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Canine Influenza

Updates and Current Trends



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Dear colleague,

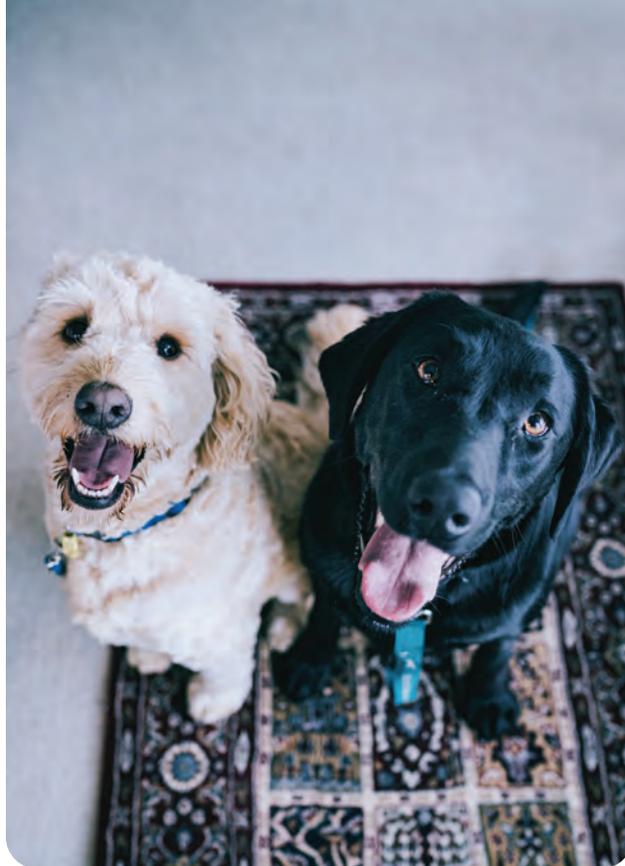
Canine influenza emerged as a novel disease in the United States more than 15 years ago, and it has significantly affected canine health. Those of you who have had direct experience with an outbreak understand how devastating canine influenza can be to your clients and their pets. If you have not yet seen the spread of canine influenza in your local area, consider yourself fortunate. We have seen businesses close or lose substantial revenue during outbreaks. Plus, the disease is not slowing down. Whatever your experience is with this disease, what prevention protocol do you have in place for your patients?

Today's dog owners seek socialization opportunities for their pets, such as:

- Spending time at doggy daycare
- Taking trips to the dog park
- Playing with neighborhood dogs

These interactions provide not only important benefits but also opportunities for potential disease exposure. Every social dog is at risk for exposure to canine influenza, and we have seen the virus sweep through boarding kennels and doggy daycare facilities. Our mission in publishing this booklet is to provide up-to-date information regarding canine influenza's impact on patient health, to equip you to educate clients so that they can make an informed decision regarding the disease, and to help you establish a protocol to protect your patients, facilities, and community.

Preserving animal health is our primary job as veterinarians, and vaccination is a powerful tool to accomplish that goal. When a highly efficacious vaccine is available to prevent a potentially fatal disease or when prevention is more cost-effective than treatment, recommending vaccination for



patients seems like an easy decision; however, a large percentage of pets remain unprotected from canine influenza. As veterinarians, we owe it to our clients and their pets to remain at the forefront of protecting the human-animal bond.

I challenge you to have a conversation as a veterinary healthcare team and talk with every dog owner about the importance of protecting their best friend from canine influenza. Your clients are interested in learning information about infectious diseases, and you are the best person to educate them.

Christine Royal, DVM

Christine Royal, DVM
Director, Veterinary Professional Services
US Companion Animal and Equine Business Unit
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A Brief History of Canine Influenza Virus in the United States

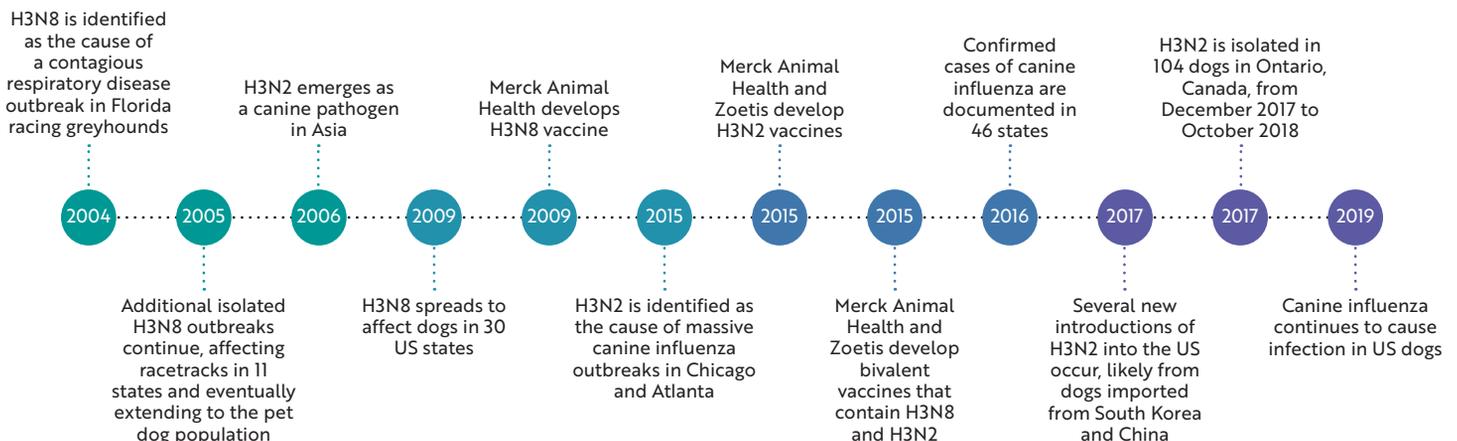
Canine influenza is a highly contagious viral infection that has caused significant respiratory disease outbreaks over the past 15 years. Two surface glycoproteins, hemagglutinin and neuraminidase (HxNx), are used to identify influenza viruses, and different subtypes and strains vary in their ability to infect specific host species. Influenza viruses cause well-described disease in many species, including horses, birds, pigs, and humans. They can mutate easily, and their shifts from one host species to another are well documented. When a new influenza subtype or strain enters an immunologically naive population, an outbreak is likely.

