5N1 from wild birds to dairy cattle allowed for cow-to-cow ongoing transmission.

Image from: https://www.farmprogress.com/business/dairy-market-cows-worth-more-than-you-think



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

Several factors are leading to spread of H5N1 between dairies and occasional spillback into poultry facilities.



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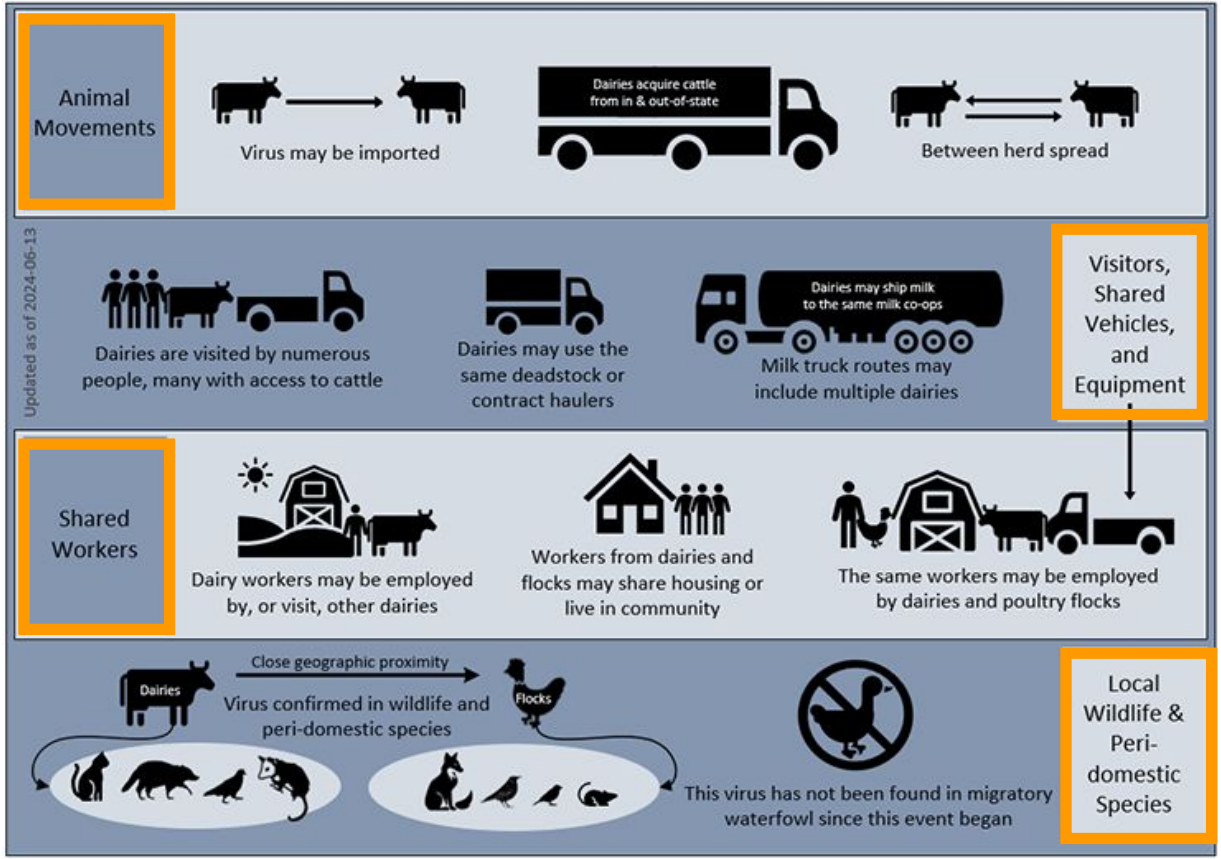


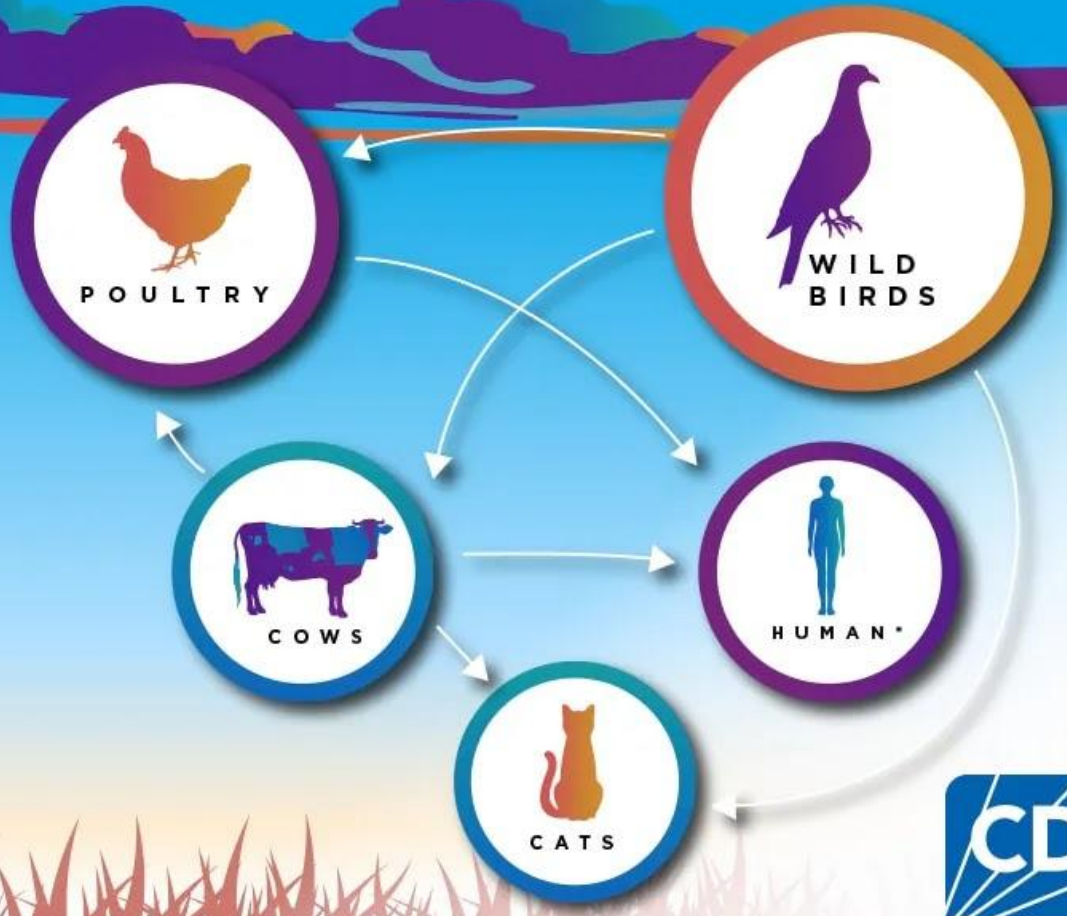
Dairy cows

- In February 2024, veterinarians were alerted to a syndrome occurring in lactating dairy cattle in northern Texas.
- Nonspecific illness accompanied by reduced feed intake and rumination and an abrupt drop in milk production developed in affected animals.
- The milk from most affected cows had a thickened, creamy yellow appearance similar to colostrum.
- Incidence appeared to peak 4–6 days after the first animals were affected and then tapered off within 10–14 days; afterward, most animals were slowly returned to regular milking.
- Dairy cattle are susceptible to infection with HPAI H5N1 virus and can shed virus in milk and, therefore, might potentially transmit infection to other mammals via unpasteurized milk.

