INFECTIOUS DISEASE

Avian Influenza and Dairy Cattle: What Mixed Animal Practitioners Need to Know

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It started as a mystery. An unknown disease was spreading through a herd of dairy cattle on a farm in the Texas panhandle in the first months of 2024. The symptoms painted a murky clinical picture: respiratory and digestive issues as well as mastitis and subsequent decreased milk production.

The veterinarians on site ran a litany of tests to rule out the usual suspects. Those diagnostics yielded no definitive answers.

"Nobody really knew what the what was going on," says Kay Russo, DVM, MAHM, DACPV, of RSM Consulting based in Colorado. Dr. Russo was employed as a technical services veterinarian for a feed additive company at the time and was asked to reach out to the clinicians at the impacted farm.

"When I was talking with them," Dr. Russo says, "I recognized fairly quickly that this wasn't something that I've seen clinically in dairy practice. The combination of clinical signs just really didn't add up."

As a dairy cattle and poultry veterinarian, Dr. Russo had a suspicion. She asked, "What's going on with the birds on the farm?" The on-site veterinarian replied, "Well, they're all dead."

The farm's birds were submitted for testing. The suspicion was confirmed. The birds tested positive for avian influenza. The next step was to test the cattle.

Although no approved test existed at the time to check for avian influenza in dairy cattle, researchers at Iowa State University performed testing on the milk from the farm's dairy cattle.[1] It was positive. The first case of avian influenza in U.S. dairy cattle had been confirmed in March 2024.[1]

A GROWING OUTBREAK

The current avian influenza outbreak began in the United States in early 2022. Since that time, more than 175 million birds across all 50 states have been affected, including nearly every type of avian creature: commercial poultry, backyard flocks, and wild birds.[2] As of late summer 2025, more than 1000 herds of cattle have been infected, with cases appearing in at least 17 states.[3] An estimated 70 people across more than a dozen states have also tested positive for avian influenza.[4] And this flu is not unique to just these species; avian influenza has been confirmed in a wide range of mammals throughout the country, including bears, raccoons, skunks, rodents, seals, and big cats held in captivity.[5]

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It's important to note that the numbers of animals impacted are changing daily. See **BOX 1** for resources reporting updated numbers of cases per animal groups and their geographic distributions for a better understanding of the state of the outbreak in your area.

Beyond the sheer number of animals infected are the degree and impact of those individual infections. Birds have been most severely affected by this strain of avian influenza, with an average mortality rate of nearly 100%.[6] Due to this high mortality rate and the need to minimize the disease's spread, poultry farms where avian influenza is detected tend to cull entire flocks.[6] Cats, while not as widely impacted, seem to have a mortality rate of around 70% or higher.[7] Meanwhile, the mortality rate for cattle has been estimated to be much lower at well under 10%.[8,9] The mortality rate for humans who contract avian influenza has historically been around 50%, although that figure has been much lower for those who have contracted the disease in this latest outbreak, with only 1 of 70 cases leading to death so far.[10]

The death and illness of these agricultural animals bring about associated financial impacts, with this latest avian influenza outbreak representing the largest economic impact from an outbreak of animal disease in the country's recorded history.[8]

BOX 1 Disease Dashboards

The USDA and CDC track the most up-to-date numbers of avian influenza cases in different animal groups across the United States. Scan the QR codes below to understand the risk for a specific group in your area.

USDA: Cattle

USDA: Poultry

CDC: Humans

USDA: Other mammals

The loss of 175 million-plus birds creates major impacts on poultry farms across the country. And while the mortality rate for cattle may be relatively low, sick cows may be at higher risk for culling or reduce their milk output, which can have a quantifiable impact on production. A team of researchers sought to better understand this impact through an investigation of dairy cattle affected by avian influenza at a farm in Ohio (**BOX 2**).[8] The total financial impact to the herd was estimated to be nearly $750 000 according to Elisha Frye, DVM, DACVPM, an associate professor in the department of population medicine and diagnostic sciences at Cornell University College of Veterinary Medicine and a coauthor of the study.[8] Overall, "the cows on this farm diagnosed with clinical influenza had profound decreases in their rumination and milk production," Frye says. "The depression in milk production was prolonged, well after the animals had returned to preoutbreak rumination levels. The affected cattle were at a higher risk of dying or being culled." Frye added that it is important to keep in mind that this information is specific to this herd and could be different on other dairy farms with different management styles.

