

For tiger populations, a new threat: Canine distemper virus could be significant driver toward extinction

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Amur tiger photographed by camera trap. Credit: WCS Russia Program

Along with the pressures of habitat loss, poaching and depletion of prey species, a new threat to tiger populations in the wild has surfaced in the form of disease, specifically, canine distemper virus (CDV). According to a new study from the Wildlife Conservation Society (WCS) and its partners, CDV has the potential to be a significant driver in pushing the

animals toward extinction.

While CDV has recently been shown to lead to the deaths of individual tigers, its long-term impacts on tiger populations had never before been studied.

The authors evaluated these impacts on the Amur tiger population in Russia's Sikhote-Alin Biosphere Zapovednik (SABZ), where tiger numbers declined from 38 individuals to 9 in the years 2007 to 2012. In 2009 and 2010, six adult tigers died or disappeared from the reserve, and CDV was confirmed in two dead tigers—leading scientists to believe that CDV likely played a role in the overall decline of the population. Joint investigations of CDV have been an ongoing focus of WCS and Russian scientists at Sikhote-Alin Zapovednik and veterinarians at the regional Primorye Agricultural College since its first appearance in tigers in 2003.

A key finding of this study: Modeling shows that smaller populations of tigers were found to be more vulnerable to extinction by CDV. Populations consisting of 25 individuals were 1.65 times more likely to decline in the next 50 years when CDV was present. The results are profoundly disturbing for global wild tigers given that in most sites where wild tigers persist they are limited to populations of less than 25 adult breeding individuals.

The scientists used computer modeling to simulate the effects of CDV infection on isolated tiger populations of various sizes and through a series of transmission scenarios. These included tiger-to-tiger transmission and transmission through predation on CDV-infected domestic dogs and/or infected wild carnivores (such as foxes, raccoon dogs and badgers). High and low-risk scenarios for the model were created based on variation in the prevalence of CDV and the tigers' contact with sources of exposure.

Results showed that CDV infection increased the 50-year extinction probability of tigers in SABZ as much as 55.8 percent compared to CDV-free populations of equivalent size.

"Although we knew that individual tigers had died from CDV in the wild, we wanted to understand the risk the virus presents to whole populations," said WCS veterinarian Martin Gilbert. "Tigers are elusive, however, and studying the long-term impact of risk factors is very challenging. Our model, based on tiger ecology data collected over 20 years in SABZ, explored the different ways that tigers might be exposed to the virus and how these impact the extinction risk to tiger populations over the long term."

WCS Russia Program Director Dale Miquelle said, "Tigers face an array of threats throughout their range, from poaching to competition with humans for space and for food. Consequently, many tiger populations have become smaller and more fragmented, making them much more susceptible to diseases such as CDV. While we must continue to focus on the primary threats of poaching and habitat destruction, we now must also be prepared to deal with the appearance of such diseases in the future."

Priorities for future research, according to the authors, include identifying the domestic and wild carnivore species that contribute to the CDV reservoir, and those that are the most likely sources of infection for [tigers](#). Tigers are too rare to sustain the virus in the long term, so CDV must rely on more abundant carnivore species to persist in the environment. Understanding the structure of the CDV reservoir will be a critical first step in identifying measures that might prevent or control future outbreaks.

In addition, since we now know that small [tiger populations](#) are at greater risk to diseases such as CDV than larger populations, conservation

strategies focusing on connectedness between populations become all the more important.

More information: "Estimating the potential impact of canine distemper virus on the Amur tiger population (*Panthera tigris altaica*) in Russia," appears in the current online edition of *PloS ONE*.

Provided by Wildlife Conservation Society

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