The tiger, soon to be named ‘Awang Besul’, was taken into care by the Terengganu Wildlife and National Parks Department (Perhilitan), then transferred to the National Wildlife Rescue Center in Sungkai, Perak. Initially he ate and drank on his own, but his neurological disease worsened. Despite the best efforts of the veterinarians caring for him, his condition deteriorated, and he died just four days later. Suspicion focused on canine distemper virus, and it was soon announced that Awang Basul was the first case of the infection recorded in a wild Malayan tiger.

Canine distemper virus (CDV) is something of a misnomer. Although long recognised as a serious and often lethal disease of unvaccinated dogs, it is also commonly found in wild carnivores, from the raccoons of urban America to the lions of the Serengeti, and even the seals of the Caspian Sea. But the case of Awang Besul was an alarming development. Fewer than 100 Malayan tigers remain in the forests of Peninsular Malaysia and the subspecies is now recognized as critically endangered. In better days, in the early twentieth century when tigers thrived throughout the verdant forests of Southeast Asia, outbreaks of disease were inconsequential, with any deaths quickly replaced by the abundant breeding population. But in today’s world, with depleted tiger numbers scratching out a living in remaining pockets of snare-infested forest amid a sea of rubber and palm oil, every death counts and an outbreak of disease can drive the last nail into the coffin of population extinction.

The story of CDV in wild tigers didn’t begin in the tropical swelter of Malaysia, but three thousand miles to the north in the frozen taiga forests of the Russian Far East. Concerns were first raised following the death of a young tigress in early 2004, but it wasn’t until 2010 – when a series of cases were detected in widely scattered locations – that alarm bells really started to sound. At the time, I was working as a wildlife veterinarian for the Wildlife Conservation Society, and I made my first visit to Russia to investigate whether distemper might pose a threat to the Amur tigers (also known as Siberian tigers) that live there. My research there – which became the focus of my master’s degree and then of my PhD – found that the virus did indeed pose a threat to the tigers, particularly the smaller and more isolated populations that had become the reality for most tigers worldwide by that time.

By the time I joined Cornell University in 2016, we had accumulated a fairly detailed understanding of the epidemiology of CDV in Russia and its impact on the tiger population there, but almost nothing was known about the threat it posed to tigers elsewhere in the species’ range. Researching the health of an animal as rare and elusive as the tiger is a challenging proposition. How do you study a species that is observed so infrequently? Compounding this, the virus itself can be hard to find. Infections last just a few weeks, and either kill the tiger host or are vanquished by its immune system. The answer lies in the longevity of this immune response, with antibodies to CDV remaining detectable for years in those tigers that survive infection. Detection of antibodies in tiger blood is therefore the key to assessing the level of CDV exposure in a tiger population, and with antibodies now found in a third of Russian tigers, we have a benchmark against which to compare.

Although in theory these tiger antibodies are a prime target for surveillance, the practice of detection presents a considerable challenge. Commercial test kits designed for measuring CDV antibodies in dog blood have proven useless for screening tigers, as the dog-specific indicator reagent they use fails to bind reliably to tiger antibodies. The most practical alternative is called a serum neutralization test (SNT).
This does not detect the antibodies directly, but measures the ability of serum (due to the antibodies it may contain) to neutralize virus and prevent it from infecting cells. However, this is more technically demanding and largely unavailable in the countries that tigers inhabit. Prospects for shipping tiger samples for testing in international laboratories are hampered by export restrictions in some countries, and the reluctance of others to issue CITES permits (designed to regulate trade in endangered species) unfortunately and ironically curtails access to critical wildlife health diagnostics. This leaves us with only one option – if we cannot get the sample to the laboratory, then we must take the laboratory to the sample – and set up our own SNT protocols in tiger range countries.

With generous support from the Cornell Feline Health Center, we have now introduced SNT protocols to Chulalongkorn University in Thailand, Bogor Agricultural University in Indonesia, and the Agriculture and Forestry University in Nepal. Our training sessions have included veterinarians from each of these countries as well as colleagues from the tiger range states of Bhutan and India. Most crucially, we have been able to use these tests to screen archived samples from wild tigers, and have confirmed the presence of CDV exposure in tigers in Sumatra and in Nepal for the first time.

Simultaneously, we have also been working to strengthen access to critical wildlife health diagnostics. This leaves us with only one option – if we cannot get the sample to the laboratory, then we must take the laboratory to the sample – and set up our own SNT protocols in tiger range countries.

Left to Right: Vinodhat Nataprun, Techahirongkra (Chiulalongkorn University) guides Silmi Mariya (Bogor Agricultural University) on the interpretation of the serum neutralization test. (Photo credit: M. Gilbert)
Martin Gilbert digitizes histopathology slides using the Grundium scanner in Nepal. (Photo credit: J. Bodgener)
Manager of the Barumun Centre, Syukur Alfajar uses a remote camera to monitor the Sumatran tigers being rehabilitated at the facility. (Photo credit: M. Gilbert)