Wildlife Health Network

Advancing the conversation

April 25, 2020 Issue 1

Wildlife Health: A call to action

This first newsletter is brought to you from the isolation of quarantine as the United States struggles to mitigate the COVID-19 pandemic. With current evidence pointing to a wildlife origin of SARS-CoV-2, the global importance of wildlife health and One Health has never been more apparent.

As hospitals struggled to handle their caseload over the past few weeks, several states put out a desperate plea for people with medical training to enter the workforce. Recently retired nurses and physicians dusted off their scrubs to join the fight. Fourth year medical students that had not yet even graduated were suddenly fast-tracked into the workforce and thrown into the frontlines. In the U.K., some 750,000 members of the general public volunteered to help the National Health Service. In all of these instances, we've seen how those called to action have risen to the challenge.

I would argue that now is the time for a similar call to action for wildlife health. Now is the time to support as many students and professionals as we can, enabling them to contribute in their own ways towards a better understanding of wildlife health. Now is the time to be proactive - rather than reactive - to issues affecting the health of wildlife. Now is the time to modernize our definition of wildlife health beyond just "the absence of disease." Now is the time to advance the conversation, and change the status-quo.

The goal of this project is to build connections and provide an easier way to keep everyone informed on relevant wildlife health related news, research, opportunities, and initiatives. I'll be synthesizing resources and compiling them all together in one short, easy to read newsletter every couple of weeks. Over time, I hope to develop this into a valuable platform where all students and professionals across disciplines with a vested interest in wildlife health and disease can share information in real-time.

If this is something that interests you, I hope you'll consider this your personal call to action. Join our list and share this with your colleagues that may also find this valuable.

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Stay healthy,

Michelle Kneeland, DVM

Wildlife Origins of SARS-CoV-2: What We Know So Far

Key Takeaways:

- Severe Acute Respiratory Syndrome Corona Virus 2 (SARS-CoV-2) was identified as the pathogen of COVID-19
- The specificity of the interaction between a virus and its receptor determines host tropism and which species the virus may be capable of infecting
    - Human Angiotensin-converting enzyme 2 (ACE2) binds to the receptor-binding domain (RBD) of the spike protein of SARS-CoV-2, allowing it to enter human cells
- SARS-CoV2 is showing 96.3% genomic identity with Bat-CoV-RaTG13 that was previously detected in the horseshoe bat (*Rhinolophus affinis*) from southwest China's Yunnan Province
    - However, there is a key difference between these two viruses within the RBD: the SARS-CoV-2 RBD is adapted to binding ACE2 receptors which allows it to enter human cells, while BatCoV-RaTG13 cannot bind ACE2
    - There is general consensus that the origin of SARS-CoV-2 is presumed to be bat, but and an intermediate host with reassortments in the RBD region was necessary to invade human cells.
- The intermediate host is not clear, and some studies suggest that pangolin is involved in the evolution of SARS-CoV-2.
    - A Pangolin coronavirus (Pangolin-CoV) was discovered in 2019
    - Pangolin ACE2 may show better affinity to SARS-CoV-2 than human ACE2
    - While this finding supports the hypothesis that the pangolin was involved in SARS-CoV-2 evolution, the pangolin has *not* been determined as an intermediary or amplification host in this SAR-CoV-2 outbreak

Sources:

Spike protein recognition of mammalian ACE2 predicts the host range and an optimized ACE2 for SARS-CoV-2 infection
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7102515/

World Organization for Animal Health FAQs on COVID-19:
https://www.oie.int/scientific-expertise/specific-information-and-recommendations/questions-and-answers-on-2019novel-coronavirus/

Risk of Reverse Zoonosis to Bats?

Key Takeaways:

- US Fish & Wildlife Service and the Association of Fish and Wildlife Agencies recently put out directives advising researchers and rehabbers to temporarily suspend all activities involving the handling of live wild bats
- The National Wildlife Rehabilitators Association put out their own **Position Statement** supporting the continued admittance of bats to rehab centers
- Given these conflicting approaches and opinions, increased communication between agencies and the rehabilitation community will be critical moving forward

It is not currently known whether the novel coronavirus, SARS-CoV-2, has the potential to infect North American wildlife. Specifically, it's unknown if the virus will spillover to North American bats, if these bats are susceptible to infection, could serve as a new reservoir for the disease, or if the virus will result in morbidity and mortality, particularly in bats weakened by white-nose syndrome or other stressors.

