

H3N2 CANINE INFLUENZA VIRUS FAQs

SHELTERS AND RESCUE GROUPS

What is H3N2 Canine Influenza Virus?

H3N2 canine influenza virus (H3N2 CIV) is a very contagious influenza virus that infects dogs. This virus recently emerged in the US in 2015. It has already infected thousands of dogs in more than 30 states. H3N2 CIV has also infected cats in shelters, but this may not be a common occurrence. There is no evidence that this virus can infect people.

What does H3N2 CIV cause?

H3N2 CIV causes a respiratory infection in dogs that looks like “kennel cough”. Common symptoms include sneezing, nasal discharge, and frequent coughing that can last for 2 weeks or more. Many dogs have a fever, decreased appetite, and lethargy during the first few days of illness. Some dogs develop more serious disease and pneumonia that requires hospital care.

H3N2 CIV can cause respiratory infections in cats too. The cats have typical respiratory symptoms of sneezing and nasal discharge but usually do not cough. One unusual symptom noted in infected shelter cats has been “lip-smacking” and drooling (see <http://newswise.com/articles/uw-shelter-medicine-wvdl-find-canine-influenza-transmitted-to-cats-in-midwestern-shelter>).

How do dogs get H3N2 CIV infection?

H3N2 CIV is spread by direct contact with a sick dog and by contact with an environment or people that are contaminated with the virus. Coughing dogs produce virus-containing mists that can travel 20 feet or more in the air, facilitating virus dissemination over distances. This type of virus transmission contributes to a rapid increase in coughing dogs in shelters. Shelter workers and volunteers with contaminated hands and clothing transmit the virus between dogs. There are numerous cases where they have also carried the virus home to their own dogs.

The virus can survive in the environment (kennel surfaces, crates, food/water bowls, collars/ leashes, toys, beds, vehicles) or on people’s clothing and hands for 12 to 24 hours before it dies. It is easily killed by most disinfectants, handwashing with soap and water, normal laundering of clothing and bedding, and washing food/water bowls and toys with soap and water.

What dogs are at risk for H3N2 CIV?

Most dogs do not have immunity to H3N2 CIV. This means that dogs of any breed, age or health status will likely be infected if they are exposed to the virus. Dogs at most risk for exposure are those participate in group events or are housed in communal facilities. Dogs in shelters and rescue groups are a high-risk group, especially those with daily admissions from a community where the virus is circulating or that transfer in animals from another community where the virus is known to exist. Infected dogs can also be transferred from affected facilities to foster homes.

Cats in shelters are the highest risk group for cats. Housing cats in separate rooms from dogs reduces risk for exposure.

How do I know if my shelter or rescue group has H3N2 CIV?

First of all, H3N2 CIV cannot be diagnosed based on clinical signs because the same signs are caused by other more common respiratory pathogens documented in sheltering organizations. Here are some clues that should raise your suspicion of canine influenza:

- Explosive increase in number of coughing dogs in the facility over a period of 2-3 weeks. The sick dogs can be more than 50% of the population
- Some of the dogs develop high fevers and pneumonia within a week of starting coughing
- Shelter staff report that their dogs at home are coughing
- Adopters, transfer partners, and foster homes report that dogs they recently took from the facility are now coughing
- Community veterinarians report they are seeing an increased number of coughing dogs that originated from the facility, some of which are very sick
- Media reports of documented H3N2 CIV cases in the community or nearby communities

Is diagnostic testing necessary if I strongly suspect canine influenza?

Absolutely. Achieving a diagnosis through testing dictates how to manage each dog, how to manage the population of dogs, and how to manage spread of disease back out to the community. Diagnostic testing must be performed to rule out infection with other more commonly occurring respiratory viruses and confirm infection with H3N2 CIV. The best diagnostic test for respiratory pathogens is PCR performed on swabs collected from the nose and throat of sick dogs (see **Swab Collection for Respiratory Pathogen PCR** and the video demonstration at the following link:

<https://www.youtube.com/watch?v=wYP4cFh398>). Collect swabs from dogs that have been sick for <4 days to maximize detection of known canine respiratory pathogens. Submit swabs to veterinary diagnostic laboratories that offer a comprehensive canine respiratory pathogen PCR panel that includes H3N2 CIV along with other known pathogens such as IDEXX (<https://www.idexx.com/small-animal-health/solutions/news-and-topics/canine-influenza-outbreak.html>).

Confirming H3N2 CIV by diagnostic testing is essential to next steps for management of infected dogs and prevention of virus transmission to more dogs. Management is dependent on pathogen properties such as incubation time (time from infection to clinical signs) and shedding time (how long the dog is contagious to other dogs). The shedding or contagious period for H3N2 CIV is much longer than that for

other respiratory pathogens and canine influenza viruses, so confirmation of H3N2 CIV infection is necessary (see ***Canine Respiratory Infections in Shelters***)

What can I do if H3N2 CIV is confirmed by diagnostic testing?

