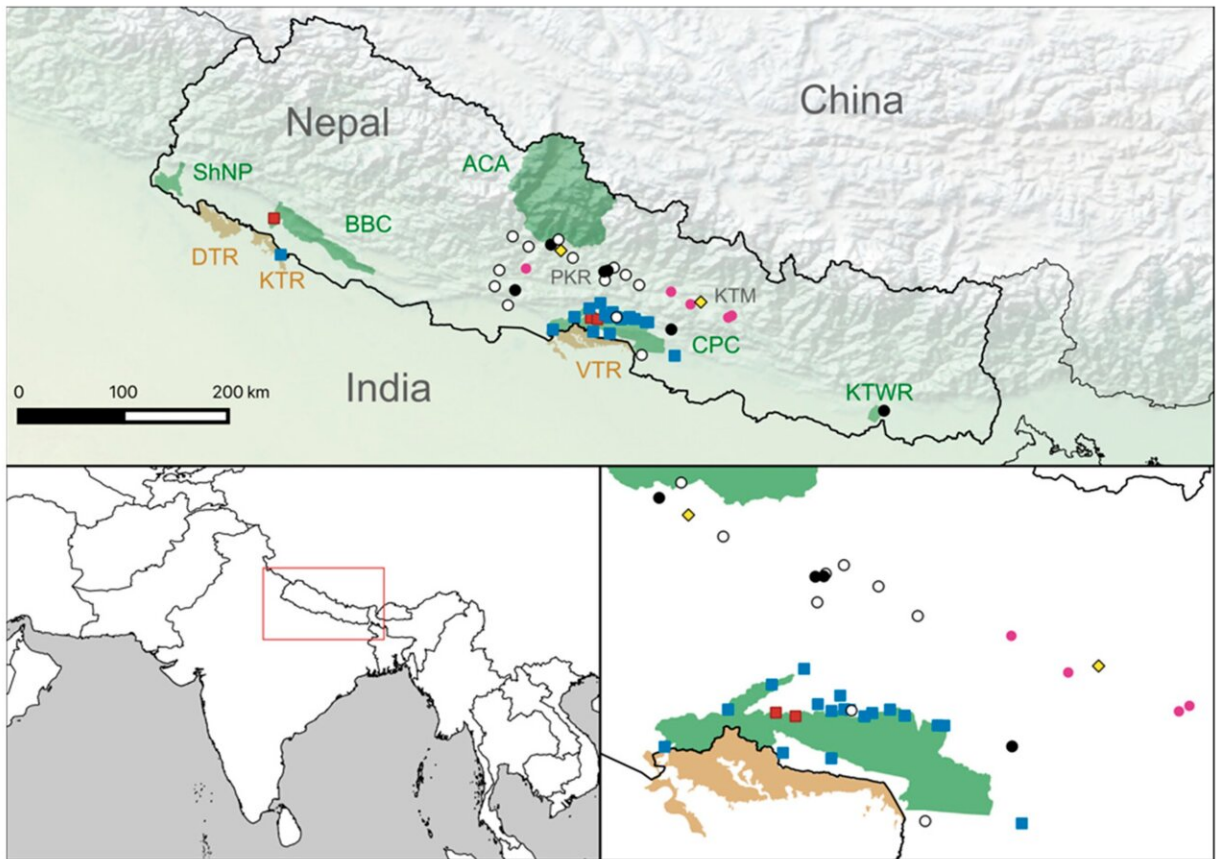


Canine distemper now threatens big cats in Nepal

February 16 2023



Geographic distribution of samples and results. The locations of tiger and leopard samples are marked by squares (seropositive = red, seronegative = blue) and circles (seropositive = black, seronegative = white), respectively. Unsampled sick leopards are indicated using pink circles. Protected areas are shaded in green (Nepal) and tan (India). In Nepal, these include: Shuklaphanta National Park (ShNP), Bardia–Banke Complex (BBC), Annapurna Conservation Area (ACA), Chitwan–Parsa Complex (CPC) and Koshi Thappu Wildlife Reserve

(KTWR). Indian protected areas include: Dudhwa Tiger Reserve (DTR), Katarniaghat Tiger Reserve (KTR) and Valmiki Tiger Reserve (VTR). The cities of Kathmandu (KTM) and Pokhara (PKR) are indicated by yellow diamonds. Credit: *Pathogens* (2023). DOI: 10.3390/pathogens12020203

Researchers with the College of Veterinary Medicine have confirmed the first cases of canine distemper virus (CDV), which can cause fatal neurological disease, in tigers and leopards in Nepal.

