

COVID-19 shows need to understand health interconnectedness

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Credit: Vilem Skarolek/public domain

The transmission of SARS-CoV-2 virus from a bat to a human and the human-to-human spread of COVID-19 demonstrates how animal, human, plant, and environmental health are interconnected, according to a team of One Health researchers at the University of Tennessee, Knoxville, and the UT Institute of Agriculture.

One Health is a concept that recognizes that humans, animals, plants, and

the environment are inextricably linked—the health of one affects the health of all—and health issues must be addressed cohesively.

The UT System plans to do just that by harnessing the statewide resources from UT Knoxville, UT Institute of Agriculture, UT Health Science Center, and Oak Ridge National Laboratory to make life-changing contributions to the global One Health effort.

"COVID-19 is just one example of the importance of looking at health in a holistic framework," said Debra Miller, interim director of the UT One Health Initiative and professor in the Department of Forestry, Wildlife, and Fisheries and the Department of Biomedical and Diagnostic Sciences. "We are seeing the impact of health on the economy, job security, and so much more."

"As people go about their daily lives now, they are directly experiencing One Health-related issues," said Nina Fefferman, associate director of UT One Health and professor of ecology and evolutionary biology. "They may feel stress or anxiety as they take steps to keep themselves, their families, their co-workers, and their communities safe through social distancing. These mental impacts take their own physiological toll."

Other ways people are experiencing the interconnectedness of global health include how they are assessing their nutrition and food needs while in self-isolation and how they are considering the needs of and shopping for those who are vulnerable to severe illness.

"We are keenly aware that efforts to 'flatten the curve' are about making sure that medical resources are available when they are needed—supply chains and the ability to receive medical attention also are closely interwoven," Fefferman said.

One Health data indicates that approximately 70 percent of emerging infectious disease cases in humans are a consequence of spillover events from wildlife. Similarly, humans play a role in animal disease emergence by spreading infectious agents and altering environmental conditions in a way that hurts wildlife. Plant diseases disrupt major food crops, undermining national and global food security.

"While COVID-19 is certainly currently incredibly important, it is also important not to lose sight of other threats to health just because they are not currently the most pressing," said Fefferman. "While our immediate efforts may be most directed at helping combat the COVID-19 pandemic, we must also continue our efforts in other areas of health that continue to affect human, animal, agricultural, and [environmental health](#)."

Miller said that the COVID-19 pandemic also highlights how pathogens can change and adapt from one host to the next, especially if hosts are vulnerable.

"Reducing stress within the environment for all species is vital for any host to defend against an invading pathogen. In other words, how we treat our surrounding environment and all that inhabit it ultimately affects us," she said.

There are many other One Health issues facing Tennesseans and their environment such as chronic wasting disease, loss of pollinators, loss of biodiversity, substance abuse, food insecurity, and more.

Miller said that if we can begin to tackle some of the broader issues—[climate change](#), biodiversity, food insecurity—we can hopefully curtail development of novel [health issues](#) such as COVID-19.

Studying what contributed to the development of COVID-19 and its

transmission will reveal the broader issues that are critical to address.

A key component of One Health is delivering research-based information and providing best practices to the general public, policy makers, and industry.

Fefferman has expertise in pandemic preparedness and outbreak response and recently drafted emergency childcare guidelines adopted by the state of Vermont.

Miller and Marcy Souza, associate professor of veterinary public health, also serve on the UTIA COVID-19 task force.

[A recent op-ed by Souza](#) with the headline, "Coronavirus is not the first disease that spills over from animals to humans and it will not be the last," was widely shared in Tennessee newspapers.

"The current COVID-19 outbreak is a glaring example of One Health that will hopefully allow people to see and accept the interconnectedness of our world," said Souza.

Provided by University of Tennessee at Knoxville

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