Canine influenza is caused by an influenza A virus, with two variants currently circulating among dogs in the US. Both strains, H3N8 and H3N2, originated in other species, mutated to gain the ability to infect dogs, and caused severe disease in unprotected canine populations.

When a respiratory infection outbreak occurred among greyhounds at several Florida race tracks in 2004, veterinarians assumed a particularly virulent strain of *Bordetella bronchiseptica* or parainfluenza virus was circulating. However, diagnostic testing for common respiratory pathogens turned up no clues until an influenza-like virus was discovered and sequenced. The virus was determined to be H3N8, which had originated in horses but had developed not only the ability to infect dogs but also the ability for transmission between dogs. Influenza viruses had never been associated with clinical disease in US dogs before, and the finding was unexpected. Additional isolated outbreaks were reported at other racetracks over the next year, with eventual transmission to the pet dog population.¹

In March 2015, influenza was believed to have caused a surge of respiratory disease, characterized by cough and fever, in Chicago-area dogs; however, PCR testing for H3N8, as well as other respiratory pathogens, was consistently negative. Further testing eventually characterized the virus as an influenza virus that was a new strain to North America—H3N2. The H3N2 virus originated in birds, and

Significant Events in the Emergence of Canine Influenza



canine infection was previously documented only in South Korea, China, and Thailand. An infected dog likely was brought from Asia to Chicago, possibly as a rescue or military dog, and served as an infection source for other dogs.^{1,2}

Current Canine Influenza Trends (2017–2019)

Since the initial H3N8 and H3N2 outbreaks, influenza has persisted in the canine population by quietly causing consistent, low-level incidence punctuated by occasional larger outbreaks. Viral genomic sequencing has also shown that several new introductions of H3N2 into the US have occurred, likely from dogs imported from South Korea and China, that caused outbreaks in the southeastern US and Los Angeles in 2017.³ The first introduction of H3N2 to Canada was documented in December 2017, when two dogs imported from South Korea

to Chicago were transported to Ontario.⁴ Recent outbreaks include diagnosis of H3N2 in a significant number of dogs in the San Francisco Bay area in early 2018, and again in the summer of 2019, as well as outbreaks in Northern California and Oregon in June and July 2019.⁵

According to Melissa Bourgeois, DVM, PhD, DACVM, associate director of professional services for Merck Animal Health, “It [canine influenza] pops up in areas that we don’t expect. We’ve detected cases of the virus in many states across the country, in both rural and urban areas. We can never predict where the virus is going to come next based on any historical precedence.” The fact that the virus remains quiet for months at a time, and then emerges over and over again during sudden outbreaks, lends to its unpredictability and the need to protect dogs in areas with previous exposure, as well as areas that have remained largely unaffected.

The number of dogs who tested positive during each outbreak is documented; however, this data inadequately represents the actual number of infected dogs, which can be misleading to veterinarians and pet owners who are making decisions about the necessity of vaccination.

Bourgeois was part of Merck Animal Health’s Respiratory Disease Surveillance Program during the 2015 outbreak, when more than 800 dogs from the Chicago area and more than 500 dogs in the Atlanta area tested positive. Thousands of dogs likely contracted influenza during the outbreak, but since canine influenza is not a reportable disease, and testing is optional, the data reflects only dogs who were tested.

The unfortunate result of inadequate representation of true disease prevalence is a misconception that canine influenza is not widespread, and that only a

Meet the Expert

Canine influenza expert: Melissa Bourgeois, DVM, PhD, DACVM

Title: Associate director of professional services (south zone), Merck Animal Health

Why she’s an expert: Bourgeois promotes the canine influenza vaccine, educates veterinarians about its use, and is part of the Respiratory Disease Surveillance Program. She has also worked in the influenza division of the Centers for Disease Control and Prevention.

