

# Dog Flu in Canada

*[Announcer] This program is presented by the Centers for Disease Control and Prevention.*

[Sarah Gregory] Hi everyone, I'm Sarah Gregory, and today I'm talking to Dr. J. Scott Weese, who's a veterinary internist at the University of Guelph in Canada. He's also an associate editor of EID. We'll be discussing an outbreak of flu in dogs in Ontario. Welcome, Dr. Weese.

[Scott Weese] Good afternoon.

[Sarah Gregory] I know the thought of canine flu is scaring a lot of people, me included. What is it?

[Scott Weese] Well, canine flu is very similar to human flu in terms of what it does and how it's transmitted. It's the dog version of what we get in influenza, caused by an influenza virus, and it usually causes, you know, what we call flu-like disease, they don't feel very well, they get a cough, and they usually get over it in a few days.

[Sarah Gregory] Okay, so the symptoms are—malaise, coughing, fever— just like in a human, sort of?

[Scott Weese] They are pretty nonspecific, because sometimes they'll have a pretty nasty cough for a few days, sometimes they just won't be feeling well, occasionally they'll develop pneumonia, secondarily. It's very similar to what we would get with flu, we don't see the dogs telling us they don't feel very well or they've got muscle pain, but we'll see them laying around more, not eating as much, and just generally look miserable.

[Sarah Gregory] Okay, so flu is pretty common in birds and pigs, but we don't usually hear about it in dogs until recently. Are these strains related?

[Scott Weese] Well, we've had two types of canine flu that we've been concerned about in North America. One originated in the early 2000s, and was a problem mainly in greyhound facilities in the U.S. And this was an equine flu virus that made the jump into dogs and spread around the U.S. a little bit, but is largely died out. Then, in about 2015, a different flu virus made its way to the U.S., and it hit Chicago hard, and this was an avian influenza pass-off. What started off as a bird flu moved into a dog and became a dog flu in Asia, and then has been imported from Asia into North America a number of times.

[Sarah Gregory] Okay, so you sort of said how it happened, but can you kind of go a little bit more into detail about how this happened? And where and when it evolved and how it ended up in Canada?

[Scott Weese] So, the H3N2 canine flu that we've been dealing with in North America lately, it's present fairly widely in some parts of Asia, in China, in Korea. And we know there's a risk because we bring in dogs quite regularly into North America. So, it's been introduced into the U.S., probably numerous times, and has caused a few outbreaks, and it spread around the U.S. So, in Canada we were expecting to get it at some point, we didn't know whether it was going to come from Asia or from the U.S., a dog that had, you know, been infected from Asia. But we were somewhat expecting it to happen and that would be what happened. At the end of 2017, we had our first cases, and these were dogs that had been imported from Korea just a few days before they became sick.

[Sarah Gregory] Why are dogs being imported from Korea?

[Scott Weese] We see dogs...a lot of dogs being imported from various countries. A large number of dogs get imported from Asia because there are a large number of dogs looking for homes. There are dogs that are being produced for meat; there are rescues that are trying to bring these dogs over. There are a variety of reasons why people import dogs and Asia's been an area where we see fairly massive numbers of dogs imported into North America because some of the publicity surrounding the meat production market.

[Sarah Gregory] Meat production market in North America?

[Scott Weese] No. In Asia, dogs are produced for meat, just like we produce food animals here. And some of these dogs are kept in very, very bad circumstances, so there are a number of rescues that go over and try to buy or rescue dogs that are being bred for meat and try to close down producers that are breeding dogs for meat, and many of those end up being imported into North America.

[Sarah Gregory] I see, okay. So okay, so tell us about the specific outbreak clusters in Ontario. When did they start and how did they spread?

[Scott Weese] So, we had a few introductions of canine flu into Canada. The first one was at the end of 2017. And this was two dogs that had been brought in from South Korea, they flew into Chicago, got into a van, and drove into Canada. And the two dogs were left in the U.S., which may have caused an outbreak there. But not long after they arrived in Canada, they showed signs, you know, that you would attribute to flu, they weren't feeling very well, they had a cough. And they went in to their primary care veterinarians who realized it was a different situation since these dogs had just been imported from Asia, did some testing, and those were our first influenza cases.

