INFECTIOUS DISEASE

Avian Influenza and Feline Patients

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Abstract

Highly pathogenic avian influenza H5N1 is an emerging disease of public health concern that poses a risk to many animal species. Over the past several years, H5N1 has expanded its geographic range and ability to infect different hosts. Domestic cats are at particular risk for severe respiratory and/or neurologic illness that is often fatal. Risk factors include exposure to wild birds or livestock as well as consumption of raw dairy products or raw meat. No clinical studies have documented the effectiveness of antivirals, and no vaccines are available for H5N1 in cats. Veterinarians should incorporate a screening protocol of risk factors for cats with respiratory and/or neurologic signs and wear appropriate personal protective equipment for suspected cases.

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Take-Home Points

- At the onset of H5N1 infection, cats may present with nonspecific clinical signs that progress to acute respiratory and/or neurologic signs; neurologic abnormalities are more common.
- Transmission of H5N1 commonly happens in cats via direct contact with infected animals or their secretions, ingestion of infected animals or animal products, or potentially through contaminated fomites.
- Screening questions for potential exposure, such as access to poultry, wild birds, and outdoor bodies of water and ingestion of raw dairy products, should be asked in veterinary facilities for cats that present with respiratory and/or neurologic signs.
- Appropriate personal protective equipment should be worn for suspected cases.

Currently, highly pathogenic avian influenza (HPAI) is predominantly caused by the H5N1 subtype of influenza A that naturally circulates in wild waterfowl populations. H5N1 can infect additional bird species as well as a growing range of mammalian species. First detected in domestic geese in China in 1996, this lineage of HPAI H5N1 has demonstrated the ability to expand its geographic range and host infectivity over time.[1]

Since 2020, the incidence and geographic distribution of HPAI H5N1 have increased considerably among avian and nonavian species. Although several clades are currently circulating, clade 2.3.4.4b has emerged as the predominant virus, causing widespread outbreaks in domestic poultry and extending to dairy cattle, wildlife (including foxes and sea lions), and companion animals such as domestic cats.[2] The first known feline patient associated with this clade was in France in December 2022 in a cat residing near a duck farm recently culled due to HPAI H5N1 infection.[3] The cat exhibited severe respiratory and neurologic signs and was subsequently euthanized. Soon afterward, additional clusters of infection were reported among domestic cats in Poland that had been fed raw poultry and domestic cats housed in shelters in South Korea.[3]

In the United States, the Department of Agriculture first detected HPAI H5N1 in wild birds in January 2022, followed by the first commercial poultry outbreak in turkeys the next month.[4] The first documented cases of clade 2.3.4.4b infection in domestic cats were reported in April 2023 in 3 outdoor cats, all of whom developed severe illness.[5] Two of the cases rapidly progressed within 2 days and were euthanized due to poor prognosis.[5] In March 2024, HPAI H5N1 infection was confirmed in dairy cattle for the first time, marking a significant expansion in host range.[6] Within 2 months, associated feline cases were detected.[7] In May 2024, 2 indoor-only cats belonging to dairy farm workers in Michigan tested positive for HPAI H5N1 and subsequently died or were humanely euthanized due to severe illness.[7]

Transmission

Cats may be exposed to HPAI through multiple routes. Transmission commonly occurs via direct contact with infected animals or their secretions, ingestion of infected animals or animal products, or potentially through contaminated fomites.

Exposure associated with infected poultry or dairy cattle is a frequently reported source of feline infection.[7-9] In contrast to other species in which infection is often fatal, affected dairy cattle may display limited clinical signs (e.g., decreased milk production, inappetence, fever), allowing the infection to spread within herds. Cows have a high concentration of sialic acid receptors, which are necessary for viral entry into the respiratory tract and mammary glands, making them vulnerable to HPAI H5N1 infection and causing a high viral load in milk.[2] Cats may ingest the virus by consuming unpasteurized milk or colostrum from

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infected dairy cattle.[6] Consumption of infected poultry or dead wild birds, or exposure to a carcass contaminated with the virus, are other sources of infection. Commercial raw poultry–based diets for pets have also been implicated as a cause of feline infection, highlighting dietary habits as a significant risk factor when considering the potential for HPAI infection in cats.[8] Transmission via humans, such as farm workers carrying virus particles on clothing or footwear, has been suspected in some cases.[8] Predation may also be an exposure risk. HPAI H5N1 has been detected in several small mammal species commonly preyed upon by cats, including deer mice, house mice, rats, and squirrels.[3] Although cat–cat and cat–human transmission of clade 2.3.4.4b has not yet been reported, cats shed the virus in urine and respiratory secretions; cat–cat transmission of other H5N1 clades has been documented.[9,10] Thus, the potential for zoonotic transmission or viral adaptation is a concern.

