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Greyhound illness spreads to household dogs

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In 1999, a mysterious epidemic struck American racing kennels, where greyhounds succumbed to ravaging fevers, gagging coughs and bleeding lungs.

The dogs' handlers called it "kennel cough" — a name that really meant "We don't know what this is." Millions of dollars were lost as races were canceled and tracks were closed. Meanwhile, dogs suffered and died.



Dog flu: Inside
an epidemic



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Seven years later, the same type of illness is spreading to animal shelters and household pets. This time, through the work of veterinary scientists in Florida, Georgia and New York, the vexing disease has a name.

It is influenza — canine H3N8 — more commonly known as dog flu.

Until the recent discovery, veterinarians believed influenza did not spread in dogs. Scientists have traced the strain back to one that first sickened horses a half-century ago, according to evidence first published in October in the journal *Science*.

The initial dog flu strain has been dubbed "Florida '04" because it was isolated in 2004 from racing greyhounds in Jacksonville. Since then, dog flu outbreaks have raced through 22 states and 21 of Florida's 67 counties.

Among the hardest hit: Palm Beach County. This spring, the disease sickened so many local greyhounds

that the Palm Beach Kennel Club was forced to shrink its racing schedule. By August, an estimated 180 dogs had been treated for flu at the Peggy Adams Animal Rescue League in West Palm Beach.

But the deadliest outbreak erupted in July at Palm Beach County Animal Care & Control. The flu unleashed an unprecedented killing season as veterinarians worked to control the outbreak and stop the virus from escaping into the wider pet population.

In one month, 529 dogs were killed at the division's Belvedere Road shelter — 172 more than usual. Fifty-six of those dogs were put down because they either had the flu or were exposed to it. Others were killed because the shelter halted adoptions — there simply was no room to keep the stream of incoming dogs alive.

Dog flu usually means weeks of coughing and fatigue. But if the associated high fever hits, death can come to a dog within three days. Moreover, it is highly contagious — especially in its early stages, when victims show no symptoms.

"One day you can have one dog with it, and the next day you'll have 30," said Carl Leveridge, executive director of the Peggy Adams Animal Rescue League.

Did it spread through food?

Like a human pandemic, highly contagious dog flu has raced ahead of veterinary science's ability to respond. There's not yet a commercially available vaccine or a lab test to quickly confirm a diagnosis. Vets and pet owners instead must keep a close watch for symptoms: a sudden high fever; a soft, choking cough; a nose that runs, occasionally with blood.

"I've been seeing dogs with this disease for five years," said Dr. Scott Miller, a suburban West Palm Beach veterinarian who treats many kennel club greyhounds. "Most of them come down with a cough. The normal temperature is 100 to 102, and they'll spike fevers really quick to 105. You've got to treat them, and treat fast."

Precisely how and where the flu jumped from horses to dogs is uncertain. Experts say it required years of repeated contact between equines and canines for the flu to successfully mutate and spread.

"The evidence points to repeated introductions from horse to dog, horse to dog, horse to dog," said Dr. Cynda Crawford, lead author of the *Science* article, who is based at the University of Florida's College of Veterinary Medicine.

The search for the source has focused on racing hounds. But where would the crossover happen if greyhounds actually were the first animals? Horses and dogs race at different tracks.

Some believe greyhounds' food bowls may have served as the mixing vessel. Most greyhounds today eat beef. But in the 1980s and early 1990s, trainers straining for a competitive edge fed their dogs raw horse meat — deemed unfit for human consumption.

It's possible, researchers surmise, that the horse flu virus unwittingly was fed to the dogs. Over the years, the horse virus would have mutated and survived in canine carriers — slowly spreading to epidemic proportions.

The unintended prize may have been the new flu strain that now threatens an estimated 50 million to 70

million dogs in the United States, most of them family pets. Even with veterinary care, up to 8 percent of infected animals die, Crawford said.

As the greyhound industry's feeding practices draw more scrutiny, the racing industry is demanding proof.

Gary Guccione, executive director of the National Greyhound Association in Abilene, Kan., gave an annoyed laugh when asked about the horse meat connection. He referred questions to a scientist who conducts sponsored research for the association, Dr. Brad Fenwick at Virginia Tech, based in Blacksburg, Va.

Fenwick accused Crawford of advocating the horse meat theory without data to back it up — a charge Crawford denies. The supposition has appeared in other scientists' articles, but without proof.

"That's a hypothesis that's unproven. That is pure speculation," Fenwick said. "Have dogs been exposed via that route? Yeah, perhaps. But is that the vector? Hard to say."

It just as easily could have developed in stable dogs that lived around horses, he said.

Crawford said she's doing experiments now to see whether dogs can catch influenza by consuming infected meat.

"That's a plausible explanation, but it's certainly not proven," she conceded.

For years, most Florida kennel operators have gotten their meat from Seminole Animal Supply in Altamonte Springs. It's a small operation run by Frank McCarron, who uses two freezer trucks to deliver meat to 140 greyhound farms and kennels statewide. The meat comes boxed from packing houses in Wisconsin.