Meet the Expert

Canine influenza expert: Christopher Lee, DVM, MPH, DACVPM

Title: Senior professional services veterinarian, Merck Animal Health

Why he's an expert: Lee is a preventive medicine expert who educates veterinarians about canine influenza prevention.

small number of dogs have been infected in areas where outbreaks have occurred. In fact, only a small portion of infected dogs in outbreak areas are actually tested, so the numbers represented on surveillance maps largely underrepresent the actual number of sick dogs. Christopher Lee, DVM, MPH, DACVPM, Merck Animal Health senior professional services veterinarian, said, in his experience, clients may look at surveillance maps and think, “Luckily I don’t have an orange or red dot near me, so I’m OK,” when in fact, local dogs may be sick or contagious but not tested. The numbers we see on surveillance maps represent not the tip of the iceberg but “the tip of the tip of the tip of the iceberg,” he said.



Continued transmission of infection among unprotected dogs, along with new H3N2 introductions by means of imported dogs, makes canine influenza a constant threat.

Which Dogs Are at Risk of Canine Influenza Virus?

Canine influenza is an airborne infection that is shed via aerosolized droplets when dogs sneeze, cough, or bark. The virus can also be transmitted through direct contact with an infected dog, as well as through fomites and people who have been in contact with infected dogs. The virus can remain viable and infectious for 48 hours on surfaces, 24 hours on clothing and bedding, and 12 hours on human skin.²

Infected dogs are most contagious during the incubation period, before clinical signs are apparent, and approximately 20% of infected dogs do not develop signs but still shed the virus and infect other dogs.² The virus’ ability to live for a significant amount of time outside a host, paired with shedding by apparently healthy dogs, contributes greatly to its communicability. Virus shedding by subclinical dogs also makes it impossible for clients to protect their dogs simply by avoiding contact with dogs who are obviously sick.

Canine influenza is clearly here to stay, and it will continue to infect US dogs. If you have not yet seen cases at your veterinary hospital, it is only a matter of time before you will.

The risk profile for canine influenza overlaps significantly with that of other respiratory pathogens, such as *Bordetella bronchiseptica*, parainfluenza, and adenovirus type 2. Risk assessment for any disease exposure is based mainly on a dog's lifestyle and demographics. Since canine influenza infections have been diagnosed in almost every state,⁶ a dog's



Which Dogs Are at Greatest Risk?

The dogs at greatest risk for canine influenza are those who visit locations frequented by other dogs, such as:

- Boarding facilities
- Doggy daycares
- Grooming facilities
- Dog parks
- Dog shows
- Sporting events (i.e., agility, racing, dock diving)
- Behavior and training classes
- Pet stores

individual risk comes down to lifestyle. Because of the disease's highly infectious nature, any social dog (i.e., a dog who has direct contact with other dogs) is at risk of canine influenza infection.

Contact with other dogs obviously increases a dog's risk of contracting a number of infectious diseases; however, socialization is critical to a dog's mental health. Lee said, "We do want dogs to be social; we want them to be interacting. If we had a dog who never required a vaccine, I would feel really bad for them. I want them to go to places where they need some vaccines, because they're living a full, active dog life." Today's pet owner recognizes the importance of socialization, and an increasing number of dog owners take their pets to doggy daycare, to dog parks, to puppy classes, and for social visits with other dogs.

Direct dog-to-dog contact carries obvious risk, but dogs can be indirectly infected through fomites or their owners. Consider these often-overlooked sources of exposure:

- Direct or indirect contact with neighborhood dogs
- Dogs, or secretions they left behind, that a dog may encounter on a daily walk
- Owners who contact an infected dog and carry a pathogen home on their hands or clothes
- A dog's social housemates

Veterinarians were stumped by the source of infection among dogs living in high-rise apartment buildings during the 2015 Chicago outbreak. Dogs who never went outside were becoming infected, despite having no direct contact with other dogs. Investigation eventually revealed that the dogs were being infected when they traveled in the elevators.

Only one exposure is needed to initiate a quickly spreading web of infection in unprotected dogs. Although an owner may not consider their dog social, pointing out potential indirect sources of infection can be helpful when assessing a dog's risk. When you consider all possible infection sources, almost every dog is at risk of exposure and deserves to be protected against infection. Jenifer Chatfield, DVM, DACZM, DACVPM, staff veterinarian of 4J Conservation Center, said, "In this day and age, in American culture, you are hard-pressed to find a dog who does not meet the risk profile necessary for canine influenza vaccination."

Canine Influenza Presentation in Infected Dogs

Virtually all dogs who have not been exposed to the canine influenza virus become infected when exposed. Approximately 80% of infected dogs develop clinical illness, and the 20% who do not develop clinical signs typically shed the virus and contribute to infection spread. Following infection, the virus replicates inside cells lining the entire



Meet the Expert

Canine influenza expert: Jenifer Chatfield, DVM, DACZM, DACVPM

Title: Staff veterinarian, 4J Conservation Center; instructor for FEMA/DHS courses; regional commander, National Disaster Medicine System Team

Why she's an expert: Chatfield works to educate the public and prepare veterinary teams for potential pathogen emergence.

respiratory tract, which kills the cells and exposes the underlying basement membrane to secondary bacterial infections that can increase disease severity.²

Canine influenza causes acute respiratory disease similar to other influenza viruses. Unlike human influenza, the disease is nonseasonal, and infection can occur any time of year. The incubation period lasts one to three days, and infected dogs begin shedding the virus before clinical signs develop.¹