We'd started looking at dogs they'd been in contact, and we saw transmission of flu to other dogs that were in those households. And these dogs came in, they went into households with other dogs, and those other dogs got sick. So, that was our first outbreak and that was the end of it. We were able to identify it fairly quickly, people did a very good job of keeping those dogs quarantined or isolated so they didn't pass it on anymore. But two weeks later we found another little cluster in the same general area and were suspicious that the flu virus had snuck out from that first group, but we don't actually know where it came from. We had another little outbreak there, and again that was contained with identifying the cases very quickly and testing them and quarantining them.

And then a little bit later we had a large outbreak that occurred in a different part of Ontario, and this was in a different importation. This was a group that was bringing in dogs from China and they brought influenza. But we didn't actually find it with the imported dogs first, we found it because there was an outbreak of respiratory disease in a kennel. And it was a large number of dogs that were affected, it was most of the dogs were affected. And it's not uncommon for us to see outbreaks of respiratory disease in kennels. Kennel cough is something we see in dogs, caused by a range of viruses and bacteria. But this outbreak was very quick and there were a lot of dogs that were affected and the veterinarian that's in charge of that kennel did some testing and that's where we found canine flu.

And as we traced it back we realized that for the dogs it was imported into a rescue, that dog was then fostered in a household. It infected dogs in that household, and one of those dogs went to the kennel. So, the importation link was there, it was just a little farther back. And then with that outbreak we saw a variety of transmissions linked to the rescue. It was doing boarding of dogs and walking dogs and daycare. And we saw dogs getting infected, then infecting other dogs. We had to do fairly extensive contact tracing and testing to try to figure out who was exposed so we could isolate and prevent further transmission of the virus. Because the concern we had in Ontario, this was a new virus for us at that point, and basically no dog in Canada had immunity to it. So, as it starts to get out there you could see very rapid transmission because every dog is susceptible, and we wanted to keep it contained so it didn't get into the larger dog population.

[Sarah Gregory] Yeah, sure. So, I guess this sort of manifests like a cold. How did the vets figure out that this was more than just a cold?

[Scott Weese] It looks very similar to any other respiratory disease that you see. So, looking at a single dog there's nothing really that's going to trigger 'flu.' The thing that gets us thinking influenza is when we have a lot of dogs affected, especially if they've been vaccinated against other types of respiratory disease, or if there's a link to imported animals. So, with our big outbreak that happened in central Ontario, the big trigger there was, a lot of dogs affected very quickly.

[Sarah Gregory] I see, okay. Were there specific dogs that were...breeds that were affected? You were talking about these imported dogs from Asian countries. Are they a particular breed and are they particularly vulnerable? Or is it just the conditions?

[Scott Weese] Yeah, we don't see any breed predispositions. The dogs that have been bringing it in from Asia are...they're fairly typical Asian dogs. But there's nothing that would suggest that one breed is more at risk than another. What we're concerned about from the breed standpoint is there are certain breeds that, if they get sick with a respiratory virus, they're more likely to get very sick or more likely to die. And that's what we call the brachycephalic breeds, so "smushy-faced" breeds, like Bulldogs, that they're just more prone to getting serious illness whenever they get a respiratory infection. So, any dog can get flu, but some dogs are at greater risk of getting serious flu or dying, and that's those smushy-faced dogs, as well as old dogs, young dogs. And it's similar to people when it comes to some of those risk groups. We're worried about elderly individuals and young children getting exposed to flu. So, we have the same thing with dogs... worried about the young, the old, dogs that have other respiratory disease, dogs that have heart disease or anything else that weakens their immune system.

[Sarah Gregory] Sorry about that folks, we had some technical difficulties here in the studio. So we have Dr. Weese back on the line, but he may sound a little different this time. So, as part of your investigation, you traced the contacts of the sick dogs. Is this process different from contact tracing in people?