Pathogenesis

At the early onset of infection with H5N1, cats may display nonspecific clinical signs, such as fever, decreased appetite, and lethargy. These clinical signs may progress to acute respiratory and/or neurologic signs, yet neurologic abnormalities seem to be predominant. Acute respiratory illness is characterized by nasal or ocular discharge, coughing, sneezing, and respiratory distress. Affected cats also typically develop acute and rapidly progressive neurologic disease, including signs of encephalitis such as blindness, disorientation, ataxia, seizures, and paralysis. Progression is often rapid and may result in death.[11] Insufficient data exist regarding the effectiveness of available antiviral medications such as oseltamivir.[12] No feline vaccines are available for H5N1. Therefore, therapy typically consists of supportive care.[1,11]

Because neurologic signs may closely mimic those seen with rabies, H5N1 infections in cats may be underreported or misdiagnosed.[9,13] In experimentally infected cats, onset of clinical signs began 1 to 4 days after inoculation with the virus.[10,14] A systematic review of 2 decades of literature on avian influenza in cats found a fatality rate of 90% for H5N1 clade 2.3.4.4b; however, this is likely an overestimate resulting from lack of testing and serosurveillance.[13] Of note, infection with other clades of HPAI can occur, although H5N1 accounted for 98% of feline HPAI infections.[13] Necropsy findings vary but most commonly involve severe inflammatory infiltrate and necrosis of the lungs, liver, and central nervous system.[15]

Disease Detection

Recognizing HPAI in cats can be challenging due to its nonspecific clinical signs at infection onset and the broad range of potential differential diagnoses, including more common causes of feline upper respiratory tract infections (e.g., herpesvirus, calicivirus) and life-threatening neurologic infections (e.g., rabies, toxoplasmosis, feline infectious peritonitis) (**BOX 1**). A recent meta-analysis found that 3% of cats with reported infections had no clinical manifestations of H5N1.[15]

Diagnostic testing typically involves PCR analysis of an oropharyngeal swab, blood, or urine, which can be submitted through commercial diagnostic laboratories.

BOX 1
Clinical Signs of Highly Pathogenic Avian Influenza H5N1 Infection in Cats

- Lethargy, fever, inappetence
- Rapid illness progression
- Acute respiratory signs (e.g., nasal discharge, ocular discharge, sneezing, dyspnea, tachypnea)
- Acute, progressive neurologic signs (e.g., blindness, disorientation, ataxia, tremors, circling, seizures, paralysis)
- Sudden death

Results are reported as negative or "non-negative," the latter requiring formal confirmation by the USDA Animal and Plant Health Inspection Service (APHIS) National Veterinary Services Laboratories or another APHIS-approved facility before being reported as positive.[3,16] The best PCR testing samples for affected cats is not yet known.[17] Oropharyngeal swabs are typically preferred for antemortem samples. Veterinarians are advised to submit whole carcasses for necropsy.[8,17] Veterinarians should refer to the diagnostic laboratory's testing guidelines before submitting a sample and refrain from using HPAI H5N1 rapid tests as their accuracy has not been validated in cats. Any samples of raw food that the cat has consumed should be submitted for testing as well.[8] Samples should be kept refrigerated or frozen and shipped with ice packs to the diagnostic laboratory according to their specific instructions. Timely testing and notification are essential due to the severity of disease and public health importance of HPAI.

BOX 2
Risk Factor Screening Questions for Cats With Possible Highly Pathogenic Avian Influenza (HPAI) H5N1

- **Are the following clinical signs present?**
  - Acute respiratory illness (e.g., nasal discharge, ocular discharge, sneezing, dyspnea, tachypnea)
  - Acute, rapidly progressive neurologic illness (e.g., blindness, disorientation, ataxia, tremors, circling, seizures, paralysis)
- **Does the cat have access to outdoor bodies of water used by wild birds?**
- **Has the cat:**
  - Been exposed to sick poultry, dairy cattle, or wild/domestic birds?
  - Had any recent interaction with dead birds?
  - Consumed raw or unpasteurized dairy products?
  - Consumed raw poultry, including commercially prepared raw diets?
- **Has the owner recently been exposed to, worked on, or visited a farm with known or suspected HPAI H5N1 cases?**

