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The Honorable Katie Porter
Subcommittee on Oversight and Investigations
House Committee on Natural Resources
c/o Kelsey Hartman

Dear Chair Porter,

Thank you for the opportunity to participate in the April 28, 2022 hearing on *"Preventing Pandemics through US Wildlife-borne Disease Surveillance."*

Please find enclosed my answers to your additional post-hearing questions.

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1. In your testimony, you said that "Building a more centralized infrastructure for zoonotic disease surveillance could easily be the lowest-cost, highest-return way to make our country more prepared for both the pandemic era and the health hazards of a warming world." Could you elaborate on the kind of infrastructure and data-sharing needed? Will the expansion of the U.S. Geological Survey's Wildlife Incident Reporting System fill this gap, or is more needed?

Through the planned expansion, the Wildlife Health Information Sharing Partnership (WHISPers) system takes an important step towards consolidating wildlife disease surveillance in the United States. The WHISPers database is relatively unique as a public scientific repository, and stores infectious disease data in a format compatible with other important causes of animal mortality (e.g., poisonings, accidents, or unknown causes). For wildlife health professionals, this is critical infrastructure. WHISPers also offers several important features that are critical for government work—in particular, the ability to share data with partial confidentiality (e.g., precise locations). At present, WHISPers is used unevenly across pathogens, hosts, and regions, but has been particularly useful so far for tracking panzootics that threaten wildlife conservation (i.e., white-nose syndrome in bats; chytrid fungi in amphibians) and avian influenza die-offs in wild birds. To date, it has been used less for zoonotic surveillance, perhaps both because a mortality-focused resource may not be immediately applicable to some zoonotic reservoirs (which often tolerate diseases that are deadly in humans), and because its availability as a resource has been underpublicized in the zoonotic disease research community.

The expansion of WHISPers will be an important step towards integrated disease surveillance in the United States—even just by bridging the gap between the U.S. Geological Survey and the U.S. Fish and

Wildlife Service—and offers a key opportunity to connect state agencies not just with federal infrastructure but also with each other. Expanding inputs into WHISPers will empower the partnered federal agencies in their mission, and the availability of more data in a standardized location will empower the broader research community. WHISPers' user base in academic research is currently much smaller than it could be; establishing the database as the definitive data hub for wildlife mortality data in the United States would go a long way to also identifying the USGS-FWS partnership as the coordinating federal authority on these issues. Outreach to academics is important to complement adoption by current and future USGS partners, and - for maximum efficacy - USGS would benefit from additional dedicated support for the community building and outreach dimension of its mission with the database. To bring more scientists' attention to this resource, agencies might also consider digitizing and sharing existing data sources through WHISPers that have historically been restricted in their sharing, such as various long-term surveillance projects by the USDA's National Wildlife Disease Program.

At the same time, these changes are only a first step towards a truly coordinated national infrastructure for disease surveillance. The simple fact is that data sharing *infrastructure* is only as valuable as the investments made to generate *data itself* that can then be shared, stored, reanalyzed, and used to spot trends and risks. Perhaps the most important step forward would be to allocate more dedicated funding to scientific research on disease transmission in wild animals within the United States, with a focus on (1) known zoonotic pathogens, and more broadly, key systems that introduce high-risk respiratory pathogens into human populations (e.g., influenza and the interface among wild birds, poultry, and swine; coronaviruses and bats; hantaviruses and rodents); (2) climate change, land degradation, and urbanization as key drivers of zoonotic risk within the United States; (3) collection of new field data that monitors for geographic shifts in pathogen intensity (rather than perpetual re-analysis of existing data, which has finite value for real-time monitoring); and, perhaps most challenging, (4) integration of wildlife disease surveillance with efforts to monitor for outbreaks in human populations. Funding for the wildlife and human aspects of these problems are fragmented by a conventional divide between the mandate of the U.S. National Science Foundation (which funds most wildlife research) and the U.S. National Institutes of Health (which traditionally handles more research that directly relates to human health). Recent efforts like the recent NSF Pandemic Intelligence for Pandemic Prevention program, or the long-standing NSF/NIH/USDA Ecology and Evolution of Infectious Diseases program, have been an important step towards bridging that divide, and are useful models for future funding programs.

In conjunction with an expansion of scientific research, data sharing requirements (as appropriate) would be an important step to ensure federal investments lead to a greater baseline of available disease surveillance data. Encouraging researchers to deposit data in WHISPers could be very valuable if acute outbreaks are detected in the course of routine federally-funded wildlife research. Other databases also address other key dimensions of surveillance: for example, genetic sequence data generated by federally-funded research is already regularly deposited in NCBI's GenBank repository. Enhancement of NCBI's resources might also be considered, given that the core team maintaining these resources has historically been very small, relative to their indisputably global role in keeping scientific research afloat.

2. Is there any additional information about your views on domestic U.S. surveillance of wildlife-borne diseases for future pandemic prevention that you would like to share for the record?