[Scott Weese] Process is basically the same. What we're trying to do is identify dogs that might be infected, whether it's dogs that might have infected the dogs that we know about, or dogs that might have become infected and we're trying to identify them, so we know everyone that's infected so we can contain them. 'Cause our big goal is to try to identify everyone that's shedding this virus, and make sure that we isolate them so we can stop the transmission cycle.

[Sarah Gregory] Okay, so...sorry. Isolation then is part of the control that was used. Is there anything else you did to control the outbreak?

[Scott Weese] Well there are various things that we did but isolation was the main one. Because if we could make sure a dog doesn't get out there and encounter another dog, we can stop the transmission. We had to deal with things like education and getting testing, making sure there was awareness, that people understood that this virus is out there. We didn't get to the point where there was a lot of restriction of healthy dogs going places but we got the information out so people could make a more informed decision. If there was flu activity in an area, they could decide whether or not they should take their dog out in public or go to a park. So, a lot of it was revolving around trying to get people to be aware to make early diagnosis and get better interventions.

[Sarah Gregory] I understand the weather affected the spread between dogs? Was this also during the flu season for people?

[Scott Weese] The cases we saw were largely during the general flu season, there wasn't, you know, big human flu activity at the time, which could be good for...in a few different ways. We don't really know if there's much seasonality to canine flu, it tends to jump around a lot because we've got such a different situation than in people, where there's...there're influenza viruses out there, and people have been exposed, and there's a lot of antibody protection. Versus dogs, we have a completely immunologically naïve population, so dogs are susceptible to it. So, if flu comes into an area we tend to see a lot of disease over a short period of time, and then it sometimes works its way away. So, there isn't as much of a flu season that we recognize right now in dogs. One advantage though, that we had in the weather, was that it was winter in Canada. And it's a lot easier to keep people from taking their dogs out in the public. 'Cause if it's summer there are more people traveling with their dogs and dogs going to dog parks, and that would have been probably a bigger concern for us, because we could have seen a lot more spread. When the weather's really bad, it probably helped us because then people keep their dogs inside for a while.

[Sarah Gregory] Oh, yes sure. Okay, I'm sure we're all wondering at this point, can dogs catch the flu from their owners and can we catch this dog flu from them?

[Scott Weese] Yeah, the ability of flu viruses to move between species is always a concern. So, dogs wouldn't catch this flu from their owners, because this is a dog flu. But dogs can catch flu, human flu, from their owners. So, if I have influenza, my dog could get my influenza. It's pretty rare but it does happen. Could dogs infect us with the canine flu? That's something we don't really know. We know flu viruses have the ability to change and they can move between hosts. We don't currently have any evidence that this canine flu virus can infect people. And if it did, it would probably be just a rare infection that wouldn't be that big in the grand scheme.

What we're really worried about is creating a new flu virus. We just don't want flu viruses around, because the more flu viruses that are around, the greater chance they can get together and make a new flu virus. So, because dogs can get human flu, what the real concern is, would be if, okay, my dog has canine flu and I have human flu, and I infect my dog with my flu at the same time it has his flu, then the dog has two different flu viruses inside it. And when that happens, you get the potential for those two flu viruses to come together and create a new virus. And what we would be concerned about is one, they would be able to infect people and transmit between

people really readily, but be different enough that our immune system wouldn't recognize it. That's very unlikely to happen, but that's why we track influenza viruses, because we want to make sure that it doesn't happen, or we identify it if it does.

[Sarah Gregory] Is there a treatment for dogs with the flu?

[Scott Weese] The treatment for dogs with the flu is pretty similar to the treatment for people with flu, which is just give it time. It's supportive care, make them feel better, keep them inside and warm and happy. There are antivirals that can be used, they're just very rarely used in a dog. If they get a secondary bacterial infection, which can happen in some cases, then they get antibiotics. Sometimes we'll use drugs to reduce their cough, 'cause the cough can be the biggest problem. But it's a self-limiting disease in that we have to give it time and the body will get rid of it.