The key points to management of H3N2 CIV in individual dogs and populations of dogs include:

- Incubation time = < 1 week
- Shedding or contagious time = 3 to 4 weeks
- Most, if not all, dogs become infected if exposed
- Most sick dogs recover in about 2 weeks with no further health complications
- H3N2 CIV is readily killed by common disinfectants

The critical steps for management of infected dogs and prevention of virus spread to more dogs include:

- ***Isolate all sick dogs for 4 weeks***
- ***Quarantine all exposed dogs for at least 1 week, preferably 2 weeks***
- ***Prevent exposure of new dogs to sick dogs and dogs already exposed to sick dogs***

(See ***Management of Disease Outbreaks in Shelters***)

Foster homes and foster-based rescue groups

- Avoid placing sick dogs in foster homes with other dogs.
- Isolate sick dogs in the foster home for 4 weeks. Even though the dog may recover in 2 weeks, they are still contagious for another 2 weeks.
- If foster homes have multiple dogs, the entire household must be isolated for 4 weeks.
- Physical isolation of sick dogs from other dogs in the home is ideal to reduce continual virus exposure. Since all of the dogs have already been exposed, they are likely to get sick too.
- Keep cats from direct contact with the dogs and their living quarters.
- Wash hands and change clothes/shoes after handling dogs and before handling other animals.
- Do not associate with dogs outside of the home unless wearing clean clothing/shoes and hands are thoroughly washed. The virus remains viable on clothing, hands, and vehicles for 12 to 24 hours and can be transmitted to dogs during this time.
- DO NOT add any more dogs to the home until 4 weeks after the LAST dog gets sick.

Shelter facilities

- Isolate all sick dogs from the other dogs in the facility for 4 weeks. Even though the dog may recover in 2 weeks, they are still contagious for another 2 weeks.
- Isolation is the single most important steps to virus containment. Effective isolation requires a physically enclosed room since the virus is air-borne. Don't have an isolation room? Consider these alternatives:
 - Transfer to foster homes with no other dogs for completion of the 4-week isolation
 - Transfer to another facility with isolation capacity

- Find an empty building or warehouse for housing sick dogs for 4 weeks
- Contact a disaster response group to see if they can provide temporary housing and care
- Quarantine all asymptomatic dogs exposed directly or indirectly to sick dogs. These dogs may be infected but in the pre-clinical incubation period. Infected dogs shed virus during the incubation period so they must be separated from other dogs.
 - Quarantine means no dogs in and no dogs out until their infection status is known.
 - The dogs must be quarantined for at least 1 week, preferably 2 weeks.
 - Monitor the dogs at least twice daily for cough. Coughing dogs must be promptly removed to isolation.
 - The quarantine clock must be re-started every time a new dog starts coughing.
 - If resources are available, each dog in quarantine can be tested by collecting nasal and throat swabs and submitting them to a laboratory that offers H3N2 CIV PCR testing.
 - Dogs can be tested 4 days or more after exposure in order to detect the virus
 - Dogs with negative test results can be removed from quarantine
 - Alternatively, exposed asymptomatic dogs can be moved into a home without other dogs for completion of a 2-week quarantine time.
- Stop all dog admissions, adoptions, transfers, and transports.
 - A complete shutdown of the shelter's dog operations is the best practice for prevention of disease spread to more dogs and perpetuation of the virus transmission cycle. Some shelters have not been able to eradicate H3N2 CIV from their facility because of admission of new dogs while the virus is in the shelter.
 - The shelter should remain closed to dog movement in and out until the virus is eliminated from the population. Cat operations can continue as normal as long as people cannot enter the dog areas
 - Municipal shelters may not be able to stop all dog admissions because of their public health mandate. Here are some strategies to reduce admissions to the "must admit" dogs only:
 - Temporary moratorium on admission of owner surrenders for at least 4 weeks.
 - Divert healthy stray dogs to a partner facility for at least 4 weeks
 - Home quarantine of dogs that have bitten a person if this is a safe alternative
 - Quarantine of dogs that have bitten a person at local veterinary clinics
 - Restrict intake to "must admit" dogs that are injured, ill, or a public safety threat
 - "Must admit" dogs must be housed in a separate area from the dogs in isolation or quarantine to maintain the "clean break" necessary for stopping virus transmission in the shelter.
- Stop movement of unnecessary personnel in dog areas. This includes volunteers, the public, and anyone who is not a trained employee.
- Insure that staff caring for dogs in isolation and quarantine wear appropriate PPE.

