

Integrating human and animal health can prevent pandemics



Headline Issues

- > Increased animal consumption and ecological disruption are enabling new diseases to jump from animals to humans more rapidly.
- > Pathogens like COVID-19 originated in animals, yet public health seldom interfaces with animal health.
- > The fragmentation of animal health monitoring into distinct agencies that focus on pets, livestock, and wildlife further inhibits our ability to track and control zoonotic diseases.

The Center for Environmental and Animal Protection (CEAP) aims to provide academic leadership for research, policy-making, and addressing critical social issues at the intersection of environmental and animal protection.

Summary

We should have seen the novel coronavirus (COVID-19) coming. The past twenty-five years have witnessed a cascade of novel disease outbreaks that almost became catastrophic global pandemics: bird flu; swine flu; SARS; Ebola; West Nile Virus; Zika. All of these emerging infectious diseases [EIDs] are zoonotic, meaning that they originated in animals but opportunistically jumped to humans.

In most countries around the world, human and animal diseases are treated as separate entities. This creates a silo effect whereby agencies that monitor animal health rarely share disease surveillance data or coordinate responses with agencies that monitor human health. This problem is exacerbated by a division of labor *within* the domain of animal health: Distinct and sometimes competing agencies regulate and surveil animal populations based on whether they are categorized as pets, livestock, or wildlife.

Successfully preventing future pandemics requires replacing the old epidemiological division of labor with an integrative disease surveillance system that recognizes the interdependence of human, animal, and environmental health.

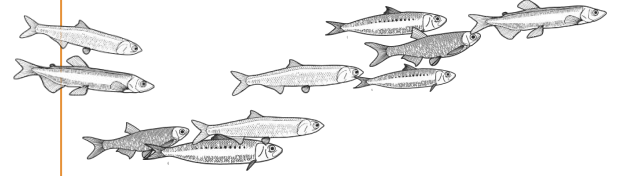
Most emerging infectious diseases that threaten public health, including COVID-19, originated in animals.

Pandemics are driven by ecological disruption and animal consumption

The incidence of zoonotic diseases is on the rise. Many are quick to blame China's 'wet markets', which likely provided a staging ground for the novel coronavirus and SARS to jump from wild animals like bats to domesticated animals and people. Yet wet markets are just one symptom; the driver is anthropogenic change.

Habitat fragmentation and the clearing of forests for ranching, mining, and human settlements enable diseases endemic in wild animals to spill into farms and cities. Concentrated animal feed operations allow diseases to incubate and quickly mutate in response to antibiotic regimens. Global travel and trade quickly spread emergent pathogens around the world. Given all this, those who track EIDs have been arguing for two decades that we were *overdue* for a global pandemic.

"Heading off the next pandemic requires tearing down the traditional barriers between human and animal medicine and linking 'wildlife' and 'livestock' disease surveillance systems."



A lack of cooperation among animal and human health agencies is abetting pandemics

Over 60 percent of EIDs, including COVID-19, are zoonotic. Why do we keep failing to discover zoonoses before they mutate or circulate to the point where they can pass between humans without an animal host? A major reason has to do with the way that many nations (and provinces) divide up responsibilities for monitoring and responding to diseases according to the species (e.g., homo sapien) or category (e.g., livestock) of the disease host.

Case in point: Several months after the "swine flu" became a pandemic in 2009, it was discovered for the first time in birds. This raised the possibility of the virus recombining with flu genes from its new hosts--turkeys--to produce a strain that could be far more lethal to people. Yet most public health officials were not alarmed by the spread of H1N1 to birds, including Dr. Anthony Fauci, the highly regarded director of the US National Institute of Allergy and Infectious Diseases, who called it "a Department of Agriculture issue."

Dr. Fauci's response is emblematic of the bureaucratic and cultural divide that exists between human and animal medicine. Human health organizations seldom monitor animal health or consider it relevant to their institutional prerogatives. Just as problematic, a similar organizational silo effect can be found within the realm of animal health.