Thanks kindly for the opportunity to answer this question. One of the biggest threats to domestic health security is the delayed notification, reporting, or publication of key information about zoonotic disease—not just in animals, but also in humans. Several recent instances speak to the need not just to share *more* information, but to share information *faster:*

- In 2018, two unconnected patients in Washington, D.C. both tested positive for Seoul hantavirus, an uncommon haemorrhagic fever not previously known to be a risk in the region. The findings remained unpublished until 2022.[1]

- Between May 2017 and April 2018, researchers screened samples from patients in North Kivu Province, Democratic Republic of the Congo, for various diseases. They found that several had antibodies to Ebola virus, despite the fact that spillover had not previously been observed in this region. In July 2018, a devastating epidemic of Ebola virus disease started in Kivu, and would continue until July 2020. The scientists' results were finally published in November 2020.[2]

- In 2017, multiple medical professionals returning to Florida from Haiti, where they had been engaged in Zika outbreak response, presented with a mild but unusual illness. After ruling out Zika and other likely explanations, ***scientists identified the presence of an unknown coronavirus***, but waited to publish research until confident in its specific identity (a recombinant canine coronavirus); the description of the viral spillover was published in 2021.[3]

Each instance reflects the painstaking work scientists must undertake to identify and trace zoonotic spillover with confidence, but the broader picture speaks to how academic publishing is insufficient for rapid information sharing with the U.S. government and the global public. These delays increase the risk of another pandemic, and have ripple effects that limit the ability of animal surveillance to keep pace with shifting priorities: scientists have only recently learned they should be monitoring for hantaviruses in D.C.'s rats, or for recombinant canine coronaviruses in domestic and wild animals worldwide.

These delays reflect several intersecting challenges: broad effects of funding scarcity on publishing speed; the limitations of for-profit journals, and the under-incentivization of transparency processes like preprints; and, perhaps most notably, the fact that the vital work of epidemiology and zoonotic spillover detection often falls on academic scientists, instead of the severely under-resourced federal agencies, like the CDC, that should be better empowered to lead this surveillance. A distributed network of well-trained academic epidemiologists and veterinarians across the country has much greater total capacity than, for example, CDC's Epidemic Intelligence Service or USDA's National Wildlife Disease Program—but has fewer formal reporting channels available, and less ability to mobilize resources if an event that threatens public health is detected. Greater investment in federal capacity for both wildlife and human

1. Ravi-Caldwell, N., Iyengar, P. and Davies-Cole, J., 2022. Notes from the Field: First Reports of Locally Transmitted Seoul Hantavirus Infection—District of Columbia, May 2018–December 2018. *Morbidity and Mortality Weekly Report,* 71(9), pp.359-360.
2. Goldstein, T., Belaganahalli, M.N., Syaluha, E.K., Lukusa, J.P.K., Greig, D.J., Anthony, S.J., Tremeau-Bravard, A., Thakkar, R., Caciula, A., Mishra, N. and Lipkin, W.I., 2020. Spillover of ebolaviruses into people in eastern Democratic Republic of Congo prior to the 2018 Ebola virus disease outbreak. *One Health Outlook,* 2(1), pp.1-10.
3. Lednicky, J.A., Tagliamonte, M.S., White, S.K., Blohm, G.M., Alam, M.M., Iovine, N.M., Salemi, M., Mavian, C. and Morris, J.G., 2021. Isolation of a novel recombinant canine coronavirus from a visitor to Haiti: further evidence of transmission of coronaviruses of zoonotic origin to humans. *Clinical Infectious Diseases,* available online.

disease surveillance, and increased opportunities for government-academic partnerships in One Health outbreak investigations, would be key to solving this problem.

These delays also speak to another challenge: the need to promptly and transparently share information about domestic zoonotic surveillance and outbreaks with the rest of the world. In light of growing evidence that spillover risk is increasing worldwide—and after multiple years of extensive scrutiny on China's early outbreak response—it seems obvious that the United States must lead the world in transparent reporting of human and wildlife disease surveillance, including notifications to the World Health Organization (WHO) and World Animal Health Organization (OIE) about key events. The current international system for disease outbreak notifications is severely limited, and is designed to only set a response in motion after an emergency starts—rather than earlier, in the key moments when an emergency might be *prevented.* A promising opportunity for reform exists in discussions of a Pandemic Treaty or similar multilateral agreement with the goal of preventing and preparing for future pandemics. This instrument will likely address several important issues, among them: curbing human drivers of zoonotic emergence; tracking pre-emergence pandemic pathogens in animals, and detecting spillover into humans earlier; building better emergency response plans and supply stockpiles; and otherwise fixing the unforced errors that made the Covid-19 pandemic a disaster. Negotiations have already begun on this treaty, and are being discussed in the coming weeks at the World Health Assembly.

For transparent and effective surveillance of wildlife-borne disease, a Pandemic Treaty offers a chance to redefine obligations that include data sharing *outside* of acute emergencies, and connect our disease surveillance infrastructure to other surveillance systems around the world. It is vital that the United States be a full Party to such a Treaty, and that the final agreement includes provisions that address wildlife and human disease surveillance data sharing. The United States owes the world the same that we ask of other nations: rapid and transparent sharing of information about zoonotic disease, a threat that is fundamentally transboundary in nature.

Thank you for the opportunity to add additional information to my testimony, and please don't hesitate to reach out if you have any further questions.

Kindly,

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