

Researchers hope to tap into big data to help improve pet health

By Julie A. Jacob

As the COVID-19 pandemic vividly demonstrated, data is crucial for understanding how diseases spread, pinpointing outbreaks, and determining the most effective prevention strategies and treatment methods. Unlike the world of human medicine, however, there is no one organization in veterinary medicine that gathers and analyzes data on companion animal diseases and treatments.

Researchers at the University of Minnesota College of Veterinary Medicine hope to remedy that gap with the Companion Animal Veterinary Surveillance Network (CAVSNET). Their goal is to use data gathered and analyzed from veterinary electronic health records to provide veterinarians with a robust database that can assist them with their clinical decision-making. The CAVSNET team is currently focused solely on antibiotic prescribing for common infections, but they hope to eventually expand the database to encompass a broad range of diseases and treatments.

Inspiration across the pond

CAVSNET was inspired by the Small Animal Veterinary Surveillance Network (SAVSNET) in England, explains Jennifer Granick, DVM, PhD, Dipl. ACVIM (SAIM), and an associate professor of clinical sciences at the University of Minnesota College of Veterinary Medicine.

"Alan Radford was at a conference in Bristol a number of years ago, where I was presenting information on urinary tract infections in dogs, and he shared with me what they were doing at SAVSNET," recalls Dr. Granick.

SAVSNET was launched in 2012 as a joint initiative of the University of Liverpool School of Veterinary Science and the British Small Animal Veterinary, and it is now

run by the University of Liverpool. SAVSNET analyzes data harvested from veterinary clinic electronic health records across Great Britain to track and monitor disease outbreaks in companion animals, communicate information about best practices in veterinary care, provide benchmarking data, and share data with other researchers and the general public.

When an outbreak of diarrhea and vomiting occurred among dogs in the UK, SAVSNET determined it was associated with a canine enteric coronavirus, explains Alan Radford, BSc, BVSc, PhD, MRCVS, professor in veterinary informatics at the University of Liverpool.

SAVSNET has identified other disease outbreaks and risk factors in animals as well.

"We have identified novel risk factors for important diseases of rabbits, allowing more targeted health messages to rabbit owners most at risk of fly strike and myxomatosis," Dr. Radford says. "We have developed and proved the methods that can reduce the use of the most critical antibiotics by veterinarians, particularly in cats. We completed the first large-scale survey to confirm the albeit rare levels of infection of dogs and cats with SAR-CoV2."

Granick hopes CAVSNET will one day offer the same type of comprehensive data analysis for a wide range of diseases.

"We're aiming to be a sister network to SAVSNET and we've had a lot of guidance for Dr. Radford," Granick says.

Starting with antibiotic prescribing

While the long-term goal for CAVSNET is to gather and analyze data on many types of diseases in companion animals, it is currently concentrating on antibiotic prescribing patterns for dogs and cats being treated for oral/gastrointestinal diseases, urinary tract infections,

respiratory conditions, otitis, and skin disorders. With funding from a Food and Drug Administration (FDA) grant, CAVSNET is analyzing electronic health record information provided through a collaboration with 116 Banfield veterinary clinics that use one of two electronic health record (EHR) systems.

"We are looking at how common those diseases are," says Granick. "We look at the high level and then look down to the individual diagnoses and look at antibiotics that are prescribed."

One challenge, she says, is developing a uniform nomenclature for diseases and treatments. For example, in one data stream, urinary tract infections are abbreviated as UTI and in the other as UTI, lower.

"That requires us to do some mapping to a common vocabulary," Granick says.

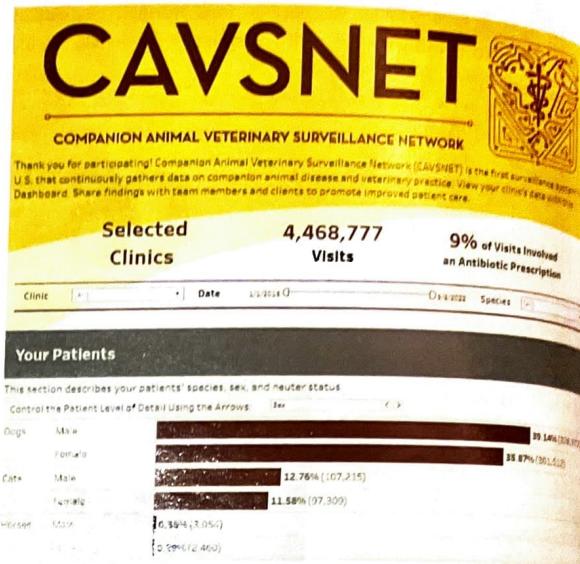
Adding, so far, the CAVSNET data aligns with what SAVSNET has found regarding antibiotic prescribing.

"We see that gastrointestinal disease is commonly prescribed and we see a lot of metronidazole for diarrhea in dogs and cats," she says.

Given judicious antibiotic usage is a concern in both animal and human medicine, the Minnesota Department of Public Health, through its One Health Antibiotic Stewardship Collaborative, is partnering with CAVSNET. The One Health program brings together professionals in human, animal, and environmental health in Minnesota to promote responsible antibiotic usage and preserve the efficacy of antibiotics.

Amanda Beaudoin, DVM, PhD, an epidemiologist with the Minnesota Department of Health, is a co-investigator of CAVSNET's FDA-funded antibiotic tracking project.

"Because MDH is a health department, our network is



Participating clinics can view their data on the CAVSNET dashboard.

a member of the collaborative, I am able to take information about how we're tracking antibiotic use in dogs and cats," Dr. Beaudoin says. "CAVSNET provides a platform for communicating the data and building relationships to get more people to do what we're doing here in Minnesota."

Beaudoin hopes CAVSNET will bring veterinary medicine up to speed compared with human medicine in terms of antibiotic stewardship.

"There's been progress going on to improve antibiotic usage in health care for years and expectations in hospitals and clinics for how they use antibiotics. We don't necessarily have that in veterinary medicine. If we are going to be a contributing partner to the bigger picture of antibiotic stewardship, we need data to measure practice and identify areas for improvement and measure progress for that improvement," Beaudoin says.

The importance of setting up a data dashboard

Given data is the engine powering CAVSNET, a lot of its start-up work has focused on better ways to gather and present data. Using funding from the Shavlik Family Foundation, CAVSNET is developing a real-time data dashboard that veterinaries will be able to view on its website.

Veterinary clinics
interested in participating
should contact CAVSNET at
cavnet@umn.edu.

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CAVSNET also used a Minnesota Animal Health grant to hire a graduate student to develop a method for mining data from EHR free text notes.

For example, an algorithm can be programmed to flag certain words and phrases in free text notes, explains Granick. It is similar to the machine-learning text mining CAVSNET already uses.

CAVSNET is meticulous about maintaining data privacy and confidentiality, she adds. Pet owners sign a consent form before the data is used, and all data is de-identified except for zip codes.

"Even though we don't have HIPAA for animals, we treat the data just the same with multiple firewalls and analyze the data in a secure environment," Granick says.

Eventually, CAVSNET hopes to open participation to any interested clinic, no matter the EHR used.

CAVSNET aims to make the data gathering process as seamless and simple as possible for veterinary clinics.

"It just wouldn't be viable if we took a lot of work on the part of clinics," Granick says. "The goal is to have a sustainable system and to really harness the power of big data in companion animal medicine, which really hasn't been done in the U.S. in this context. Big data and pet medicine is the new horizon."

Julie A. Jacob is a communication professional and writer who often contributes to Veterinary Practice News. She lives in Wisconsin with her two poodles.