In the US (and elsewhere), some government agencies exclusively surveil diseases circulating among livestock (e.g., the USDA), while others focus solely on wildlife.

There is often little interagency cooperation or sharing of information about new disease outbreaks. This hinders epidemiologists' ability to discover patterns across disease clusters among various animal and human populations and track how diseases are circulating or mutating in ways that enable them to jump the species boundary. The first human deaths from West Nile Virus in the US, which occurred in Queens, NY, were originally misdiagnosed because no one thought to compare the victims' neurological symptoms to similar symptoms cropping up in crow populations across the city.

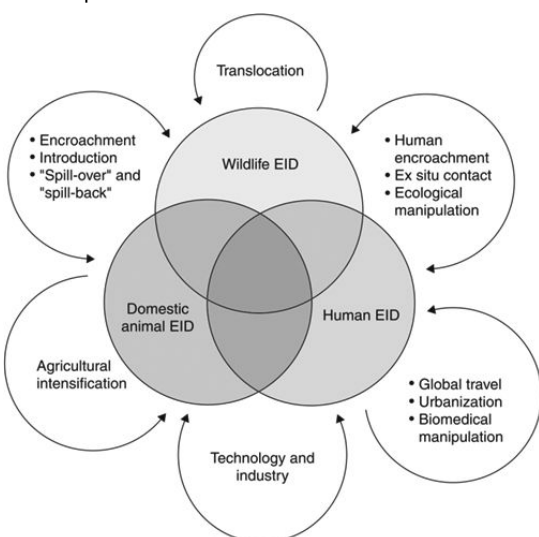
Toward Planetary Health

Increasingly, pathogens do not respect boundaries between species. "The convergence of people, animals, and our environment," Dr. Lonnie King writes, "has created a new dynamic in which the health of each group is inextricably interconnected." Indeed, we shouldn't lose sight of the fact that humans are also passing new lethal pathogens (including COVID-19) onto animals.

So little research funding is dedicated to "human-animal interface studies" that there's virtually no surveillance of zoonoses until after they jump the species barrier to humans. Heading off the next pandemic requires tearing down the traditional barriers between human and animal medicine and linking "wildlife" and "livestock" disease surveillance systems. This is easier said than done, as it would entail the redistribution of authority and resources away from some traditional--and powerful--human and animal health agencies. It would also require trust and collaboration among bureaucracies that have historically seen each other as adversaries in the competition for funding and jurisdictional turf.

Epidemiologists and some agencies, like the Centers for Disease Control and Prevention, are increasingly adopting a "One Health" or "Planetary Health" perspective. This involves focusing on emergent health issues at the "human-animal-environment interface" and fostering research collaborations and data sharing among experts across these disciplines (e.g., doctors, veterinarians, and ecologists) so that zoonoses can be identified and contained before they become endemic in new animal and human populations. Actions like the CDC's establishment of the One Health Office in 2009 are a major step in the right direction and should be supported at provincial, national, and international levels. (President Trump's 2020 budget requested a twenty percent *reduction* to the CDC's fund to combat zoonotic EIDs).

To prevent pathogens like COVID-19 from jumping the species boundary, we must stop creating the conditions that foster novel encounters between human and animal populations (see Figure 1). This would entail reducing or reversing habitat and biodiversity loss, which create pathways for diseases to spill over from one species to another. It would also require a major reduction in our consumption of animal products, as the factor most responsible for the spread of zoonoses is the mass confinement of animals in markets and feed lots.



About this research

This research brief is based on: Jerolmack, C. (2013). "Who's worried about turkeys? How 'organisational silos' impede zoonotic disease surveillance," *Sociology of Health and Illness*, 35, 2, 200-12.

The original work was part of a project funded by the Robert Wood Johnson Foundation and carried out at Harvard University (2008-2010). Jerolmack interviewed US state and federal veterinarians, doctors, and epidemiologists working at government agencies who were tasked with tracking and responding to zoonotic diseases.

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