Burrough, E. R., Magstadt, D. R., Petersen, B., Timmermans, S. J., Gauger, P. C., Zhang, J., ... & Main, R. (2024). Highly pathogenic avian influenza A (H5N1) clade 2.3. 4.4 b virus infection in domestic dairy cattle and cats, United States, 2024. *Emerging infectious diseases*, *30*(7), 1335.

There are no FDA approved veterinary vaccines for HPAI.

H5N1 Bird Flu
How is it Spreading?



*No human-to-human spread of H5N1 has been detected during the current outbreak in dairy cows.

CDC

ARIZONA DEPARTMENT OF HEALTH SERVICES

Image from: https://www.worldatlas.com/maps/united-states/arizona

- **November 2024**
  - **Commercial poultry in Pinal County**

Image from: https://www.worldatlas.com/maps/united-states/arizona

- November 2024
  - Commercial poultry in Pinal County
  - H5 Wastewater detections
    - Maricopa County
    - Coconino County

Image from: https://www.worldatlas.com/maps/united-states/arizona

- November 2024
  - Commercial poultry in Pinal County
  - H5 Wastewater detections
    - Maricopa County
    - Coconino County
  - Backyard flock in Maricopa County
  - Zoo in Maricopa County

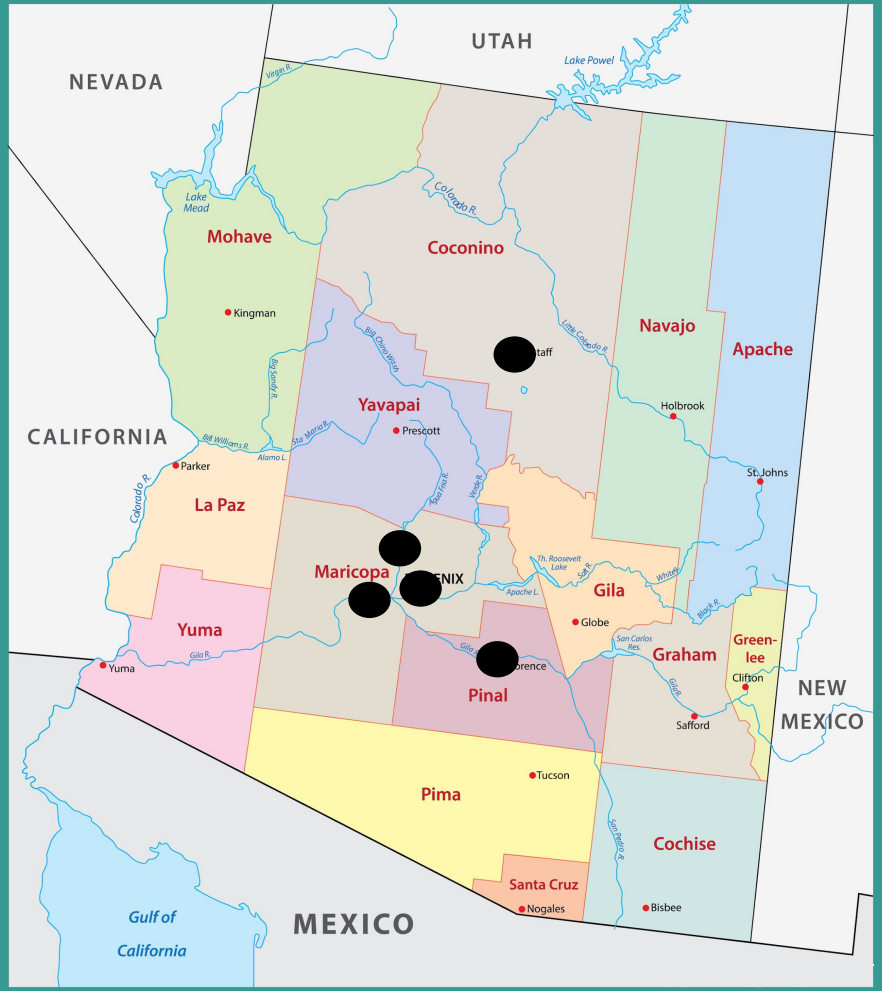


Image from: https://www.worldatlas.com/maps/united-states/arizona

Symptom monitoring was conducted for people potentially exposed to H5N1 at the commercial poultry facility and at World Wildlife Zoo.

- **Two probable* human cases of H5N1 infection among workers at the commercial poultry facility.**

*Defined as probable because specimens tested positive for H5N1 at ASPHL, but did not test positive at CDC Laboratories.

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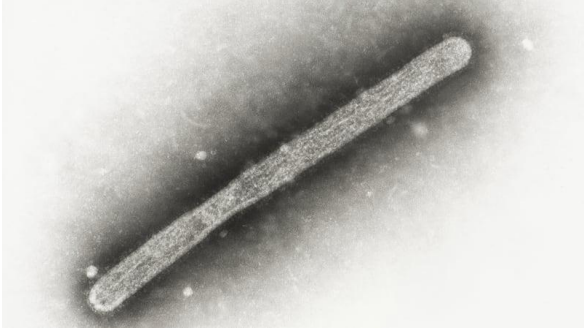
HEALTH SERVICES

Current situation- human cases

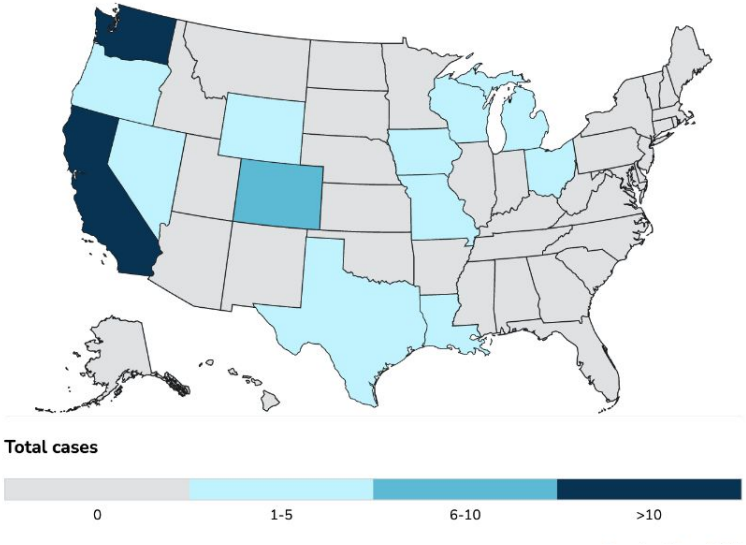


National Total Cases: 70

Cases	Exposure Source
41	Dairy Herds (Cattle)*
24	Poultry Farms and Culling Operations*
2	Other Animal Exposure†
3	Exposure Source Unknown‡

NOTE: One additional case was previously detected in a poultry worker in Colorado in 2022. Louisiana reported the first H5 bird flu death in the U.S.

*Exposure Associated with Commercial Agriculture and Related Operations
†Exposure was related to other animals such as backyard flocks, wild birds, or other mammals
‡Exposure source was not able to be identified



National situation summary

Person-to-person spread

NONE — There is no known person-to-person spread at this time.