Beyond these considerations is the recognition of the need for a broader shift in the perspective of providing veterinary medical care. "Prior to this," Dr. Russo says, "we really didn't have avian influenza on the differentials list for a lot of species—we kind of considered it more often than not an infection limited to birds ... Ultimately, I think it needs to be on the rule-out list at this point for most of the mammals that we handle."

UNDERSTANDING AVIAN INFLUENZA

Avian influenza is an influenza A virus. There are generally 2 types of avian influenza determined by their pathogenicity within poultry: highly pathogenic avian influenza (HPAI) and low pathogenic avian influenza (LPAI).[11] Whereas LPAI spreads rapidly in poultry but does not tend to result in death, the virus associated with the ongoing outbreak, which has been spreading rapidly in the United States since early 2022, is referred to as an HPAI due to its high mortality rate in these animals. This subtype of avian influenza can also be referred to as H5N1, referring to its particular mix of the surface proteins hemagglutinin (H) and neuraminidase (N), for which there are 16 and 9 different types, respectively.[12] Specific types of avian

BOX 2 By the Numbers: The Avian Influenza Impact on a Dairy Cow Herd in Ohio

The full impact of avian influenza on dairy cows is still being investigated, but a study published in *Nature Communications* in July 2025 quantified the effect for a single herd in Ohio.[8]

3876
The number of cows in the studied herd.

40%
The percentage of dry cows estimated to have antibodies for avian influenza out of the total herd.

90%
The percentage of lactating cows estimated to have antibodies for avian influenza out of the total herd.

20%
The percentage of adult cows in the herd that had clinical disease.

8.6
The approximate typical duration in days of clinical disease in affected cows.

6
Cows with clinical signs were this many times more likely to die from the virus.

3.6
Cows with clinical signs were this many times more likely to be removed from the herd.

900 kg
The amount of milk production lost per cow for roughly 2 months following the outbreak.

$737 500
The amount of estimated money the farm lost during the observation window due to cow death, loss of milk, and cows being removed from the herd.

influenza can be further subdivided into groups known as clades, which are identified by their genetic makeup, and even further into genotypes.[11] The specific virus impacting dairy cattle in the United States has been identified as HPAI H5N1 clade 2.3.4.4b, with most as genotype B3.13 and very few as genotype D1.1.[9]

The way that avian influenza is transmitted varies according to species and the way in which those species interact with other animals and objects in the environment. Studies have confirmed numerous routes of transmission, including via direct contact, fomites, respiratory secretions, dairy cattle milk, and consumption of infected raw meat.[13] However, the original source of the current outbreak and a major contributor to the virus' ongoing spread is wild bird migration. Wild birds, such as migratory water fowl, are known to be asymptomatic reservoirs of the virus and have spread the clade along their migratory tracks, ultimately from Europe, Asia, and Africa to Canada and south to the United States.[14]

See **TABLE 1** for a breakdown of the most common routes of transmission among specific animal groups, associated best practices for transmission prevention, common clinical signs, and general information related to likely health impacts and treatments. Note that clinicians should always follow institutional biosecurity protocols. See **BOX 3** for the latest resources on reducing the risk of infection in different animals.

TESTING AND REPORTING

Avian influenza can be detected using PCR tests, which are designed to detect the virus' genetic code. In lactating dairy cows, the virus concentrates in the milk, which can be tested. In other animals, a nasal or nasopharyngeal swab may be best for testing.

Clinicians who suspect avian influenza in cattle should immediately isolate those animals, wear personal protective equipment when interacting with them, and work with state or federal officials on confirmation testing and next steps. Dr. Frye encourages clinicians to contact and work with a National Animal Health Laboratory Network (NAHLN; **go.navc.com/4pjNQ4Q**) lab. NAHLN labs provide free H5 livestock testing and report to the USDA. Avian influenza is a reportable disease; therefore, any suspected cases must be reported. This is important, Dr. Frye says, because "if we fragment ourselves, we're going to lose the ability to track this virus."