- Ideally, the staff can be segregated into 3 groups – one for isolation, one for quarantine, and one for unexposed “must admit” dogs and cats.
- Staff caring for isolated dogs or quarantined dogs must wear protective outerwear that covers the entire body, including the arms and legs, boots (not shoe covers), gloves, and hair cover similar to surgeon’s caps. Staff should never be in these 2 “dirty” areas without this PPE nor should they wear the PPE outside of these areas.
- If there are not enough staff to dedicate to each of the 3 areas, then they should care for unexposed dogs and cats first, then put on PPE to care for the quarantined dogs, then change into different PPE dedicated to the isolation dogs.
- Cats can be infected by H3N2 CIV, so they must not have any direct or indirect contact with dogs.
- Staff must take precautions to prevent transport of the virus home to their pets. This includes a change of clothes/shoes and washing hands before entering their vehicle.
- Prepare a press release to inform the community.
 - Transparency is essential for protecting other dogs in the community.
 - The press release should tell recent adopters what to do if their dogs become ill.
 - The press release should inform the community of confirmed H3N2 CIV in the shelter and what the shelter is doing to contain and eliminate the virus. Informing the public engenders their understanding and support.
 - The press release also informs veterinarians and dog owners about the risk for H3N2 CIV exposure in the community so they can take precautionary measures to protect their clinics and dogs.

How are H3N2 CIV-infected dogs treated?

Since canine influenza is a viral infection, treatment is mainly supportive. Secondary bacterial infections are very common and can be treated with a broad-spectrum antibiotic such as doxycycline. Fortunately, most dogs recover in about 2 weeks without complications. However, about 20% of infected dogs progress to pneumonia within the first week of illness. These dogs may have a fever, not eat, are lethargic, and have rapid or labored breathing. The pneumonia can be life-threatening without proper veterinary care in a hospital.

What can I do to protect my shelter or rescue group from H3N2 CIV?

You should be aware of any information about confirmed documentation of H3N2 CIV in your community or communities that are a source of dogs for your organization.

- Refrain from admitting owned dogs with respiratory illness. Ask the owner to isolate the dog at home for 2 weeks.
- If sick dogs with signs of respiratory infection must be admitted, then isolate them from other dogs and submit swabs for the comprehensive canine respiratory pathogen PCR panel test to rule out H3N2 CIV.

- Ask owners intending to surrender their dog if the dog has been sick within the past 2 weeks or has been around sick dogs in the past 2 weeks. If so, ask the owner to quarantine the dog at home for another 2 weeks. If the owner cannot keep the dog, then quarantine it in the shelter until the dog is tested for H3N2 CIV.
- Use extra precautions for dogs imported from South Korea and China. These countries are endemic for H3N2 CIV and there are several instances where imported dogs brought H3N2 CIV with them. If you take in these dogs, Dogs from these countries should be quarantined for 2 weeks and monitor for coughing or test for H3N2 CIV.
- Train staff to monitor dogs in the general population for signs of respiratory infection at least twice daily. Dogs with compatible signs should be immediately removed from the population and housed in isolation. These dogs should be tested for H3N2 CIV if the shelter is in a community where this virus is known to exist.

Is there a vaccine for H3N2 CIV?

Merck Animal Health and Zoetis have vaccines for H3N2 CIV. Just like human flu vaccines, the H3N2 CIV vaccine may not completely prevent infection but will make it less likely. Additionally, if a vaccinated dog does get infected, the disease is likely to be more mild and of shorter duration. The vaccine can also reduce the risk for pneumonia. The H3N2 vaccines contain killed virus so they cannot cause disease. Two doses of vaccine must be given for optimum immune response – the doses are administered over a 2-to 3-week period and establish immunity within 1 to 2 weeks after the second dose.

If it takes 2 doses and 5 weeks for optimal response, is vaccination practical for shelters and rescue groups? Vaccination is the most important tool for reducing or preventing influenza virus circulation in the community. The more dogs vaccinated, the greater the immune barrier, and the less opportunity for virus transmission between dogs. Vaccination is most practical for shelters and foster-based rescue groups where dogs may stay in their care long enough to get the required 2 doses. Vaccination can also be considered by shelters with short lengths of stay if adopters and transfer partners are provided a plan for follow up administration of the second dose.

Are there resources to help my shelter or rescue group?

Shelter medicine programs at the University of Florida College of Veterinary Medicine, the University of Wisconsin School of Veterinary Medicine, the University of California at Davis School of Veterinary Medicine, and at Cornell University College of Veterinary Medicine have expertise to help shelters and rescue groups with canine influenza and other infectious diseases. Please reach out to these experts for assistance and guidance.

Maddie's Shelter Medicine Program at UF: Dr. Cynda Crawford at crawfordc@ufl.edu

Shelter Medicine Program at Wisconsin: uwsheltermedicine@vetmed.wisc.edu

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