Current public health risk

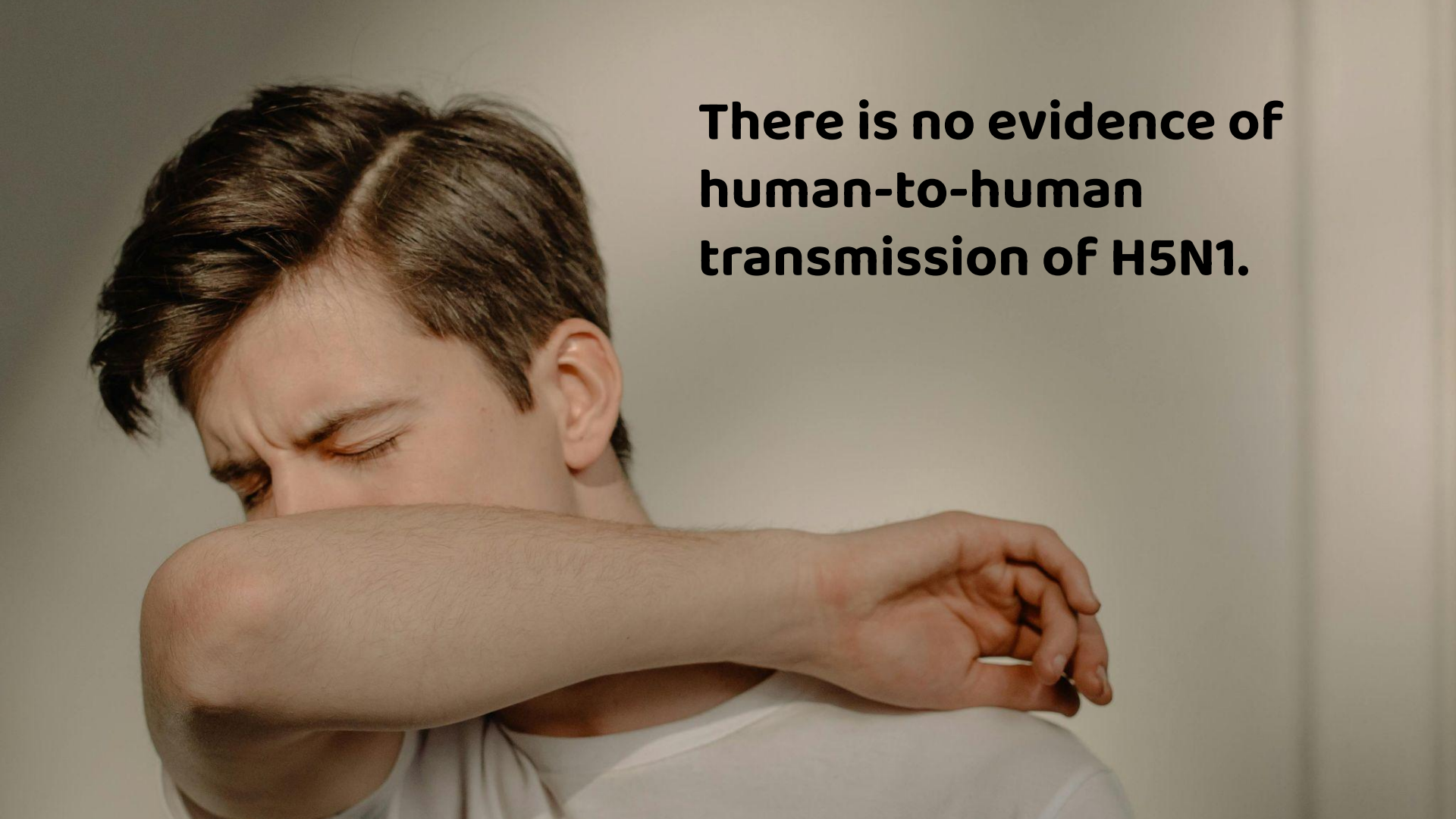
LOW — The current public health risk is Low.

Cases in the U.S.

70 cases

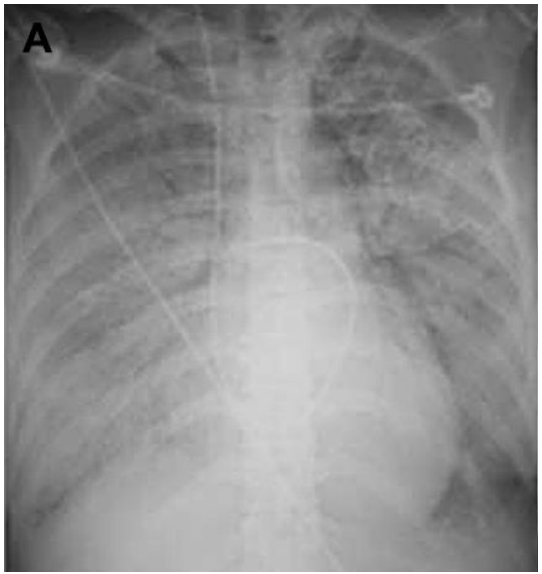
Deaths in U.S.

1 death


There is no evidence of human-to-human transmission of H5N1.

HPAI clinical symptoms

- Onset of symptoms usually around 3 days (2-7 days average)
- MILD
  - Conjunctivitis, mild fever (temperature of 100ºF or greater), cough, sore throat, runny or stuffy nose, muscle or body aches, headaches, fatigue
- MODERATE- SEVERE
  - High fever, shortness of breath or difficulty breathing, altered consciousness, seizures
- **COMPLICATIONS**
  - Pneumonia, respiratory failure, acute kidney injury, multi-organ failure and sepsis, septic shock, meningoencephalitis



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

HPAI (H5N1)

- Conjunctivitis >90%
  - Only symptom 33%
- Fever (40-60%)
- Respiratory symptoms (~36%)
- Days with symptoms 2-5 days

Variable	Exposure to Poultry (N=20)	Exposure to Dairy Cows (N=25)	Overall (N=45)
Signs and symptoms			
Conjunctivitis — no. (%)	19 (95)	23 (92)	42 (93)
Measured fever or feeling feverish — no. (%)	12 (60)	10 (40)	22 (49)
Respiratory symptoms — no. (%)†	9 (45)	7 (28)	16 (36)
Cough	3 (15)	5 (20)	8 (18)
Sore throat	7 (35)	6 (24)	13 (29)
Shortness of breath	3 (15)	4 (16)	7 (16)
Myalgia — no. (%)	11 (55)	8 (32)	19 (42)
Headache — no. (%)	11 (55)	9 (36)	20 (44)
Fatigue — no. (%)	6 (30)	4 (16)	10 (22)
Nausea — no. (%)	6 (30)	0	6 (13)
Vomiting — no. (%)	1 (5)	1 (4)	2 (4)
Diarrhea — no. (%)	2 (10)	0	2 (4)
Clinical constellations			
Status with respect to conjunctivitis — no. (%)			
Conjunctivitis only	4 (20)	11 (44)	15 (33)
Conjunctivitis plus any respiratory symptom	8 (40)	6 (24)	14 (31)
Conjunctivitis plus any nonrespiratory symptom	7 (35)	6 (24)	13 (29)
Only nonconjunctival symptoms	1 (5)	2 (8)	3 (7)
Symptoms still present at time of interview — no. (%)	2 (10)	7 (28)	9 (20)
Median no. of days with symptoms (range)‡	2.0 (1.0–8.0)	5.0 (2.0–7.0)	4.0 (1.0–8.0)

Garg, S., Reinhart, K., Couture, A., Kniss, K., Davis, C. T., Kirby, M. K., ... & Olsen, S. J. (2024). Highly Pathogenic Avian Influenza A (H5N1) Virus Infections in Humans. *New England Journal of Medicine*.