Most infected dogs develop mild clinical illness, characterized by typical respiratory infection signs. Mild infections can become complicated by secondary bacterial infections caused by pathogens such as *Pasteurella multocida* and *Mycoplasma* species. The most common clinical sign is a cough that persists for up to 21 days, which may be moist or similar to the dry cough caused by *Bordetella*. Nasal discharge may become purulent, particularly if secondary infection develops. A small percentage of dogs develop interstitial pneumonia, characterized by high fever and dyspnea. Canine influenza causes death in up to 10% of cases.²

Mild Canine Influenza Infection

- Cough (moist or dry)
- Sneezing
- Nasal and/or ocular discharge
- Lethargy
- Anorexia
- Fever

Severe Canine Influenza Infection

- High-grade fever (over 104°F)
- Pneumonia
 - Increased respiratory rate
 - Increased respiratory effort
 - Lung lobe consolidation
- Death

Viral shedding is highest during the first week of infection and can persist for several weeks. Dogs infected with H3N8 typically shed the virus for 10 days or less; however, H3N2 can be shed for up to 24 days after infection.⁷ Clinical signs often resolve well before this period, and owners may assume their pets are no longer infectious and unknowingly expose other dogs.

Canine Infectious Respiratory Disease—Test, Don't Guess

Infectious respiratory disease is often treated without identifying the specific pathogen, with the rationale that the same treatment strategies can be used regardless of the infection's cause. Treatment usually consists of supportive care, as well as antibiotics if secondary bacterial infection is suspected.



Unfortunately, assuming an infection's origin or presuming that identification of the inciting pathogen is not critical for treatment and control contributes to disease spread and severity. Natalie Marks, DVM, CVJ, medical director of Blum Animal Hospital in Chicago, treated many canine influenza cases in the outbreak's first weeks, before the isolation of H3N2 in the US. Chicago veterinarians were treating coughing dogs daily, and the assumption that a severe form of *Bordetella* or H3N8 was spreading through the canine population slowed outbreak control. "I think that's what got us into trouble in the first place," Marks said. "We assumed we were dealing with *Bordetella* when these dogs were coming in. So, we were totally wrong, and obviously it led to probably one of the largest viral outbreaks in modern US veterinary history, because thousands of dogs were affected by it."

Meet the Expert

Canine influenza expert: Natalie Marks, DVM, CVJ

Title: Medical director, Blum Animal Hospital, Chicago

Why she's an expert: Marks treated a significant number of infected dogs during the 2015 H3N2 outbreak in Chicago.

Why Test to Determine the Cause of Infectious Canine Respiratory Disease?

- **To effectively treat the patient:** Infectious respiratory disease causes similar clinical signs regardless of the causative organism, and knowing which pathogen is present based on a patient's presentation is impossible. Testing will determine whether the illness has a viral or bacterial origin, which should guide decisions regarding antibiotic use, and advances antimicrobial stewardship. Patients with a bacterial infection should be treated with an antibiotic appropriate for the species identified.
- **To diagnose coinfections:** Canine influenza's attack on the respiratory lining leaves it vulnerable to secondary infection, which can significantly worsen clinical disease. Diagnosis of coinfection is critical to direct aggressive treatment toward specific pathogens to prevent clinical disease from worsening in severity and potentially progressing to death.
- **To control disease spread:** Infected dogs shed different respiratory pathogens for specific lengths of time, and isolation protocols should be based on confirmation of a specific pathogen. Dogs infected with H3N8 shed the virus for up to 10 days, so a short isolation period is sufficient to control disease spread. Dogs infected with H3N2, however, can shed the virus for up to 24 days, so they should not have contact with other dogs for four weeks. Owners should be instructed to keep infected dogs at home during this time period, and if they come into your hospital for a recheck appointment, precautions should be taken to avoid disease spread.

- **To detect outbreaks of new pathogens:** If dogs presenting with signs of respiratory infection are tested, new, unknown pathogens will be detected sooner than if you assume the infection is caused by a common pathogen. As veterinarians, we are on the front lines to detect outbreaks of new pathogens that can have potentially devastating consequences affecting not only the pet population but also humans.

Every client who presents a dog with respiratory infection signs should be encouraged to have PCR testing performed to identify the pathogen(s) causing infection. PCR testing detects DNA/RNA in respiratory secretions to confirm the presence of specific viral or bacterial pathogens. Peak viral

What Pathogens Should I Test For?¹

Viral pathogens

- Canine adenovirus type 2
- Canine distemper virus
- Canine herpesvirus type 1
- Canine parainfluenza virus
- Canine pneumovirus
- Canine respiratory coronavirus
- H3N2 canine influenza virus
- H3N8 canine influenza virus
- Influenza A virus, to detect other influenza strains

Bacterial pathogens

- *Bordetella bronchiseptica*
- *Mycoplasma* species
- *Streptococcus zooepidemicus*

shedding occurs early in canine influenza infection, typically three to five days after infection or two to three days after clinical signs appear, and samples should ideally be collected during this time.¹ Nasal and deep pharyngeal swabs should be collected with a sterile polyester swab on a plastic shaft. The swab should be placed in a sterile red-top tube with 0.5 mL sterile saline. Samples should be refrigerated until submission, and a respiratory panel that detects both viral and bacterial pathogens should be selected to gain the most diagnostic information.

Lessons Learned from Previous Canine Influenza Outbreaks

A number of valuable lessons have been learned from previous outbreaks that you can apply to protect your patients from canine influenza's devastating effects.

