

# Companion Vector-borne Diseases: The Defining Challenge of Our Veterinary Generation?

Companion vector-borne diseases (CVBDs) pose a global threat to both animal and human health. Veterinary professionals around the world must respond to help safeguard human and animal health. Global parasitologists, veterinary clinicians and epidemiologists recently joined together for the 14<sup>th</sup> CVBD World Forum, held in Trieste, Italy, to discuss changing parasite and vector distributions in a changing world. Martin Wans, Global Communications at Bayer Animal Health, summarises the key highlights from the three-day event.

## The Vector-borne Disease World is Changing

In certain areas of the globe, the spread of disease-carrying vectors is gathering pace, moving faster than previously recorded. New species of vectors and pathogens have been identified and established pathogens have been discovered in non-endemic areas.

Take, for example, an invasive mosquito species that has spread rapidly, colonising two Italian regions in just a few years.<sup>1</sup> In addition, a recent literature review has highlighted the widespread occurrence of 12 important CVBDs across Middle and South American countries.<sup>2</sup>

These were among some of the latest results shared at the CVBD World Forum 2019, attended by more than 40 distinguished scientists to discuss this pressing issue.

Although our understanding of CVBDs is constantly evolving, it is clear that there are vast knowledge gaps and limited understanding of the lifecycle of some important CVBDs. Many of these diseases pose a worrying zoonotic risk, making the role of veterinarians vital in helping to prevent disease spread in not only animals, but humans too.

## Driving Forces

It is important to appreciate there are multiple factors influencing the epidemiology of CVBDs around the world. Top factors include:

- climate variations and weather
- an increase in pet travel and importation
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“Vector-borne diseases are recognised as being particularly sensitive to weather and climate,” explained Nick Ogden, senior research scientist at Public Health Agency of Canada. He believes climate change could have a significant role to play in the growing threat of CVBDs.

“It is expected that climate change will affect where and when vector-borne disease risks occur, and the level of risk they pose to human and animal health.”

In his presentation, Nick outlined that infectious diseases transmitted by arthropod vectors (such as ticks and sandflies) were most likely to be affected by climate variations, but how model-based predictions about climate change can help when validated by real-world results.<sup>3</sup>

Even subtle changes in climate conditions during a particular year or season may impact vectors and associated pathogens. A recent study showed how hot, dry summers have likely facilitated development of two types of tropical ticks in Germany, known to be potential vectors of highly pathogenic infectious diseases like rickettsiosis, Crimean–Congo hemorrhagic fever (CCHF), theileriosis and babesiosis.<sup>4</sup>

Research has found vectors have the ability to adjust to new environments in endemic areas. A recent study in Brazil demonstrated how sandflies have been able to adapt to human dwellings, increasing the risk of leishmaniasis transmission in indoor and immediate outdoor environments.<sup>5</sup>

Perhaps unsurprisingly, increased vector exposure can lead to an increased risk of contracting CVBDs. One study showed that cats presenting with antibodies to *P. perniciosus* sandflies were significantly more likely to test positive for *Leishmania*.<sup>6</sup>

## Increased Pet Travel

Cross-border rehoming of adult rescue dogs and illegal importation of puppies is also contributing to the changing CVBD landscape. Increased geographical mobility of pets poses disease risks such as leishmaniasis, ehrlichiosis and babesiosis to non-endemic countries.

“We are seeing more and more cases of diseases in areas where they had not previously been found,” explains Barbara Kohn, professor at the clinic for small animals at Freie Universität Berlin.

“Dogs imported from endemic areas are of particular concern for the spread of a disease.”

Increased pet travel is also an issue. In recent studies, *Ehrlichia* and *Leishmania* were most commonly detected in dogs that had travelled to endemic areas in Europe.<sup>7</sup> The data suggests there is a substantial risk to dogs when travelling to an endemic area even with a limited time of exposure,<sup>8</sup> highlighting the importance of prophylaxis.

## A Complex Clinical Picture

As well as continually evolving disease risks and patterns, clinical diagnosis and treatment of CVBDs is often not straightforward either. For example, pets with clinical leishmaniasis can be more susceptible to co-infections with other vector-borne pathogens,<sup>9</sup> with clinical outcomes of CVBD transmission easily becoming complicated by multiple infections. Many CVBDs can be severe and difficult to treat, while some geographical regions have limited access to suitable therapeutic options.

“Detection of CVBDs may be difficult due to long incubation periods and a lack of clinical signs,” explains Professor Rebecca Traub, University of Melbourne and Founding Director of the Tropical Council for Companion Animal Parasites (TroCCAP). “Infected animals may appear normal, even in blood tests, with some vectors transmitting disease hours or even days before this is detectable in the animal.”<sup>9</sup>



These findings add to the growing body of data that supports the importance of prophylaxis that prevents biting. As it is difficult to predict the ever-changing risk of vector exposure, using anti-vector products that not only kill but also repel will have the greatest impact to reduce the risk of CVBD infection and spread.

### The Veterinary Challenge

Veterinarians across the globe play an essential role in helping to control CVBDs.

Ian Wright, guideline director at the European Scientific Counsel Companion Animal Parasites (ESCCAP), said: “[Veterinarians] have an active role in helping to prevent the spread of vector-borne diseases in their area, through early detection via screening imported pets for CVBDs and vigilance for relevant clinical signs in travelled pets.”

Veterinarians need to be prepared for the real possibility of exotic parasites arriving in their country and ensure their patients are protected against the arrival of new CVBDs in their region, even if a case has not yet been experienced in practice.

Wright added: “[Veterinarians] must also ensure accurate parasite and vector prevention advice is communicated to owners, based on the latest distribution data, and encouragement of tick surveillance on pets by owners.”

Data from one study in the Netherlands suggested feeding data back to owners is one technique that can help improve owner awareness and compliance. The research trialled a smartphone app which collected epidemiological data from veterinarians and pet owners. It successfully captured information on travelling pets and movement of ticks throughout Europe, providing an early warning system for exotic ticks invading the Netherlands, improving tick control and helping increase owner awareness.<sup>10</sup>

Experts recommend veterinarians adopt a thorough year-round approach to prevent CVBDs, which includes:

- remaining vigilant and routinely screening imported and travelled pets for CVBDs
- incorporating preferably anti-vector products into health strategies that prevent biting to safeguard pets

- against quick changes in vector pressure
- considering co-infections – for example, dogs with clinical leishmaniosis should also be tested for additional vector-borne pathogen infections, such as *Ehrlichia*
- being proactive in advising owners about prevention based on the latest distribution data, especially in relation to travelling abroad and when rehoming a dog from another geographical location
- It's clear the constantly evolving nature of these diseases increases their threat, making it more important than ever that veterinarians don't become complacent.

Wright pressed the magnitude of the issue – “It is crucial that we raise awareness of this, as vigilance, testing and rapid protective measures are vital in helping to prevent spread. I would argue this is the defining challenge of our veterinary generation!”

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