Transmission

- The period of contagiousness for person with mild illness due to bird flu is similar to seasonal influenza.
- People are most contagious during the first few days of their illness.
- People with severe disease (e.g., pneumonia) may have higher viral load in the lower respiratory tract and may be contagious for several weeks.

Antiviral susceptibility

- Risk assessment of emerging influenza viruses includes determining susceptibility to available antivirals.
- Two classes of direct-acting influenza drugs are available: NA inhibitors (oseltamivir, peramivir, and zanamivir) and a cap-dependent endonuclease inhibitor (baloxavir)
- Authors conducted genotypic and phenotypic screenings of HPAI A(H5N1) viruses circulating globally in 2022 to 2023. Both screening techniques indicated that these 2 most predominant clades are largely susceptible to NAIs and CENI.
- No reduced inhibition/HRI-associated with NA were identified in viruses from the African, South American, or Oceanic regions. RI/HRI identified at frequencies of 2.05%, 0.68%, and 0.76% in Asian, European, and North American viruses, respectively
  - Overall frequency of HPAI A(H5N1) viruses with known NAI RI/HRI was low (0.78%).
  - Overall frequency of HPAI A(H5N1) viruses with CENI RI was low (0.54%).

Andreev, K., Jones, J. C., Seiler, P., Kandeil, A., Turner, J. C., Barman, S., ... & Govorkova, E. A. (2024). Antiviral Susceptibility of Highly Pathogenic Avian Influenza A (H5N1) Viruses Circulating Globally in 2022–2023. *The Journal of Infectious Diseases*, *229*(6), 1830-1835.

Recommendations for Providers

Signs/symptoms of novel influenza A virus infection in humans may include:

- Uncomplicated upper respiratory tract signs and symptoms with or without fever, including influenza-like illness (ILI) [fever ≥100°F plus cough or sore throat]
- Fever (temperature of 100ºF [37.8ºC] or greater) or feeling feverish
- Cough, sore throat, runny or stuffy nose, muscle or body aches, headaches, fatigue
- Eye redness (or conjunctivitis)
- Shortness of breath or difficulty breathing.
- Less common signs and symptoms are diarrhea, nausea, or vomiting.

Recommendations for Providers

If signs/symptoms compatible with novel influenza A virus infection and a history of exposures to animals or to a symptomatic confirmed or probable human case of novel influenza A virus infection are present:

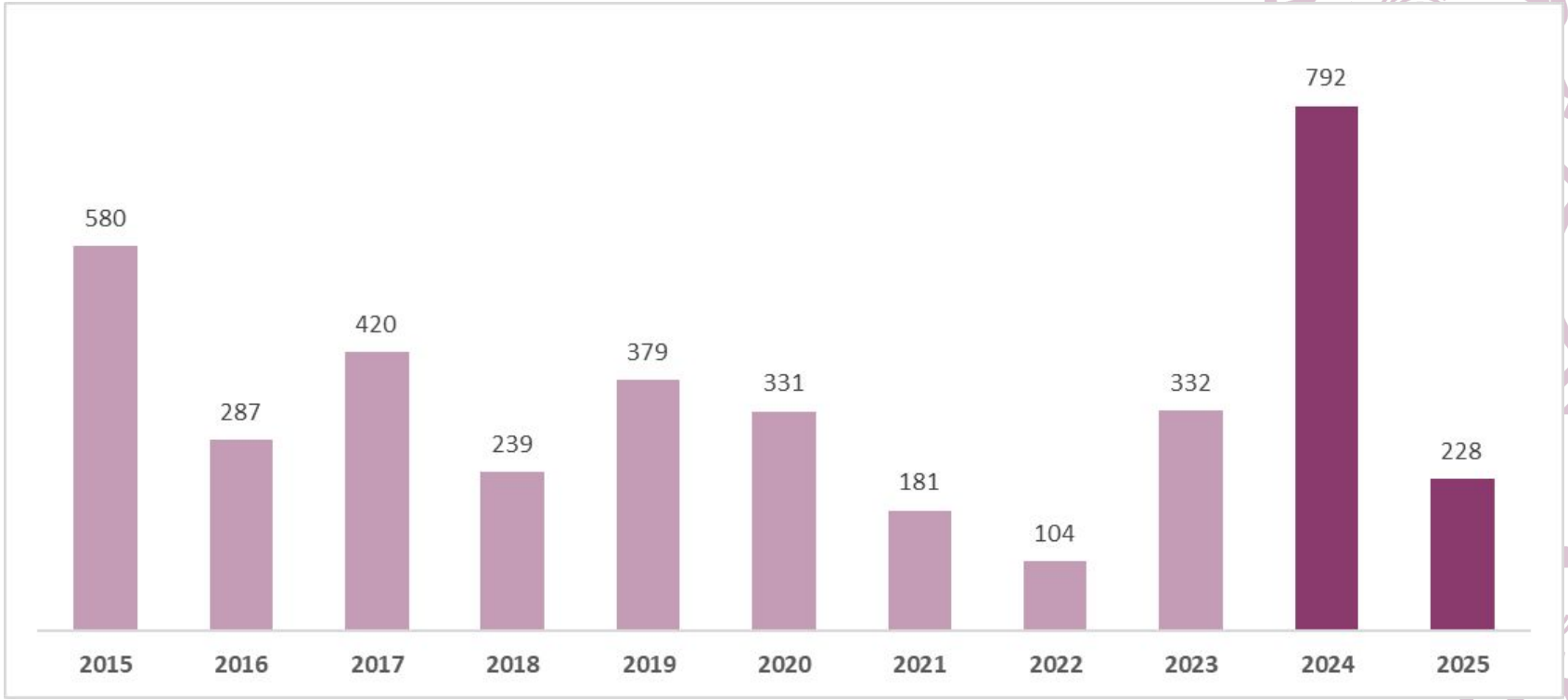
1. Isolate the patient and follow the infection control recommendations.
2. Initiate empiric antiviral treatment ASAP.
3. Notify the state or local health department.
4. Using PPE, collect respiratory specimens from the patient to test for novel influenza A viruses at a public health laboratory (e.g., state health department virology laboratory).
    a. 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.
5. Differential diagnosis- testing for other potential causes of acute respiratory illness, including SARS-CoV-2.