The Association of Fish and Wildlife Agencies' (AFWA) Fish and Wildlife Health Committee and Bat Working Group have collaborated on voluntary interim guidance, with main points outlined below:

It is recommended that state and federal fish and wildlife agency biologists and permitted researchers, consultants, or rehabbers that involve the capture and/or direct handling of bats, consider postponing those activities until more information about susceptibility of North American bats to SARS-CoV-2 becomes available.

Rehabilitation Recommendations

Some wildlife rehabilitators have direct contact with bats and there is the potential for human to bat transmission of the SARS-CoV-2 virus. Given the diversity of viral presentation in humans, the current level of testing available, and the limited availability of PPE, it is difficult to know the risk of viral transmission by a rehabilitator to animals in their care. For these reasons, AFWA recommends that wildlife rehabilitators not accept bats for rehabilitation at the present time.

In response, The National Wildlife Rehabilitators Association released a **Position Statement** that supports the continued admittance of bats for rehabilitation, "To ensure proper bat care, welfare, and conservation, but foremost as part of the solution to public health concerns surrounding bats."

Management Recommendations

While humans may unknowingly shed virus in environments used by bats such as caves, the risk of transmission of SARS-CoV-2 to bats is unknown. Until more information is available, it is recommended that fish and wildlife agencies use their discretion to determine how best to manage these risks on state, federal, and provincial lands. Several states have issued or are contemplating issuing cave closures on state managed lands.

The U.S. Geological Survey, U.S. Fish and Wildlife Service, U. S. Forest Service, and state fish and wildlife agency staff are working on a risk assessment and associated analyses to help answer these questions. We will keep you updated as further guidelines become available.

In the news:

Bats get blamed for the coronavirus. But bats face their own virus risk — from humans

U.S. advises suspending bat research over concerns coronavirus could infect North American species

Northeast Wildlife Health: Recent Research

Porcupine Fungal Disease in New England

Atypical dermatophytosis in 12 North American Porcupines (*Erethizon dorsatum*) from the Northeastern United States 2010-2017
(Link to article- full text available)

Key Takeaways:

- Twelve wild North American Porcupines diagnosed with dermatopathies at two New England wildlife rehab clinics
- Atypical dermatophytosis diagnosed in all cases
- Trichophyton sp. grown in 5/6 animals where culture was performed, with molecular diagnosis of *Arthroderma benhamiae* / *Trichophyton mentagrophytes* in these 5 cases

News stories about this study:

Fungal disease found in porcupines, adding to list of species hit by fungus outbreaks

UNH Lab Finds Often Fatal Fungal Disease in New England's Wild Porcupines

Raccoon Health Assessments in NY

HEALTH SURVEY OF FREE-RANGING RACCOONS (*PROCYON LOTOR*) IN CENTRAL PARK, NEW YORK, NEW YORK, USA: IMPLICATIONS FOR HUMAN AND DOMESTIC ANIMAL HEALTH
(**Link to article- full text available**)

Key Takeaways:

- Health assessments conducted on 113 free-ranging raccoons in Central Park, NY in conjunction with a trap-vaccinate-release program
- Given the high raccoon, domestic animal, and human density in Central Park, there is potential for interspecies transmission of disease
- These results indicate the presence of several significant pathogens for which raccoons may play an ecologic role, including Rabies virus, *B. procyonis*, *T. gondii*, *Salmonella*, *C. jejuni*, and possibly parvoviruses

- **Summary of study findings:**
  - Euthanized raccoons tested for rabies and canine distemper virus (CDV), respectively- all were negative for both
  - Endoparasitism was the most common necropsy finding, with identification of *Baylisascaris procyonis* in 75% necropsied raccoons
  - Median blood lead level was 7.3 ug/dL
  - Rabies virus neutralizing antibody titer was greater than or equal to 0.5 IU/mL in 10% unvaccinated and in 65% previously vaccinated raccoons
  - The majority were seropositive for canine parvovirus-2 (92%) and Toxoplasma gondii (65%).
  - Fewer were seropositive for *Rickettsia rickettsii* (10%).
  - None seropositive for CDV, canine adenovirus-1, or *Borrelia burgdorferi.*
  - Ectoparasites found during 16 of 118 (13.6%) included Ixodes texanus ticks (15/118, 12.7%) and Trichodectes octomaculatus lice (1/118, 0.8%).
  - *Campylobacter jejuni* detected in 6% fecal samples
  - Detected *Salmonella enterica* serotypes in 63.1% enteric cultures