In the 1980s and 1990s, he said, racing dogs ate raw horse meat, which has less fat than beef. But by the time McCarron bought his business 12 years ago, the fad had faded. Horse meat had become too difficult to obtain and too costly, so the trainers switched to beef, McCarron said.

He's troubled that it's taken so long to figure out the illness that plagues his customers. "This cough is becoming an annual event," he said. "Somebody's got to get to the bottom of it."

Owners of racing greyhounds point to the exclusive feeding of beef these days as proof that their dogs weren't the first carriers of the new dog plague. But Crawford thinks the disease was brewing for decades.

In January 1999, Derby Lane in St. Petersburg was forced to close for most of the month when 500 dogs fell ill and six died.

That February, the Palm Beach Kennel Club shut down for about a week after about 100 dogs fell ill. A dog named Chances Are Free died.

Racing industry takes hit

It wasn't just the Florida greyhounds that fell ill in 1999. Greyhound racers often travel cross-country in huge transport trucks. That year, the sickness spread to racetracks in Wisconsin, Kansas, Iowa, Colorado

and elsewhere.

In the following years, the strange kennel cough outbreaks became more frequent. As dogs grew sick, so did the dog racing industry.

In 2001-02, Florida coffers took in \$19.6 million in taxes from greyhound winnings. The state purse dropped to \$17.2 million in 2002-03, when 830 races were canceled because dogs were sick.

By 2004-05, state revenues dropped to \$12.7 million. While hurricanes took a toll at the tracks that year, respiratory illness forced the cancellation of 1,080 Florida dog races, the most ever recorded.

As the state's share shrank, the Florida Division of Pari-Mutuel Wagering took the track closures seriously and asked veterinarians at the University of Florida to investigate.

Dr. Richard Hill, a practicing veterinarian and an expert on greyhound nutrition, made the initial forays, first to Derby Lane, then to the Sanford-Orlando Kennel Club in Longwood and finally, in 2004, to the Jacksonville Kennel Club. He tested for everything imaginable — except the flu, because it wasn't something seen in dogs.

"We were looking for organisms that we knew about," Hill said. "I was disappointed. Then we did the autopsies."

Healthy dogs' lungs appear pink. These dogs' lungs were dark red, like liver, from blood vessels that had burst. The veterinarians had seen this before, in dogs that died from bacterial strep infection. But the blood tests didn't show strep.

At that point, UF's Cynda Crawford joined the hunt. She was a practicing veterinarian in Tallahassee until 1998, when her fascination with infectious diseases lured her back to research. She joined UF's College of Veterinary Medicine — in part because the school had its own greyhound racetrack.

Whenever the state notified UF of another greyhound "kennel cough" outbreak, Crawford would travel in her van to get blood samples. Sometimes she'd wrap up a dog's body and haul it back for autopsy.

"The only reason we found this virus is because she'd go anywhere in the state at the drop of a hat," Hill said.

By 2003, when the cough forced the cancellation of 830 races, the Division of Pari-Mutuel Wagering committed to spend \$100,000 a year to find the source. That money enabled an extensive investigation of a 2004 outbreak at the Jacksonville track.

Twenty-two dogs fell ill. Eight died. Crawford took blood samples and dogs' bodies for autopsies.

Tests indicated a novel organism. But what? Crawford sent samples to the nation's top animal diagnostic lab, Cornell University's Animal Health Diagnostic Center, where Dr. Edward Dubovi heads the virology section.

"If anybody was going to find anything novel with this virus in these tissues, it was him," she said. "And he did."

Dubovi started by encouraging the virus to replicate in cultures of dog cells.

"No one knew what it was, so we took a broad approach," Dubovi said.

He included one wild card: dog cells mixed in with nutrients used to grow influenza in other species.

"It was an odd thing to do," Dubovi said. "No one had ever isolated influenza from a dog before."

Yet the wild card was the only one to produce results. Dubovi was dubious, so he tried more tests. Influenza again.

'All hell broke loose'

So did Dubovi celebrate the discovery? Not at all.

He assumed the sample had been contaminated and ordered his team to repeat the studies. They did so — and produced the same positive results. This was a flu organism that favored dogs.

"At that point, we truly knew we had something," Dubovi said. "And we had no idea whether it had any public health implications."

He called on a former colleague at the U.S. Centers for Disease Control and Prevention in Georgia.

Some of the most lethal pandemics in human history have erupted after a flu virus evolved the rare ability to jump across animal species.

CDC scientists found evidence that something similar happened with Dubovi's virus samples. They discovered its genes were only slightly different from an influenza subtype discovered decades ago in horses — called "Miami '63," because it was found in 1963 in Miami.

Word began to spread among scientists.

"The initial response to this was, 'Interesting, but so what if it's only in greyhounds?' " Dubovi said. "In September of 2005, we stumbled across the fact that it was running rampant through the New York City area, in high-end kennels."

Then, as Dubovi put it, "all hell broke loose."

More tests showed that by late 2004 and early 2005, the virus had spread to virtually every greyhound racetrack in the United States.

For animal shelters and pet owners, canine influenza had become a ticking bomb. In Palm Beach County, that bomb went off in July.

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