Previous outbreaks have demonstrated that when canine influenza enters an area, immunologically naive dogs will become infected, and the disease will spread quickly. Avoiding infection by keeping dogs away from sick pets is ineffective, and vaccinating after an outbreak is not sufficient for prevention or control. Pet-care businesses, such as boarding facilities, have experienced severe outbreaks with significant impact to their canine patients' health and to their businesses.

Case Study: Dogtopia

Lorraine Rhoads, of the nationwide doggy daycare, boarding, and grooming facility Dogtopia, is an environmental biologist who focuses on the health and safety of the company's canine clients. Dogtopia locations can be independently owned, and owners determine the vaccine requirements for dogs who visit their facility. Rhoads shared the experience of an established Dogtopia facility with a steady

Meet the Expert

Canine influenza expert: Lorraine Rhoads

Title: Environmental biologist, Dogtopia

Why she's an expert: Rhoads develops health and safety protocols for Dogtopia locations and trains and supports facility owners on best practices. She has helped locations work through canine influenza outbreaks.

clientele in a location hit by a canine influenza outbreak. Rhoads is passionate about sharing Dogtopia's experience with canine influenza so other pet-care facilities can learn from them and institute policies to prevent devastating outbreaks.

Month #1: Business decreased to zero clientele during the first month of the outbreak, and the location closed for several days for sanitation. The business reopened with the requirement that all dogs must be symptom-free and have received at least the first canine influenza vaccine, with the agreement that a booster vaccine would be administered in the appropriate amount of time. The business lost an entire month's revenue during the outbreak's early stages.

Month #2: During the second month, approximately one-third of the clientele returned, generating only one-third of the typical monthly revenue.

Month #3: Approximately two-thirds of the original clientele returned for doggy daycare, boarding, and grooming services during the third month, with revenue still significantly lower than a typical month's.

Overall business impact: At least two months' revenue was lost during the outbreak, and the facility took three months to re-establish normal business flow.

Rhoads shared the Dogtopia owner's thoughts on canine influenza vaccination: "What was interesting is this particular franchisee said, 'If I could go back in time and pay for every single one of my regular daycare dogs to be current on the CIV vaccination, I would have saved myself a lot of money based on just what the lost revenue was.'"

Case Study: Dr. Dave's Doggy Daycare

David Reed, DVM, is the owner of two veterinary clinics and two doggy daycare locations in the South Bay area of California that was affected by canine influenza outbreaks in 2018 and 2019. One of his doggy daycare locations was significantly affected by a February 2018 outbreak. He said, "A mistake that I made is simply that we recommended the vaccine. And I should have just said 'We're not recommending it, we're requiring it.'"

Lessons Learned from Previous Outbreaks and Application to Prevent Future Disease

LESSON LEARNED	IMPLICATIONS OF INFORMATION GAINED	APPLICATION FOR DISEASE PREVENTION
Canine influenza virus shedding by infected dogs begins before clinical signs develop. ² Approximately 20% of infected dogs do not develop clinical signs but still shed the virus. ²	Apparently healthy dogs can shed the virus, making avoidance an ineffective method of disease prevention.	Vaccination is the only effective prevention method, and all at-risk dogs should be vaccinated.
H3N2 shedding continues after clinical signs resolve, for up to 24 days. ⁷	Dogs who are recovering from canine influenza may still shed the virus.	Infected dogs should be isolated for a minimum of four weeks.
Influenza virus can survive for up to 48 hours outside a canine host. ²	Infection via fomites, such as food bowls, cages, bedding, and clothing, is an important infection source.	Proper disinfection methods are critical to kill the virus in the environment.
Canine influenza is highly infectious, with up to 80% of exposed dogs developing clinical illness. ²	Virtually all unprotected dogs who are exposed to canine influenza will become infected.	Vaccination is critical to protect dogs from becoming infected.
Canine influenza infections can be complicated by secondary infections and coinfections. ²	Coinfections can increase disease severity and make development of pneumonia more likely.	PCR testing should be performed on samples collected from all dogs presenting with infectious respiratory disease signs, to identify the pathogen(s) responsible for infection so appropriate treatment can be instituted.
Dogs with canine influenza infections display clinical signs similar to those of infectious respiratory diseases caused by other pathogens. ²	Veterinarians cannot diagnose canine influenza virus based on clinical presentation alone.	PCR testing is required to definitively diagnose H3N8 and H3N2 infection.
Up to 10% of dogs infected with canine influenza die from severe infection and/or pneumonia. ²	Although somewhat rare, death from canine influenza virus does occur.	Vaccination of all at-risk dogs is critical to protect the lungs and prevent death.



When the outbreak hit Dr. Dave's Doggy Daycare, he closed the facility for four weeks to break the cycle and prevent the spread of infection. He continued to pay his employees because he felt that laying them off would not be fair. On reopening, Reed required that all daycare, boarding, and grooming patients be vaccinated. At his two veterinary clinics, Reed made canine influenza a core canine vaccine recommendation.

Overall business impact: During the four weeks Dr. Dave's Doggy Daycare was closed, Reed lost revenue from normal business but continued paying his employees. Although the lost income was significant, Reed felt a larger impact. He said, "The revenue from losing a month's doggy daycare and

grooming business, which is a pretty big business—that's bad. But, it's worse—these dogs that got sick were under your care when you had something that could have stopped it."