[Sarah Gregory] So, why don't you use antivirals, just because it's not that risky, usually?

[Scott Weese] For most dogs, flu is going to be not uneventful, but they'll get over it. Your average healthy dog that has influenza, they're going to get over it on their own. We don't have good evidence that antivirals help speed the course of resolution or prevent complications. We don't have a lot of experience with using antivirals for flu in dogs. It's a situation where we'd rather not use the drug if I don't see a need for it. I'd be more inclined to use it in a really sick dog or a really high-risk dog, kind of the way it's approached in people with a high-risk, severe, early infection. But those situations aren't that common and we don't often see them early enough for when we'd really want to use an antiviral.

[Sarah Gregory] Okay, yes, 'cause it has to be, like, within the first seventy-two hours, right?

[Scott Weese] Yeah, so if a dog gets flu, sometimes we'll see it right away, but sometimes we'll see it after it's been sick for a couple days and it's been coughing and the owner decides to bring it in. So, pushing that early diagnosis, it could be a challenge. By the time we get confirmation of flu we're getting outside of that early window. So, there are some situations where we'd consider it, it would just be a pretty rare situation.

[Sarah Gregory] Okay Dr. Weese, is there anything else that you want to tell us about your study?

[Scott Weese] Maybe the big thing that it showed us is, even with a new virus in an area where there's no immunity in the population, infection control can do its job. I was pretty skeptical we were going to be able to contain it when it hit a couple different areas, but with good testing, good contact tracing, good compliance by owners who are keeping the dogs isolated, we showed that you can get rid of this virus. And we've been flu-free in Canada now for over a year.

[Sarah Gregory] Oh, okay, that's good to know. I was going to ask if the dog flu was still circulating and where are endemic areas—maybe outside of Canada somewhere?

[Scott Weese] Yeah, in Canada at the moment, we don't have any evidence that there's flu circulating; the last case we saw was a little over a year ago. It is still present in the U.S., circulating in different areas, and little outbreaks occur sporadically. It's in Asia, fairly widespread. So, it's endemic disease there, that's where it originates. And anywhere that dogs are going out of Asia there's potential risk, but the U.S. would be the main place of concern, outside of Asia, right now just because it is still circulating in some areas.

[Sarah Gregory] Have there been any movements to create legislation not to bring these dogs with the flu into our—these Asian dogs, these poor rescue dogs, here?

[Scott Weese] Yeah, containing flu through imports—it's a big issue—but there's a lot of difficulty actually making restrictions on imported animals, surprisingly enough. And influenza isn't something that's driven a lot of concern at the regulatory level; certainly we're worried about various diseases that imported dogs bring in, and flu is just one of a variety of them, but there's not a simple answer to it because a dog with flu could look perfectly normal when it leaves or when it arrives, and they get sick right after that.

So, there are very few controlled borders. Even if you say they have to be healthy when they arrive, that's not going to be a guarantee they don't have flu. Influenza vaccines in dogs, we have influenza vaccines for dogs, but they're like human vaccines, they're useful but they're far from a hundred percent. So, requiring vaccination before having them leave Asia wouldn't be completely protective either.

So, there aren't a lot of things that we can do to reduce the risk. What we can do is handle the dogs better when they get to North America, like keeping them isolated, so if they have flu or something else, they get time to understand that and we get time for them to eliminate it. So, there are various places we can do things to improve it—before they're shipped out, as they're being shipped out, after arrival—but there's not one single thing that we can do that's going to eliminate the risk.

[Sarah Gregory] Okay, so it's not endemic right now in particular, but just on general principle, should I be worried about bringing my dogs to doggy daycare or doggy park or heck, even the vet?

[Scott Weese] Yeah, this is always some risk when you encounter... anyway, every time you meet a person, there's some risk you're going to get flu or something else, and we know when you put kids together in schools and camps, there's an increased risk of infectious diseases. And we do those things because we know there's value to them. So, it comes down to cost-benefit and some common sense.