"Canine distemper virus has been repeatedly identified as a threat to wild carnivores and their conservation," said Martin Gilbert, Cornell Wildlife Health Center wild carnivore health specialist and associate professor of practice in the Department of Population Medicine and Diagnostic Sciences. "This study is a first step to understanding the potential impact for Nepalese [tiger](#) and leopard populations."

Although researchers have suspected distemper was infecting these species, the study, published Jan 28 in the journal *Pathogens*, is the first definitive proof of infection in Nepal's big cats. The survey found 11% of [tigers](#) (three out of 28) and 30% of the [leopards](#) (six out of 20) had antibodies to CDV, indicating prior infection with the virus.

Relatively little is known about the status of Nepal's leopards, but scientists believe the population is in decline due to a combination of poaching, [habitat loss](#) and human-wildlife conflict. Leopards also face increasing competition for space due to the expansion of the country's tiger population. Could CDV push them even further into decline?

Unlike leopards, "tigers are enjoying a resurgence in Nepal," Gilbert said. "Their national population has almost tripled in size over the past 12 years—however, globally the species remains endangered." As the

larger and stronger of the two species, tigers have been displacing leopards from [national parks](#) and forcing them into areas with more people, where they often prey on street dogs.

Based on the findings of this paper, these dogs may be the source of infection. "We already know CDV is circulating in the Nepali dog population" said Dr. Jessica Bodgener, a veterinarian with Wildlife Vets International, who co-authored the paper, "and that leopards frequently eat dogs, while tigers do not. When we found a greater exposure in leopards it seemed like a good fit, but we need more evidence to be sure. And we can't forget three tigers also tested positive. If tigers aren't eating dogs, it raises the question, how did these animals get infected? The situation may not be straightforward."

Other species that could be acting as reservoirs include wild carnivores such as jackals and civets.

The team examined [blood samples](#) collected from tigers and leopards between 2011 and 2021 by veterinarians working for Nepal's Department of National Parks and Wildlife Conservation and the National Trust for Nature Conservation (NTNC). These were opportunistic samples, with most of the captures occurring as part of routine wildlife management. Routine collection and archiving of samples like these are important for investigating disease.

In many places, CDV surveillance is hampered by a lack of local laboratories set up to run the appropriate tests. Access to specialist international labs can be blocked by export bans or slowed by permit application processes. To sidestep these issues, Gilbert's team chose not to export the samples, but to partner with the Agricultural and Forestry University in Chitwan to establish testing in Nepal, something they hope to see replicated elsewhere.

"Establishing national testing facilities that can support coordinated CDV research and surveillance efforts is both highly desirable and achievable, and should lead to increased sampling and collaboration," Gilbert said.

With the presence of the virus confirmed in these populations, the research team recommends several immediate actions:

- Wildlife managers should be made aware of the threat posed by CDV to leopards and tigers and encouraged to report signs of neurological disease.
- Testing of leopards and tigers should be expanded to include molecular testing and genetic sequencing, as well as continued monitoring of antibodies.
- To inform appropriate control measures, such as vaccinating dogs, or potentially the big cats themselves, researchers should confirm which animals are acting as reservoirs for CDV.
- Because small, isolated populations are most at risk, efforts should be made to increase habitat connectivity through wildlife corridors.

"Since 2014, we have seen 10 leopards showing neurological disease that could be consistent with CDV infection," says Dr. Amir Sadaula, NTNC veterinarian, who led the Nepali research team. "With increased awareness, we plan to confirm future cases and obtain genetic sequences to help determine the source of infections."

Gilbert and his team plan to continue their work in Nepal, particularly on the under-studied leopard. Research is already underway to introduce more comprehensive big cat health assessments in a bid to understand the potential roles of injury and disease in increasing the likelihood of conflicts with people. Meanwhile, ongoing ecological fieldwork is investigating how the predation of domestic dogs may be influencing the

behavior and distribution of leopards outside of national parks.

More information: Jessica Bodgener et al, Canine Distemper Virus in Tigers (*Panthera tigris*) and Leopards (*P. pardus*) in Nepal, *Pathogens* (2023). [DOI: 10.3390/pathogens12020203](https://doi.org/10.3390/pathogens12020203)

Provided by Cornell University

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