Learning Objectives

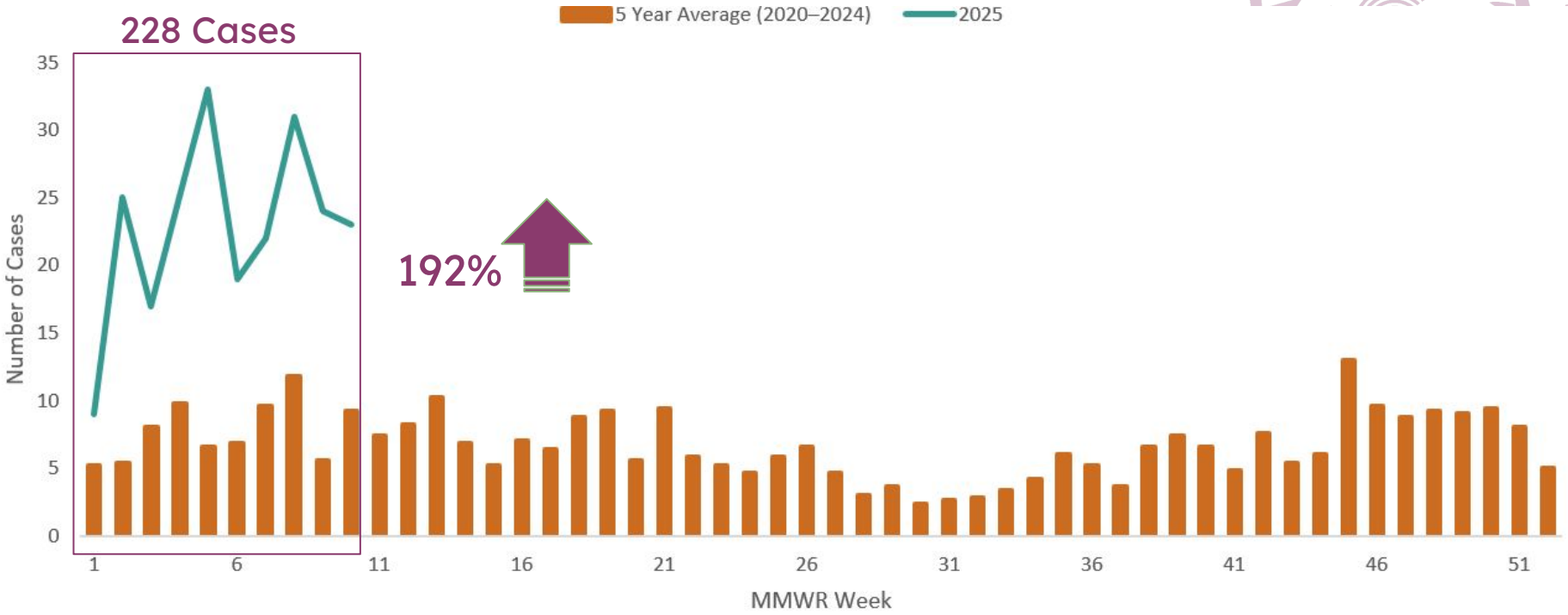
3. Learn about returning infections in Arizona as we navigate the post-pandemic era.

- Pertussis
- Measles
- Mycoplasma pneumoniae

Pertussis in Arizona

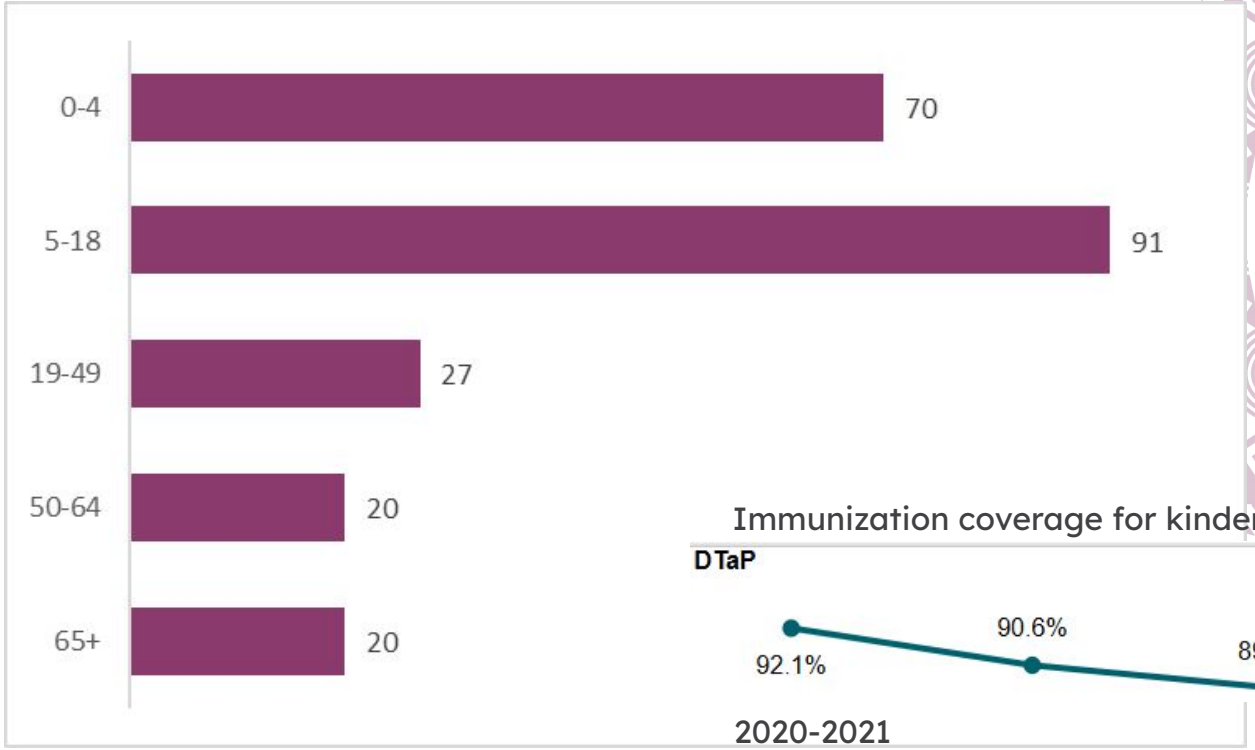


Pertussis in Arizona

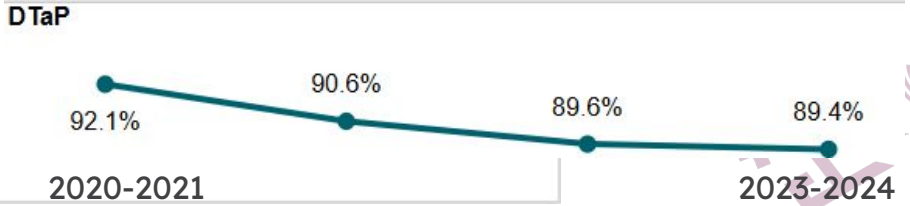


Pertussis in Arizona

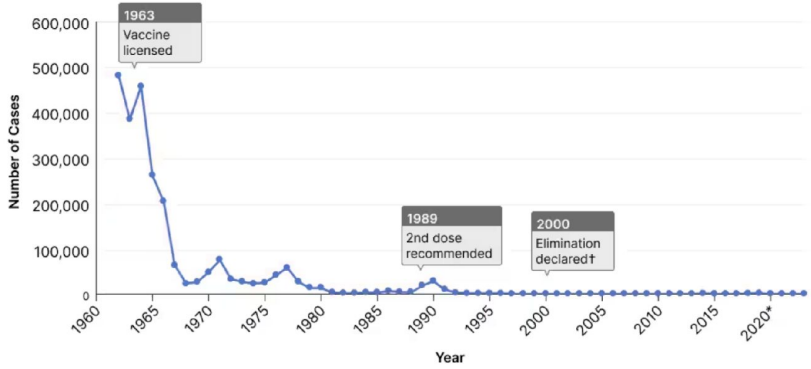
Infants, toddlers and school aged children are most affected by pertussis thus far in 2025