So yes, for doggy daycare or kennel or any type of event like that, you're creating a risk, but that's why we vaccinate, that's why we do kind of good preventive medicine to keep animals healthy, that's why we get animals diagnosed when they're sick—a lot of really commonsense things that we can do. So, if you have a dog and you see a sick dog, keep your dog away from it. Try to keep your dog from encountering a lot of different dogs. So, going to a kennel and encountering the same dogs every day is different than going to a kennel and encountering different dogs all the time. So, there's some basic things that we can do to reduce the risk, and ultimately it's cost-benefit. What's the benefit of going to that puppy class or going to that kennel or event, versus what's the risk? And in most situations the benefits are going to outweigh the risks if we use a little bit of common sense.

[Sarah Gregory] Okay, sort of along that same note, just in daily life, is there anything that I can do to protect my dogs besides vaccinations, when we're just out and about, generally?

[Scott Weese] In just terms of normal things, it's common sense, again. If your... if your dog is sick, keep it home so it doesn't infect anyone. If you're out and you see a dog that looks like it's sick, it's coughing, it has, you know, a skin infection, it's got diarrhea, things like that, keep it

away. It's really basic principles like that, it's just like you'd do for you. If you're out in the street and you see someone that's coughing away and with a running nose, you probably are going to stay back a little bit, you maybe aren't going to shake their hand, or you're going to wash your hands around that. So, it's really basic infection control we can do to reduce the risk. We're never going to eliminate it though.

[Sarah Gregory] I know that dogs love to sniff other dogs' poop, and my dog is no different than any other dog and...but I don't let her, I always pull her away. Is...could she actually...could she get something or am I being worried for no reason?

[Scott Weese] Yeah, dogs do certain behaviors that we don't tend to do, they're going to be high-risk; they do a lot of exploring with their nose, and they do a lot of exploring with their tongue, and eating things that, you know, we would not typically eat. So, that certainly does increase the risk. Feces carry billions of bacteria and some of them are harmful for dogs and for us. So, the more contact they have with that, the greater the risk of transmission. So, trying to keep your dog away from that, like I'm saying to you, people be responsible and picking up poop when their dog goes in the park, and you trying to keep your dog from snacking on anything it happens to find, it certainly will reduce the risk. Your average healthy adult dog probably isn't going to get sick from that but there are some things that could happen in terms of bacterial infections, and viral infections, and parasites, so we'd like to reduce the amount of contact that occurs like that.

[Sarah Gregory] You mentioned that there is a vaccine against this dog flu, but should all dogs be getting it all the time now, or...?

[Scott Weese] Yes, there's a canine flu vaccine, and it's hard to really position how we should use it. It's a safe vaccine, so there's no reason not to use it, but probably with influenza, it's a disease that's very sporadic, and we don't know when it's coming. And for a vaccine a dog hasn't had before, the way we vaccinate them is they get a dose, and then two to four weeks later they get a second dose, and they really don't get protected until a little bit after that second dose. So if you say, okay, well I'm not going to worry about influenza until influenza's down the street, well, it's probably too late, because you need three or four weeks from when you start vaccinating until they're protected, but influenza may never make it into your town.

So, right now in Canada, as far as we know, we're influenza-free, so we could be vaccinating for a virus that will never be here. But at the same time, the next infected dog might be on a plane that's landing in Toronto right now. So what I focus on, I guess, are two main areas. One is, dogs are at increased risk of being exposed to an influenza virus, and that's going to be dogs that are living places where dogs are being imported from Asia. So, if there's a rescue that's bringing in imports or if my neighbor is bringing in imports from China, then that puts my dog at higher risk, so I'm a little more concerned about vaccination. Dogs that encounter a lot of different dogs of varying backgrounds, so dogs that go to shows, dogs that kennel a lot, the risk is higher for them too, so flu vaccine gets a little more relevant.