Public Health Risk

The role that cats play in the overall risk for HPAI H5N1 infection in humans is uncertain. Although there is no documented evidence of zoonotic transmission of HPAI H5N1 from cats to humans, HPAI H5N1 (and influenza viruses in general) exhibits high mutability and ability to cross over into new species and hosts. Because of their proximity to humans, companion animals present a potential risk for zoonotic transmission to humans. In an experimental study, subclinical feline infections were documented in 2 cats after exposure to a swan with HPAI H5N1, raising concerns for the potential for undetected virus circulation. The factors contributing to subclinical illness are unknown.[18] As of March 2026, there were 153 confirmed cases of H5N1 infection in domestic cats in the United States.[19] Vaccine studies are underway to protect poultry flocks and dairy cattle from infection.[2,20] However, these vaccines may not prevent the shedding of the virus into the environment, posing a continued threat to other species such as cats.[2]

Precautions for Veterinary Professionals

Veterinarians should carefully assess relevant risk factors when evaluating feline patients, particularly those presenting with respiratory and/or neurologic signs. Screening should include questions about raw diet consumption; access to or ingestion of unpasteurized dairy products; predation; outdoor access; and exposure to waterfowl, domestic poultry, or dairy cattle (**BOX 2**). If H5N1 is suspected, appropriate personal protective equipment—including an N95 respirator, protective eyewear (goggles or face shield), gloves, hair covering, shoe covers, and gown—should be worn during examinations and sample collection (**BOX 3**).[8] In addition, strict isolation protocols should be followed for feline patients suspected or confirmed to be infected with H5N1.

Although the **BOX 2** screening questions have not been validated to predict H5N1 infection, indoor-only cats without these risk factors are unlikely to be infected with H5N1 unless their owner has contact with infected animals. Because H5N1 has a similar clinical manifestation as rabies virus, it is essential that veterinarians confirm current rabies vaccination status and pursue rabies testing as indicated.

Keeping cats indoors as much as possible reduces the likelihood of contact with infected wild birds and predation of small mammals.[13]

Precautions for Pet Owners

Dietary exposures have been identified as the primary mode of transmission of HPAI H5N1 in cats. Owners should be counseled to avoid feeding cats raw or undercooked poultry meat, including freeze-dried raw diets and raw or unpasteurized dairy products, even if commercially produced (**BOX 4**).[8] Keeping cats indoors as much as possible reduces the likelihood of contact with infected wild birds and predation of small mammals.[13] After handling poultry, livestock, wild birds, wild mammals (e.g., mice), or bird feeders, owners should wash their hands thoroughly and change clothes and footwear to reduce the risk of bringing the virus into the home.[9]

Summary

HPAI H5N1 is a significant public health concern due to its ability to infect a wide variety of host species and rapid mutation rate. Although subclinical infections exist, cats are at risk of developing severe disease. For cats developing clinical signs of H5N1, the prognosis is presently grave, and there are no known specific treatment options. Exposure to wild birds, predation of infected small mammals, and consumption of raw dairy or raw poultry products are risk factors that veterinary professionals should consider when evaluating feline patients with respiratory and/or neurologic signs. Owners should be advised to keep their cats indoors as much as possible; avoid feeding their cats raw diets (including those that are commercially produced); and exhibit caution when in contact with livestock, poultry, and wild animals.

Note: The number of confirmed feline cases is rapidly evolving. Readers are encouraged to consult the USDA APHIS website for the most current data.[19] TVP

BOX 3
Recommended Personal Protective Equipment for Veterinary Professionals in Contact With Cats With Suspected or Confirmed Highly Pathogenic Avian Influenza H5N1

- N95 respirator
- Protective eyewear (goggles or face shield)
- Gloves
- Hair covering
- Shoe covers
- Gown

BOX 4
Potential Sources of Highly Pathogenic Avian Influenza H5N1 in Cats

- Raw or unpasteurized dairy products (e.g., milk, cream), including those that are commercially produced
- Raw colostrum
- Raw or undercooked poultry meat, including commercially produced freeze-dried raw diets
- Exposure to infected wild birds or poultry and their environments
- Exposure to infected livestock and their environments
- Exposure to individuals who work on affected farms as well as their clothing and other fomites

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