

## Canine influenza H3N2: should you be thinking about it?

A canine influenza virus (CIV) H3N2 outbreak began in the San Francisco Bay area in December 2017, and cases have since spread throughout the Silicon Valley and into Nevada, southern California and the Pacific Northwest. This outbreak is solely caused by H3N2; the H3N8 strain is not contributing to the outbreak, and the last H3N8 positive U.S. case was detected in August 2017.

In February, a 6-year-old, healthy, small breed dog in east King County tested positive for both H3N2 and coronavirus. This dog had no history of traveling outside of King County; potential risk exposures include visiting a groomer, trail walking, and visits to stores that allow dogs. The dog fully recovered. A dog in Walla Walla also tested positive for H3N2 in February after traveling to California. Southern Oregon detected its first case in February 2018 in a 7-year-old male Yorkie that had traveled to Reno.

The last known cases of H3N2 in King County dogs occurred in December 2015–January 2016 and were associated with a large respiratory outbreak in a commercial kennel/daycare facility located in south King County. This outbreak sickened over 90 dogs, but only five cases were confirmed with laboratory testing – four in King County and one in Pierce County.

### CIV basics

There are two CIV strains that can spread between dogs: H3N8 and H3N2. Both strains cause similar symptoms in dogs. These viruses are different from the seasonal influenza viruses that spread among humans, and neither are known to make people sick. H3N8 was first identified as a factor in canine respiratory disease in 2004; this virus is a genetic variant of the H3N8 equine influenza virus that gained the ability to infect dogs and be transmitted from dog to dog. The H3N2 virus was previously only seen in Asia and is of avian origin but also gained the ability to infect dogs and be transmitted from dog to dog. It was first detected in the United States in 2015 during a large respiratory outbreak in Chicago.

As H3N2 is a 'novel' virus, all dogs are susceptible to infection when exposed. Infected dogs may have typical 'flu' symptoms: fever, cough, sneezing, nasal discharge, lethargy, and loss of appetite. Up to 25% of infected dogs have no symptoms. Most dogs recover in 2–3 weeks, but more severe and fatal cases of pneumonia do occur. Dogs may be co-infected with CIV and other emerging respiratory pathogens, such as coronavirus and *Streptococcus equi subsb. zooepidemicus*.

CIV is transmitted by direct contact with respiratory secretions from infected dogs, often in indoor spaces such as an animal shelter or boarding kennel/day care, and by contact with contaminated objects. The virus can survive for 1–2 days on floors, cages, and worker clothing. Dogs infected with CIV are most contagious during the 2–4-day incubation period, when they shed the virus in their nasal secretions but do not show signs of illness. Peak of viral shedding is 3–4 days post infection. Long shedding times of up to 24 days have been identified in dogs infected with H3N2, so a quarantine of at least 21 days is recommended for dogs with H3N2. Dogs may continue to cough for several weeks following recovery from acute infection.

H3N2 can infect cats, although rare, and there is also some evidence that guinea pigs and ferrets can become infected. In early 2016, cats in an Indiana shelter were infected with H3N2, spread to them from infected dogs, and investigators found evidence that cat-to-cat transmission is possible. Dogs with respiratory illness should not be housed with cats, if possible.

### **Infection control and vaccination– lines of defense against CIV**

Viral disease is best prevented through vaccination. Assessment for vaccinating a canine patient for CIV should be like that for *Bordetella bronchiseptica* vaccination. There is a bivalent (H3N8 and H3N2) canine influenza vaccination. CIV vaccination requires two doses, 2-4 weeks apart. Speak to the manufacturer of the vaccine you carry regarding the need for annual boosters.

To minimize the risk of introduction and spread of canine influenza and other diseases, maintain proper cleaning and disinfection, ask about exposure to other dogs such as in daycare, grooming, boarding, dog parks and other public spaces, and follow protocols for prompt isolation of ill animals.

- **Thorough cleaning and disinfection** will eliminate the risk of spreading virus by fomites like supplies/equipment or by environmental contamination. Most commonly used disinfectants will inactivate the virus. Immediately clean contaminated equipment and surfaces after exposure to a dog with respiratory disease.
- **Adequate PPE** is necessary to prevent spread of virus on staff hands and clothing. Wear disposable gloves when handling potentially infected dogs or cleaning contaminated cages. Change clothes between work and home, as dog handlers have carried virus home on clothing and infected their own dogs. Everyone should wash their hands with soap and water before and after handling each dog; after coming into contact with a dog's saliva, urine, feces, or blood; after cleaning cages; and upon arriving at and before leaving the facility.
- **Isolation protocols** should be rigorously applied for dogs showing signs of respiratory diseases. Dogs with respiratory disease should not spend time in the waiting room, and

the exam room should be cleaned and disinfected right after use. If a dog must be hospitalized for CIV infection, use an isolation space that is separate from other animals (by a full wall and door) and has its own ventilation system. Other isolation protocols include:

- Only limited, designated staff or volunteers are permitted to enter isolation areas
- Use separate coveralls or other full clothing coverage, gloves, boots or shoe covers
- Use separate cleaning, feeding and treatment supplies
- Clean and feed animals in isolation last

### **Testing for CIV**

It is difficult to determine solely by clinical signs which respiratory pathogen is present in the dog; a PCR respiratory panel is the best option. It is common to find multiple viruses in these environments and a panel will assist in finding those agents. As with all respiratory viruses, it is important to take samples for agent detection within the first few days of clinical sign onset. Dogs showing clinical signs for >7 days should be tested for CIV by an antibody test as the virus itself is often undetectable in later stages of illness, as is true for most respiratory viral infections. Veterinarians should call their reference laboratory and discuss which test is most appropriate and for sample submission details and cost. Phoenix Laboratory sends PCR and serology testing directly to Cornell University.

*In King County, Public Health collects voluntary case reports of CIV. Please visit:  
[kingcounty.gov/zoonotic](http://kingcounty.gov/zoonotic)*

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