Meet the Expert

Canine influenza expert: David Reed, DVM

Title: Owner, Reed Animal Hospital and Dr. Dave's Doggy Daycare, Boarding, and Grooming, Campbell, California, and Saratoga, California

Why he's an expert: Reed managed a canine influenza outbreak at one of his doggy daycare locations.

Canine Influenza Outbreak Management

When canine influenza exposure occurs in an immunologically vulnerable population of dogs, an outbreak is overwhelmingly probable. Some US areas, such as the San Francisco Bay area, have experienced multiple outbreaks. Outbreaks will continue to occur throughout the US until a large percentage of the canine population is protected, providing individual and herd immunity. Robert Duquette, BVSc, MRCVS, PhD, has worked with California and Oregon veterinarians during recent outbreaks, and he said, "The initial response to an outbreak is vaccinating as many dogs as possible, with the hope that the problem will be resolved. However, this has proven not to be the case. For vaccination to be efficacious it needs to be in place prior to an outbreak. Bivalent vaccination also needs to be maintained within a

community to achieve herd immunity. Sporadic CIV outbreaks have continued across the Pacific Northwest in 2019, which leads me to believe it is here to stay.”

When a local outbreak occurs, veterinarians likely will see an influx of sick dogs, as well as healthy dogs, presenting for vaccination. During a sudden rise in disease incidence, your role in outbreak management is threefold:

- 1. Isolation:** You must establish strict hospital protocols involving the entire veterinary team to prevent healthy dogs from virus exposure. Common protocols developed by hospitals include:
 - **Telephone triage of sick dogs:** Train client service personnel to identify potential canine influenza cases over the phone.
 - **Examination of sick dogs outside the hospital or in a specially designated area:** Dogs with infectious respiratory disease signs should not enter your hospital waiting room. Ideally, a designated exam room will have direct access through a back entrance without the dog having to walk through your hospital. All team members handling sick dogs should wear full personal protective equipment, including a cap, mask, gown, gloves, and foot coverings.
 - **Isolation of hospitalized patients:** Isolate hospitalized patients suspected of canine influenza from other patients. Aerosol containing infectious viral particles generated by a coughing dog can travel 20 feet or more, necessitating an isolation room with a separate ventilation system. Appoint specific staff members to care for hospitalized patients, and ensure they follow strict protocols that include wearing full-body personal protective equipment.

Meet the Expert

Canine influenza expert: Robert Duquette, BVSc, MRCVS, PhD

Title: Associate director of veterinary professional services (west zone), Merck Animal Health

Why he’s an expert: Duquette provides support and education to veterinarians during canine influenza outbreaks. He worked with California and Oregon veterinarians during the recent 2018 and 2019 outbreaks.

- 2. Disinfection:** Adequately disinfect all surfaces and objects (e.g., cage surfaces, food bowls, and leashes) that may have been contaminated by sick dogs. Influenza viruses are readily inactivated by common disinfectants, including quaternary ammonia compounds, aldehydes, potassium peroxydisulfate, phenols, bleach,² and accelerated hydrogen peroxide products.⁸ Establish and consistently follow disinfection protocols, including adequate contact time with surfaces.
- 3. Education:** Educate owners of infected or exposed dogs about the influenza virus’ shedding period and advise them to prevent contact with other dogs for at least four weeks. Inform clients presenting dogs for vaccination that immunity is not optimal until approximately two weeks after administration of the second vaccine, and to avoid contact with dogs displaying clinical signs of respiratory infection. Recommend vaccination for all dogs who fit the infectious respiratory disease risk profile.



Clinical protocols must be followed at all times, not only in the face of an outbreak. Marks said, “In general, most small-animal practices get into a routine and some of these protocols potentially become lax or not as stringently followed consistently across the board.” An outbreak often hits without warning, and although following protocols that protect against disease exposure may seem excessive to hospital team members, sharing stories and case studies to help them understand the important role they play in preventing and minimizing disease spread is vital.

Preventing Canine Influenza Virus

Canine influenza’s high morbidity, extended shedding period, and ability to survive outside a canine host make vaccination the only effective prevention method.

Vaccinating a dog confers individual immunity; however, when a large portion of a susceptible population is vaccinated, a level of herd immunity can be established. If enough dogs are vaccinated, outbreaks will diminish as infection and virus transmission decreases.

Protecting Your Patients from Canine Influenza Before an Outbreak

If you live in an area that has not experienced an H3N8 or H3N2 outbreak, it is not an issue of *if* but of *when* an outbreak will occur. Regarding outbreak likelihood, Reed shared, “Those that don’t think it’s going to hit their region live in some sort of a bubble. It’s a reality, and it’s absolutely devastating.”

If you don’t currently encourage clients to vaccinate their dogs against canine influenza, it is time to

have a discussion with every dog owner about their pet's risk. If a local outbreak has not occurred, your clients may not be aware of canine influenza's threat, and they need you to educate them about emerging health risks. Encouraging vaccination and making owners aware of the devastation of an outbreak is critical to your patients' health and safety, and to your relationship with your clients.