Immunization coverage for kindergarten declining



History



- 1757- Francis Home, a Scottish physician, demonstrated that measles is caused by an infectious agent in the blood of patients.
- 1912- Measles became a nationally **notifiable disease** in the United States (average of 6,000 measles-related deaths per year).
- 1963- **A vaccine became available**. John Enders and colleagues transformed the Edmonston-B strain of measles virus into a vaccine and licensed it in the United States.
- 1968- an improved and even weaker measles vaccine was developed (only measles vaccine used in the United States since 1968)
- 1978- CDC set a goal to eliminate measles from the United States by 1982.
- **Measles was declared eliminated from the United States in 2000.** This meant the absence of the continuous spread of disease was greater than 12 months.

Measles outbreak

- As of 4/08/2025, a total of 607 measles cases were reported: Texas, New Mexico and Oklahoma; other isolated cases in Alaska, California, Georgia, Kentucky, New Jersey, New York, Rhode Island

- There have been 3 outbreaks (defined as 3 or more related cases) reported in 2025- TX (505) and NM (38)
  - 16 outbreaks were reported in 2024 and 69% of cases (198 of 285) were outbreak-associated.

U.S. Cases in 2025

Total cases

607

Age
Under 5 years: **196 (32%)**
5-19 years: **240 (40%)**
20+ years: **159 (26%)**
Age unknown: **12 (2%)**

Vaccination Status
Unvaccinated or Unknown: **97%**
One MMR dose: **1%**
Two MMR doses: **2%**

U.S. Hospitalizations in 2025

12%

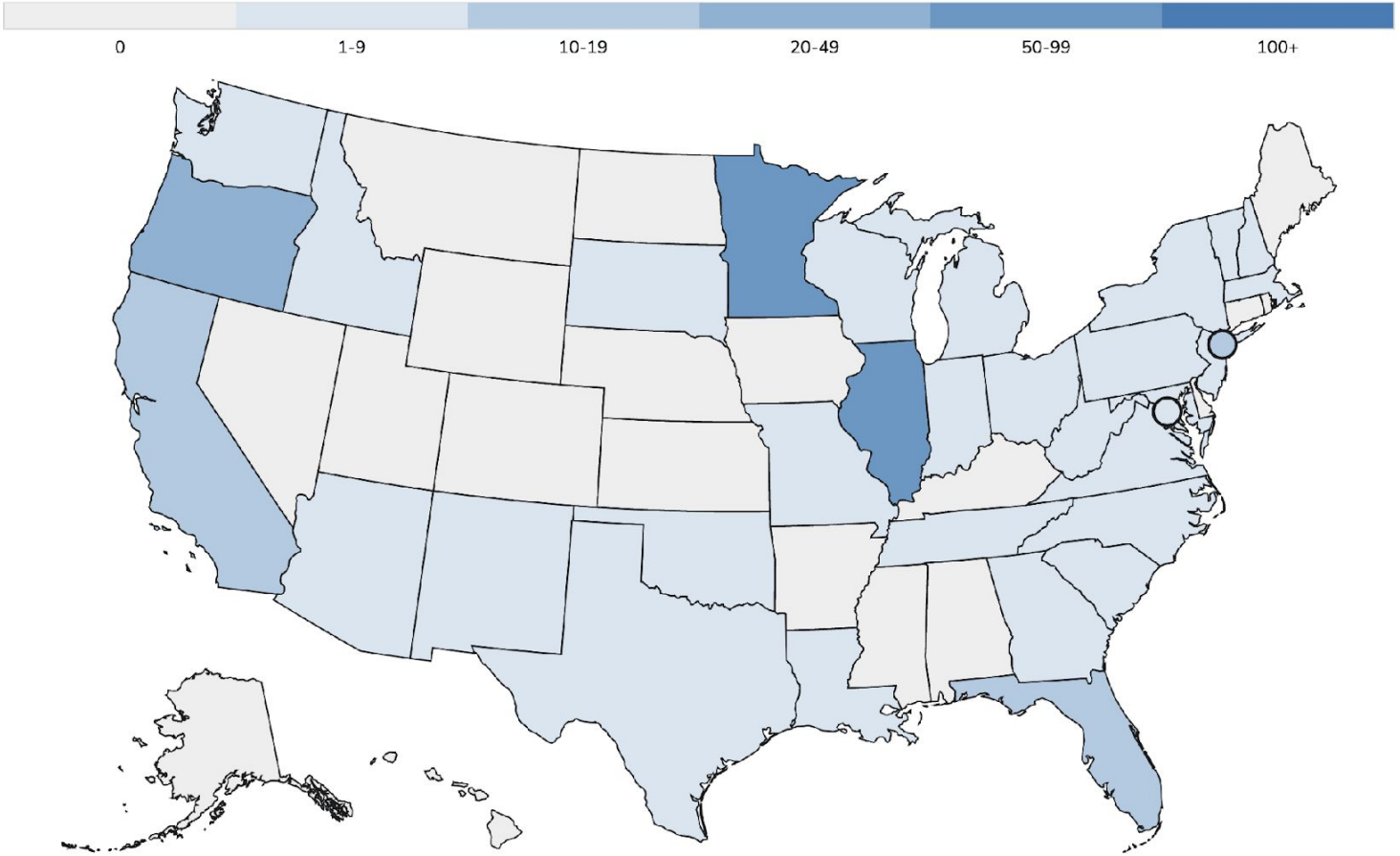
12% of cases hospitalized (74 of 607).

Percent of Age Group Hospitalized
Under 5 years: **21% (42 of 196)**
5-19 years: **8% (19 of 240)**
20+ years: **8% (12 of 159)**
Age unknown: **8% (1 of 12)**