And then the other side of the equation is, what are the dogs that are going to suffer the most serious consequences? 'Cause I have a seven-year-old dog...if he gets influenza, he's probably not going to get serious disease. If he's thirteen, he's a senior, then he's more likely to die. 'Cause the deaths that we see in dogs tend to be old dogs. So, I'm more concerned about vaccinating an old dog or a dog that's got heart disease or respiratory disease, or one of the smushy-faced breed dogs, because they're more likely to die when they get influenza. And when

I'm thinking about vaccination, that's really what I'm thinking about, I'm trying to protect the animals from getting really sick or dying, more than trying to protect them from getting your run-of-the-mill influenza. So, it's considering who's at greater risk of exposure, and who's at greater risk of getting really sick, and ultimately it's the owner's decision... how worried are you and how cost-conscious are you? And you have to make your own decision on that.

[Sarah Gregory] So, what's the key message pet owners should take away from this investigation?

[Scott Weese] Oh I think there may be a couple key messages but one is, you know, basic infection control does a lot, whether it's washing your hands, keeping your dog away from sick dogs, or whether it's the infection control investigation that helps us contain it. A lot of what we do with infectious diseases is pretty straightforward, but can be very effective if people do it right. So, common sense is probably the key thing that we can remember with infectious diseases.

[Sarah Gregory] You want to talk to us a little bit about where you work and what's involved?

[Scott Weese] So, I'm a veterinary internist, an internal medicine specialist, and I focus pretty much exclusively on infectious diseases. So, I'm at the Ontario Veterinary College, at the University of Guelph in Canada, and we have a tertiary care referral hospital but I also work with sporadic disease and outbreaks in the community. So, when strange things happen with emerging diseases, I tend to get involved, because I have an interest in trying to contain them.

[Sarah Gregory] As I mentioned in the introduction, you're an *Emerging Infectious Diseases* journal associate editor. You want to tell us what's involved with that?

[Scott Weese] Well, being an associate editor gives a lot of insight into what's coming in infectious diseases. So, through that position it means that I...we have discussions about papers that are coming in, which ones are relevant for the audience for the journal, and helping shepherd papers through the peer review process. So, finding appropriate reviewers, looking at their reviews, helping the editors make recommendations on what to change, what to accept, what to reject, a lot of it's thinking about what's the target audience, what's the most important information to get out through this journal, and how do we get the best papers we can get to the audience.

[Sarah Gregory] How long have you been doing this?

[Scott Weese] A few years, not too long.

[Sarah Gregory] Do you have any pets yourself? Any dogs that you worry about?

[Scott Weese] We've got a collection of them here. Like I mentioned, I got my seven-year-old Labrador, pretty healthy dog otherwise, so I'm not too worried about him in terms of influenza, although he goes with my wife to work, so he does see some other dogs. Got an indoor cat, and a couple of barn cats, and some llamas and alpacas and—

[Sarah Gregory] Oh, wow.

[Scott Weese] ...a chinchilla and some fish. So, there's a bit of everything around here.

[Sarah Gregory] So, you have the alpacas and the llamas for the wool or...?



[Scott Weese] No, they're just decoration. Used to have rare-breed sheep, and we have a lot of coyotes around here who started eating all the sheep. So, basically we got a llama to try to protect the sheep and she was useless, so we ended up with no sheep and a llama. So, we got the alpacas to keep her company.

[Sarah Gregory] Goodness, so you must live outside of Toronto or somewhere.

[Scott Weese] Yeah, we live outside of Guelph, so we're close to Toronto, we're about forty-five minutes, an hour from Toronto. But we're in a fairly rural area.

[Sarah Gregory] Okay, well thank you so much for joining me today, twice. And thank you out there for joining us. You can read the October 2019 article, "Emergence and Containment of Canine Influenza Virus A (H3N2), Ontario, Canada, 2017–2018," online at [cdc.gov/eid](https://www.cdc.gov/eid).

I'm Sarah Gregory for *Emerging Infectious Diseases*.

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