Drawing parallels between canine influenza and kennel cough can help owners understand their dog's disease risk, since most dog owners are familiar with *Bordetella*. When you administer a *Bordetella* vaccine, you should talk about the risk for canine influenza infection. If you make clients aware of canine influenza's potentially devastating effects, vaccination should be an easy choice. According to Duquette, "Every dog who gets a *Bordetella* vaccine is equally at risk of getting influenza. Of the infectious causes of a canine's cough, influenza is the most likely one that can result in pneumonia, and any case of pneumonia can potentially be fatal."

Vaccinating your canine patients before an outbreak hits is critical. Once canine influenza affects your

area, it will be too late to protect many pets. As Chatfield said, "If you wait for an outbreak, you're a little bit late to the party, because dogs who are sick could have been shedding the virus for 48 hours before they had any signs. So they were still going to doggy daycare [and] they were still going to the dog park." By the time dogs develop clinical signs, many other dogs may have already been infected and could be shedding the virus to infect others.

We also can't ignore the influenza virus' uncanny ability to mutate and jump species. The H3N2 and H3N8 strains both originated in other species and developed the ability to infect dogs. Although neither strain is currently able to infect people, the possibility of mutation or combination with another influenza virus strain exists, and we have to remain vigilant of the potential for human infection. Chatfield expressed concern about the zoonotic potential of canine influenza, saying, "Influenza is so mutagenic that for you to do an effective risk assessment, you have to really understand that they're all zoonotic." Vaccination of dogs could not only prevent canine outbreaks but also reduce the virus' zoonotic potential.

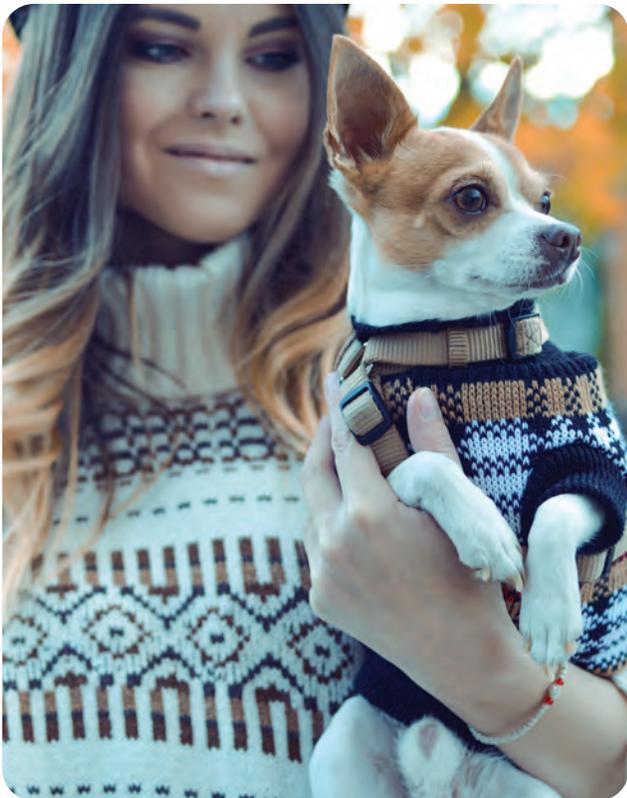


Canine influenza is a devastating disease. Although most infected dogs recover, some dogs die. Don't let your patients take this risk. Offer them protection.

What Every Pet Owner Needs to Know About Canine Influenza

Ensure your clients know these facts about canine influenza.

- 1. Canine influenza is easily spread from dog to dog.** Canine influenza is spread when dogs sneeze, cough, or bark. It can also be transmitted through direct contact with an infected dog, as well as through fomites and people who have been in contact with infected dogs. Virtually all dogs become infected when exposed to the virus, and approximately 80% will develop clinical illness, while 20% will not show clinical signs but will still spread the virus.
- 2. If your dog is at risk of *Bordetella* infection, they are also at risk of canine influenza infection.** Canine influenza and *Bordetella* are



spread the same way, and social dogs are at risk of contracting both infections.

- 3. If your dog receives a *Bordetella* vaccine, they should also receive a canine influenza vaccine.** While the pet-care businesses your dog frequents currently may only require the *Bordetella* vaccine, vaccinating against canine influenza virus is in your dog's best interest.
- 4. Not all respiratory pathogens are the same, and testing to determine the causative agent is important.** *Bordetella* infections are typically mild, whereas canine influenza infections are often more severe and can cause significant lung damage or death. Identifying the pathogen is helpful in determining prognosis and treatment and isolation protocols.
- 5. All social dogs are at risk of contracting respiratory infections, including canine influenza.** Dogs who go to doggy daycare, boarding facilities, or grooming centers contact other dogs more frequently and are more likely to be exposed to infectious pathogens, including H3N8 and H3N2.
- 6. Early detection is critical to diagnose the cause of infection and start treatment.** Clients should seek immediate care for dogs displaying infectious respiratory disease signs so PCR testing can be performed during peak viral shedding, infected dogs can be isolated to prevent spread, and treatment can be initiated to minimize disease severity.
- 7. Vaccination is the only effective means of preventing canine influenza.** The highly infectious nature of canine influenza makes avoidance an ineffective means of prevention for most dogs. Even if there has not been a local canine influenza outbreak, it is only a matter of time before the virus hits your area.
- 8. There is a low risk of side effects or adverse reactions to vaccination.** Clients may be

concerned about adding another vaccine to their pet's prevention protocol. The vaccine contains killed virus, and it will not cause canine influenza infection in dogs.