U.S. Deaths in 2025

2

2025 **2024**



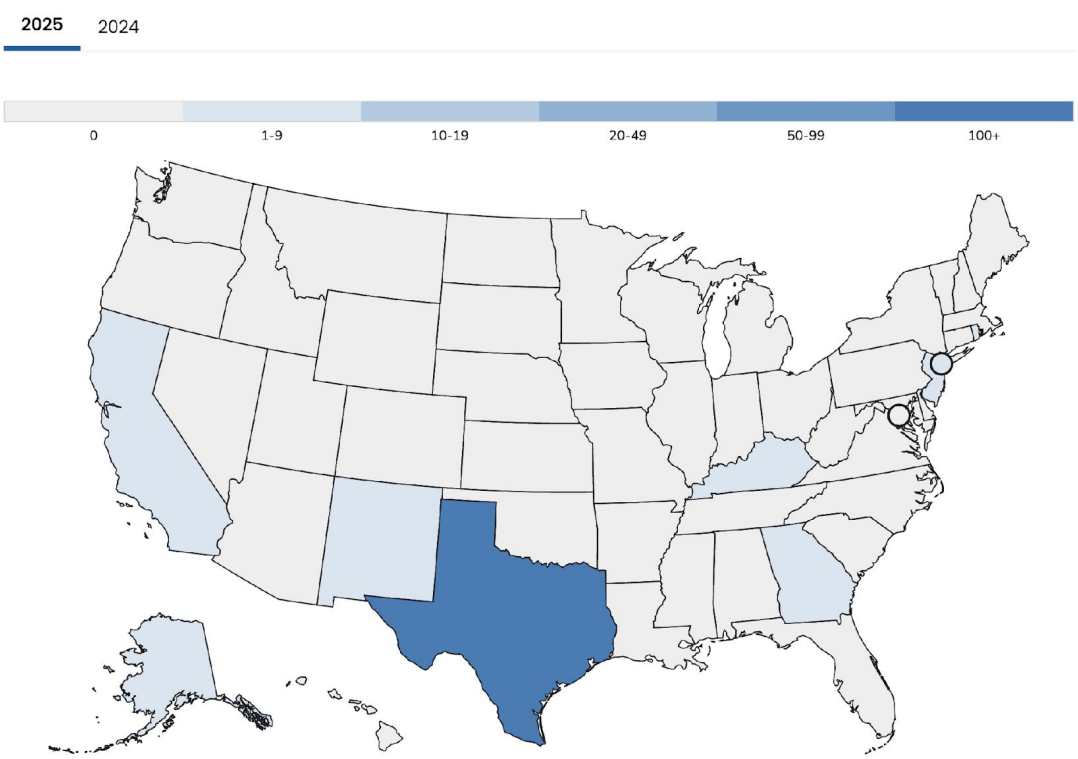
285 cases in 2024
(16 outbreaks)

NEW MEXICO:

- 56 cases
- **1 death** in a school-aged child (not vaccinated)
- **27 cases (age >18)**

VACCINE:

- 50 unvaccinated or unknown status; 6 vaccinated



TEXAS:

- 505 cases
- 57 hospitalized
- **2 death** in a school-aged child (not vaccinated)
- **191 cases (age 5-17)**

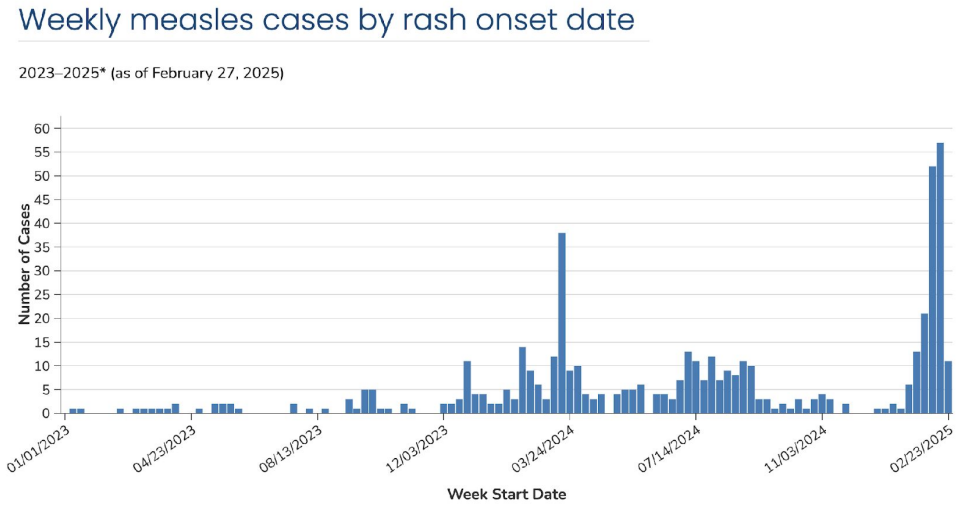
VACCINE:

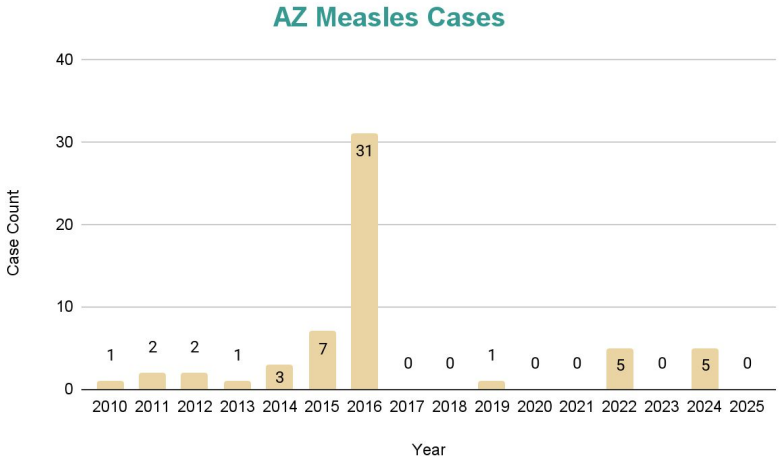
- 98+% unvaccinated or unknown status (495); 10 vaccinated

https://www.dshs.texas.gov/

Measles

- **Highly contagious disease.**
- **90% attack rate if unvaccinated**
- The virus spreads through direct contact with infectious droplets or by airborne spread when an infected person breathes, coughs or sneezes and can remain infectious in the air and on surfaces up to 2 hours after an infected person leaves the area.
- **NO CASES IN AZ (2025)**





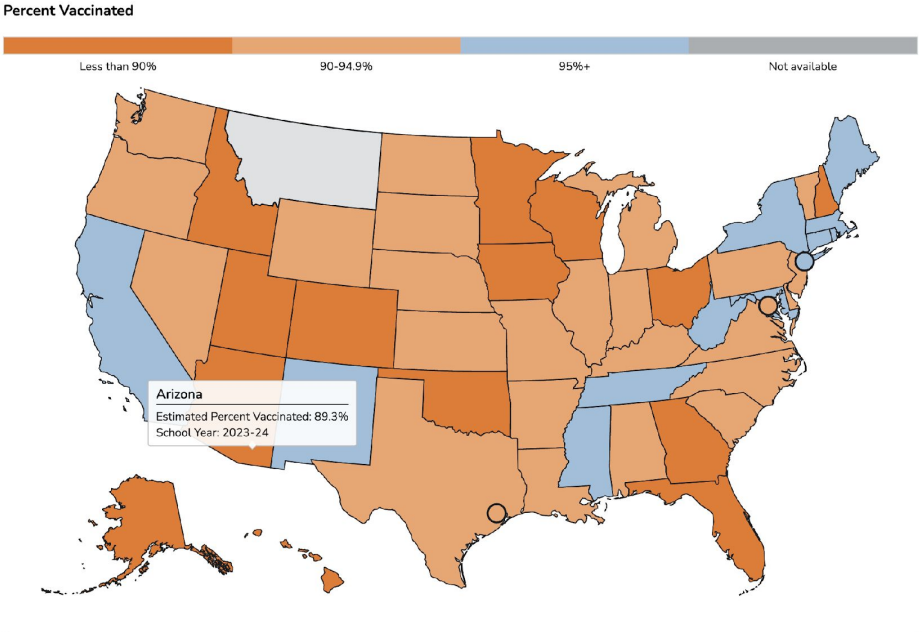
Measles clinical presentation

- Measles typically begins with fever, cough, runny nose, and pink eye that lasts 2-4 days before a rash begins.
- A person with measles is contagious from 4 days before the start of the rash through 4 days after the rash begins.
- Measles can cause severe health complications including pneumonia, encephalitis, and death.

