

Zoonotic Diseases in Animal Agriculture and Beyond: A One Health Perspective



“Whereof What’s Past is Prologue...”

- Zoonotic diseases first emerged with the domestication of animals 10,000 years ago.
- Approximately 75% of new emerging diseases infecting humans have come from or through animal populations or their products.
- The priority zoonotic diseases for the U.S. include zoonotic influenza viruses, salmonellosis, West Nile virus, plague, emerging coronaviruses, rabies, brucellosis, and Lyme disease.

Adopting a One Health approach can help prevent zoonotic disease outbreaks.

- The fundamental ethos of One Health is that the health of people, animals, plants, and their shared environment are inextricably connected, such that strengthening any of those domains can improve the others. One Health emphasizes disease prevention rapid detection before they become human threats.

A Threat Anywhere Is a Threat Everywhere

- The processes that built our globalized food system have also created a “microbial perfect storm” for emerging infectious diseases.
- Minimizing the conditions that generate the threats of pathogen emergence and filling the gaps that result in outbreaks of pandemic potential all require One Health solutions that need to be implemented globally.

Influenza viruses, both swine and avian, can become a zoonotic risk to humans.

- Avian influenza virus can become adapted to numerous avian and mammalian host species, but free-flying aquatic birds are the natural hosts.
- Multiple genes from H1, H2, and H3 human influenza A viruses originated from AIV of aquatic birds long ago and were initially pandemic and later endemic.
- A One Health perspective for influenza pandemic preparedness requires continued surveillance and assessment.

The non-judicious use of antimicrobial drugs across the globe in both human animal populations have all contributed to the emergence of antimicrobial resistant bacteria that also contaminate our environment.

- It is vital that we have access to scientifically sound data relating antimicrobial use and resistance to understand the drivers of resistance and assess the impact of interventions designed to slow the development and spread of resistance.

Climate change, biodiversity loss, and ecological disruptions represent the most significant environmental challenges of our time, and all are associated with emerging zoonotic diseases.

- An important development for the future and successes of One Health is to broaden our educational and research cultures to integrate animal, human and environmental approaches.

This new era of zoonoses and elevated risks demands new thinking, innovations, and approaches.

- The animal agriculture industry should commit to take part in a new community health effort under the common principles and practices of a One Health approach that benefit people and animals alike.
- The next pandemic will very likely originate from animals and represents an existential threat to our health. One Health strategies must become part of our national security and preparedness agenda.

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