- 9. Canine influenza will remain a significant threat to dogs.** H3N8 has caused canine infection throughout the US for more than 15 years, and H3N2 for more than 4 years. Both viruses continue to infect dogs, and we can expect them to continue causing infection and disease.

What Every Pet-Care Business Needs to Know About Canine Influenza

Pet-care businesses, such as doggy daycares, boarding facilities, and groomers, can play a unique role in driving vaccination efforts. When these pet-care professionals understand the following points about infectious respiratory disease, the likelihood of an outbreak decreases, disease spread during an outbreak is reduced, and vaccine compliance increases.

- 1. Infectious respiratory disease is easily spread between dogs.** Respiratory pathogens are spread via aerosolized secretions, fomites, and people. Direct contact is not necessary for infection.
- 2. Dogs showing signs of infectious respiratory disease should not be allowed to enter a pet-care business.** All dogs entering a pet-care business should be visually screened for signs of infectious respiratory disease and refused entry if they are obviously sick.
- 3. Boarding dogs displaying infectious respiratory disease signs must be isolated immediately, and they should not return to your business for four weeks.** Symptomatic dogs must be isolated in a separate room with a separate ventilation system until they can be discharged to their owners to



avoid transmitting disease-causing pathogens to other dogs. Canine influenza virus can be shed for up to 24 days, so dogs with respiratory infections should remain home for a minimum of four weeks.

- 4. Pet-care businesses must establish effective disinfection protocols.** All staff members must understand the importance of proper disinfection protocols. Discuss the use of

appropriate disinfectants, proper cleaning methods, and the importance of chemical contact time to ensure effectiveness.

5. **All pet-care businesses should require vaccination for canine infectious respiratory pathogens, including *Bordetella*, H3N8, and H3N2, in addition to core vaccines.** Dogs who frequent pet-care businesses are at increased risk of contracting an infectious respiratory disease. Requiring *Bordetella* and canine influenza vaccination for all canine clients will significantly reduce disease incidence.
6. **Staff members' pets are at an increased risk of infection.** Pet-care business employees can easily carry infectious respiratory pathogens home to their own pets to infect them. All pets belonging to pet-care business team members should be protected by vaccination, and team members should change clothes and wash their hands before returning home to their pets.
7. **Pet-care businesses are in a unique position to drive vaccination efforts.** A recent survey indicated that only 25% of pet-care businesses require the canine influenza vaccine in addition to the *Bordetella* vaccine.⁶ Pet owners often request *Bordetella* vaccination because it is required by a boarding or grooming facility, and if more businesses also required canine influenza vaccination, many more dogs would be vaccinated, herd immunity would improve, and outbreaks could significantly decrease.

8. **Pet-care businesses should build relationships with local veterinarians.** Pet-care business owners should communicate with their local veterinarians about their vaccination requirements so they can reference these policies to help increase owner compliance. Pet-care businesses should alert veterinarians when they see dogs with infectious respiratory signs so local veterinary hospitals can watch for similar signs in their patients.

Talking to Pet Owners About Vaccinating for Canine Infectious Respiratory Disease

Every dog owner in your practice deserves to be educated about the threat of canine infectious respiratory disease; however, starting conversations with pet owners about adding another vaccine to their dog's annual boosters can be challenging. Before approaching your clients, think about how you will respond to common barriers to vaccination, such as:

- **Perceived lack of efficacy:** Your clients may compare the canine influenza vaccine to the human influenza vaccine, which is made from the previous year's virus strain and often has low efficacy. The H1N1 virus that typically causes human influenza outbreaks mutates more readily than the strains that



affect dogs, which have remained stable since their emergence in the US. Efficacy trials have shown that the canine influenza vaccine significantly reduces the severity and duration of clinical illness, including the incidence and severity of damage to the lungs.⁹

- **Cost:** Pet owners may be hesitant to add an additional cost to their annual vaccine plan. If finances become a deciding factor, emphasize the value of vaccination by comparing its price with the expected cost of treatment should their dog develop infectious respiratory disease.
- **Perceived lack of need:** If a local canine influenza outbreak has not occurred, your clients may believe the disease is not a threat and that their dog does not need protection. Show your clients the canine influenza outbreak map at dogflu.com to illustrate the progression of disease spread since its emergence. They may be surprised to see

that canine influenza has been diagnosed in their state. Emphasize that vaccination is a preventive measure, and that once the disease hits your area, vaccination may not induce immunity fast enough to protect their dog from a potentially deadly infection.

Begin each vaccination appointment by discussing the pet's lifestyle and exposure risk for the diseases you are recommending vaccination for, and assure the owner that you will reassess the pet's risk every year to determine which vaccines are important. If a dog is scheduled to receive a *Bordetella* vaccine, talk to the owner about the risk profiles of canine respiratory disease and canine influenza, and explain that dogs who need a *Bordetella* vaccine should also receive a canine influenza vaccine. Taking time to make the owner an active part of this discussion will help them understand that their pet's health is your first priority.





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