“COUGH, CORYZA, CONJUNCTIVITIS”

Vaccine

- Vaccination is the best way to prevent measles.
- **Two doses of the MMR vaccine provide 97% protection against measles.**
- Children are recommended to receive the first dose at 12–15 months, and the second at 4–6 years
- Anyone exposed to a case of measles should monitor for symptoms for 3 weeks from last exposure and call their healthcare provider if symptoms develop.
  - **Contacts who are unvaccinated should:**
    - Receive a dose of MMR vaccine (within 72 hours of exposure) OR
    - Receive measles immunoglobulin (if unable to receive MMR vaccine) within 6 days of exposure



Mycoplasma pneumoniae

MARICOPA COUNTY
PUBLIC HEALTH

ENHANCED SURVEILLANCE ALERT

Maricopa County Department of Public Health
Mycoplasma Pneumoniae Alert for Healthcare Providers: 11/05/2024

National Increase in Mycoplasma Infections

The Maricopa County Department of Public Health (MCDPH) has been alerted to a national increase in *Mycoplasma pneumoniae* respiratory infections, commonly referred to as "walking pneumonia," especially in young children 2-4 years old (CDC Situational Summary). Since late spring, national emergency department-based surveillance of discharge diagnoses has shown increasing numbers of *M. pneumoniae* infections from 0.5% to 2.1% of visits and 1.0% to 7.2% specifically in 2–4-year-old children. Because *M. pneumoniae* is not a reportable condition in Arizona, the same trend is not verified in local data, however we have heard reports of cases from individual providers.

Mycoplasma infections typically present as mild upper respiratory illnesses that can lead to more complicated pneumonia. Symptoms often include fever, cough, and sore throat but younger children may also have diarrhea, vomiting, or wheezing. Many cases of mycoplasma are self-limited and only require supportive care, however macrolide antibiotics, such as azithromycin, can be used to treat mycoplasma, particularly in patients with immunosuppression or chronic lung conditions.

It is recommended that Maricopa County providers:

- Consider *Mycoplasma pneumoniae* infection in your differential of respiratory infections including community-acquired pneumonia
- In cases of community-acquired pneumonia warranting antibiotic treatment, cover *M. pneumoniae* infections with a macrolide antibiotic
- Collect a nasopharyngeal swab for *M. pneumoniae* testing and consider obtaining a chest radiograph

Resources:

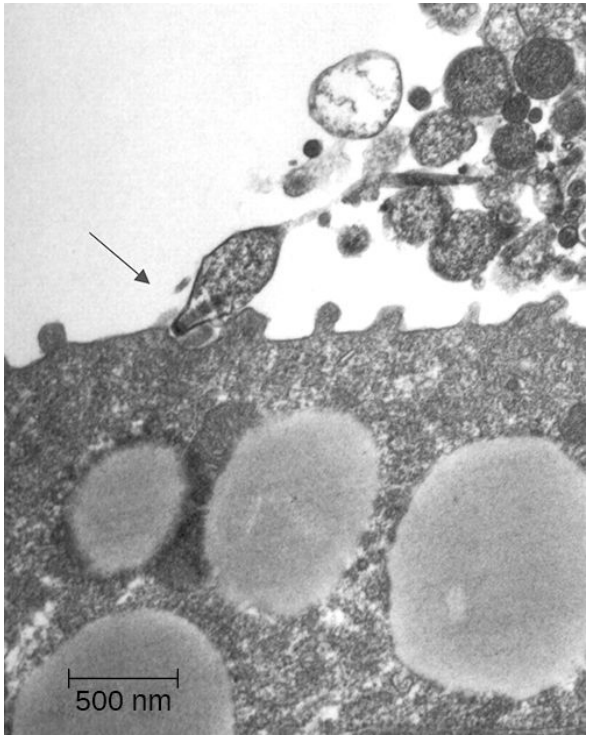
- CDC *Mycoplasma pneumoniae* infection website

Thank you for your continued collaboration and partnership.

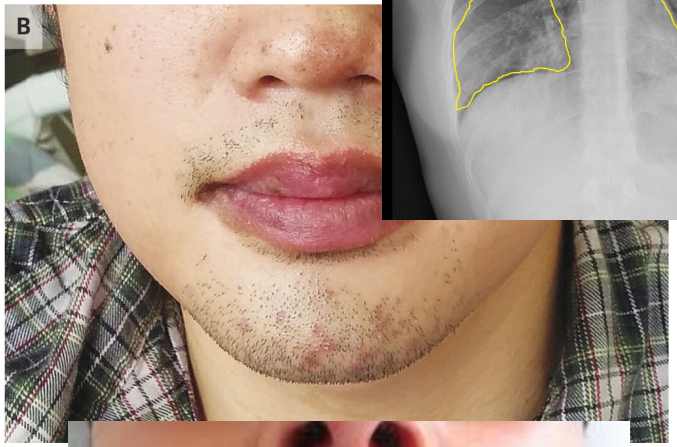
Maricopa County Department of Public Health

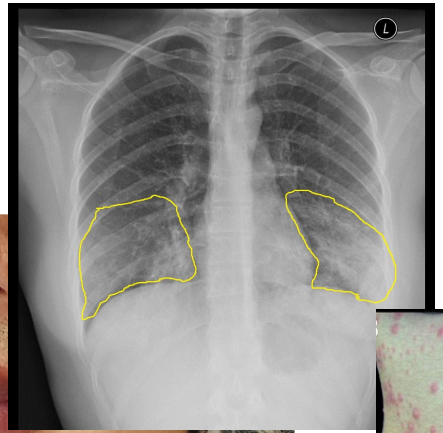
Mycoplasma pneumoniae

- Mycoplasma pneumoniae is a common bacteria cause of atypical pneumonia
- Intracellular replication, lacks a cell wall.
- Common cause of community acquired pneumonia (8-40%of the cases)
- Common to see atypical symptoms- mucositis, cutaneous manifestations, myocarditis, nephritis, meningitis



Clinical manifestations





Mycoplasma vaccines

- The types of vaccines that are most studied in *M. pneumoniae* include inactivated, live-attenuated, protein subunit and recombinant DNA vaccines.
- **Whole cell vaccines**
  - A meta-analysis suggested that inactivated vaccines reduced the incidence of both *M. pneumoniae* (MPP) and respiratory infections by ~40% only
  - Live-attenuated vaccines were found to induce protective effect in hamsters.
  - Clinical trials for efficiency evaluation of live-attenuated vaccine were never performed in humans because of the significant health risk involved
- **Recombinant Protein Subunit Vaccines**
  - Adhesion factors in M. pneumoniae, P1, P30 and other adhesion-associated protein have immunogenicity and immunoreactivity and are able to induce specific neutralizing antibodies.
- **DNA vaccines**
  - Trigger both cell-mediated and humoral immunity, but the injected DNA cannot be consistently replicated in mammalian cells.

Jiang, Z., Li, S., Zhu, C., Zhou, R., & Leung, P. H. (2021). Mycoplasma pneumoniae infections: pathogenesis and vaccine development. *Pathogens*, *10*(2), 119.

ARIZONA

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