TABLE 1 Highly Pathogenic Avian Influenza in Different Animal Groups

ANIMALS	COMMON ROUTES OF TRANSMISSION	ASSOCIATED PREVENTION	CLINICAL SIGNS	PROGNOSIS AND TREATMENT
Dairy cattle[9,15]	▪ Direct or indirect contact with infected wild birds or other poultry ▪ Contaminated materials such as respiratory secretions, feces, equipment, or clothing ▪ Contact with infected cows or infected milk	▪ Isolation from wild birds and pests ▪ Regularly cleaning and disinfecting habitats and equipment ▪ Restriction of unnecessary contact from outside people or animals ▪ Isolation from cows that show any sign of sickness	Various, including inappetence, lethargy, coughing, sneezing, eye discharge, reduction in milk production, mastitis, thickened and discolored milk	▪ Prognosis is generally good, with a mortality rate of less than 10% ▪ Treatment is generally supportive care, including fluids and fever management
Poultry[12]	▪ Direct or indirect contact with infected wild birds or other poultry ▪ Contaminated materials such as respiratory secretions, feces, equipment, or clothing	▪ Isolation from wild birds and pests ▪ Regularly cleaning and disinfecting habitats and equipment ▪ Restriction of unnecessary contact from outside people or animals ▪ Isolation from birds that have traveled before returning to the flock	Various, including death, dyspnea, lethargy, inappetence, change in egg production, respiratory discharge, and diarrhea	▪ Nearly 100% mortality rate within several days ▪ No treatment; depopulation
Cats and dogs[7,16,17]	▪ Consumption of infected raw meat or milk ▪ Proximity to infected poultry, cattle, rodents, or other animals ▪ Direct or indirect contact with a dead infected animal	▪ Limiting access to raw milk and meat products ▪ Feeding pasteurized milk products and cooked meat products ▪ Limiting access to areas with potentially infected poultry, cattle, rodents, or other animals ▪ Regularly disinfecting contaminated materials	Clinical signs are more thoroughly documented in cats, which tend to be more affected than dogs, and can include lethargy, inappetence, conjunctivitis, dyspnea, coughing, sneezing, depression, and neurologic signs (e.g., seizures, blindness)	▪ Cases in dogs seem to be rare compared to cats, for which a diagnosis carries an estimated 70% mortality rate ▪ Treatment is generally supportive care, including fluids and oxygen therapy
Humans[18,19]	▪ Direct or indirect contact with infected poultry, cattle, cats, or other animals ▪ Direct or indirect contact with a dead infected animal ▪ Consumption of infected raw meat or milk	▪ Avoiding direct contact with infected animals ▪ Wearing personal protective equipment if interacting with potentially sick or infected animals, including working in milking parlors ▪ Avoiding direct contact with and regularly disinfecting contaminated materials ▪ Avoiding touching and consuming raw milk and meat products ▪ Pasteurizing milk products and cooking meat products to their appropriate temperature before consumption ▪ Avoiding direct contact with dead birds	Various, ranging from none to mild (e.g., conjunctivitis, fever, congestion, body aches, lethargy, cough, headache) to severe (e.g., dyspnea, seizures)	▪ Variable, can be treated by human healthcare providers with antiviral medications

BOX 3 How to Stop the Spread

Scan the QR codes below for resources on reducing the spread of avian influenza.

USDA: Cattle

USDA: Poultry

CDC: Humans

AVMA: Cats

FUTURE RISK

While numbers show a slowdown in the spread of avian influenza in the summer of 2025, the outbreak is ongoing. There are conditionally licensed H5 vaccines for poultry in the United States that could help limit the spread of the disease.[20] However, vaccines are generally not being used on poultry in the United States due to myriad political and logistical reasons, including implications in the export market.[21] Avian influenza vaccines for cattle are in development, but whether these will be approved and permitted to be used remains to be seen. There are vaccines available for humans, but these are not widely available or a part of a standard vaccine schedule at this time.[21]

Looking to the future, Dr. Russo, who helped to first identify the disease in cattle, is clear about the need she sees to seriously address this outbreak. "It not only compromises food security, but it also provides an unnecessary risk to humans," she says. "With the propensity of flu viruses to change, and change quickly, it's important that we get in front of this so we don't end up with a virus that becomes more sustained with human-to-human transmission." TVP

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