Latest Regional News in Wildlife Health

Cornell Wildlife Health Center launched: because we need nature, and now nature needs us

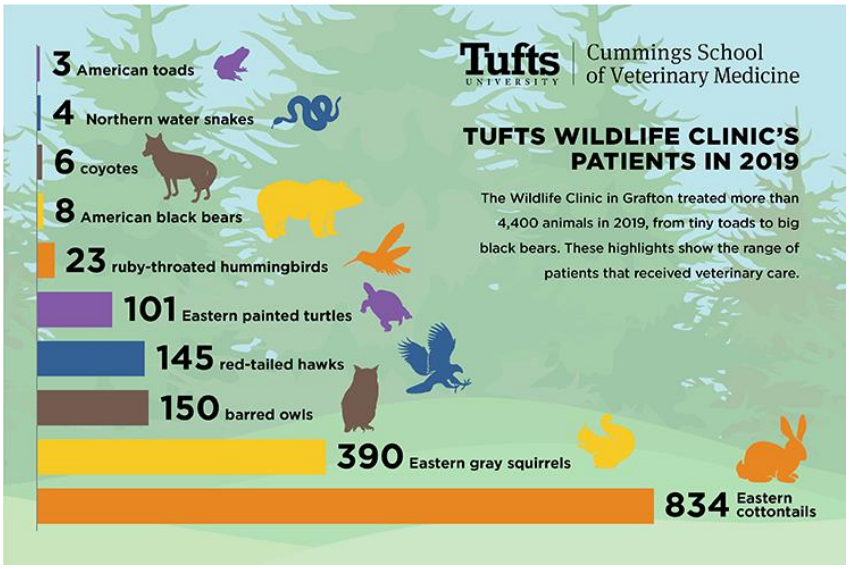
"At a critical time for the future of life on Earth, The College of Veterinary Medicine announces the establishment of the **Cornell Wildlife Health Center**. The new center focuses on catalyzing multidisciplinary collaboration to address wildlife health challenges worldwide, while immersing students in unique learning experiences at home and abroad."

Taking on Wildlife Disease

In a new partnership, PennVet and the Pennsylvania Game Commission have united to support a common cause: protecting the health of wildlife populations across the state. The **Pennsylvania Wildlife Futures Program**, established last year with $10 million in seed funding over five years, charts a way forward for wildlife professionals who aim to safeguard animals from health threats—a goal that has knock-on benefits for humans and domestic animals as well.

A Wild Year at Tufts Wildlife Clinic

"It was another record-setting year at Tufts Wildlife Clinic, where more animals were treated in 2019 than ever before. In 2019, the clinic treated 4,410 patients, including 2,169 birds, 2,011 mammals, 217 reptiles, and thirteen amphibians." Interestingly, over the past two years the number of barred owls at the clinic has doubled, from seventy-one in 2017 to 150 in 2019.



Useful Resources

Cornell Wildlife Health Lab Fact Sheets

Library of 34+ downloadable fact sheets on wildlife health issues/diseases in birds, mammals, and reptiles/amphibians

Other Interesting Resources

Podcast: **The Wildlife Origins of SARS-COV2 and Employing a One Health Approach**

Dr. Osofsky, wildlife veterinarian and director of the **Cornell Wildlife Health Center** discusses the importance of being culturally sensitive when considering changing market dynamics with the goal of protecting the world from future diseases

Links to Northeast Wildlife Health Organizations

- **Northeast Wildlife Disease Cooperative**
- **University of Maine- Wildlife Disease Genetics Lab**
- **University of Maine- Initiative for One Health & the Environment**
- **Tufts Center for Conservation Medicine**
- **Cornell Wildlife Health Center**
- **Cornell Wildlife Health Lab**
- **EcoHealth Alliance**
- **Pennsylvania Wildlife Futures Program**

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