

# Understanding the Connection Between Human and Animal Health: The One Health Concept

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## SUMMARY OF THE ISSUE

The ongoing outbreak of H5N1—commonly called Bird Flu—and the 2009 H1N1 pandemic serve as strong reminders that people, animals and the environment are inextricably linked. Many of the diseases causing death and suffering across the globe are diseases that can be transmitted from animals to humans. Often the cause of new disease threats can be traced back to changes in the environment. The effective treatment, control and eradication of these disease threats require an understanding of the interconnectedness of humans, animals and the environment. This idea is often called the One Health concept.

## DEFINITIONS

- **Emerging Infectious Diseases (EIDs)** are new, reemerging or drug-resistant infections whose incidence in humans has increased within the past two decades or whose incidence threatens to increase in the near future.
- **Zoonotic Diseases** are any infectious diseases that can be transmitted (in some instances, by a vector) from other animals, both wild and domestic, to humans or from humans to animals.

## IMPORTANCE OF EMERGING INFECTIOUS DISEASES

### Human Toll

Approximately 15 million people die each year from infectious diseases.<sup>1</sup> In children, infectious diseases are the main cause of death. Infectious diseases can also result in disability, diminished quality of life, and decreased productivity.

### Economic Impact

The cost of treatment and prevention of EIDs can be staggering and disproportionately impact developing countries. The impact of zoonotic epidemics from 1995 to 2008, many of them preventable, exceeded \$120 billion globally.<sup>2</sup>

### EIDs as Bioterrorism Agents

Although the threat to human life is generally less than that associated with other agents, the economic impact of an intentional introduction of a zoonotic disease agent could be staggering.

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**60% of the 1,461 human diseases are due to pathogens that move across species lines**

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**75% of all new emerging human infectious diseases are zoonotic—most originating in wildlife**

**RECENT OUTBREAKS**

Year	Disease/Microbe
1982	Lyme disease
1983	AIDS
1989	Hepatitis C
1996	Creutzfeldt-Jacobs Disease
1997	Avian Flu (H5N1)
1998	Nipah virus
2003	SARS
2009	Influenza H1N1 (swine flu)
2013	Avian Flu (H7N9)
2014	Ebola Virus
2017	Bubonic Plague

**CONTACT INFORMATION**

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**FACTORS LINKING HUMAN AND ANIMAL HEALTH**

Population Growth

- Crowding results in more opportunities for existing disease organisms to mutate, recombine, and reassort into more deadly strains.

Land Use

- Contamination of water resources, deforestation and other land use changes result in more contact between humans, domestic animals, wildlife and vectors.

Agricultural Practices

- Open agriculture, deforestation, intensive agriculture and the use of antibiotics in food animals all impact the potential for disease emergence.

International Trade and Commerce

- An individual infected with an EID can be anywhere in the world within hours.
- Foods are exported around the world.
- Exotic pets are traded through legal and illegal markets.

**WHAT YOU CAN DO**

The most successful and dramatic examples of real change come from committed individuals—not institutions. Here are some actions you can take now as individuals, educators, physicians or researchers to save lives and prevent disease:

- Share One Health concepts with friends and colleagues.
- Educate policymakers.
- Develop productive relationships with local, regional, and global interdisciplinary professionals to:
  - Share surveillance/laboratory data,
  - Discuss unusual cases,
  - Cooperate on training, planning and response.
- Develop curriculums that include interdisciplinary courses.
- Broaden research teams to include researchers from other disciplines.
- Target surveillance efforts in areas with social or land use changes.
- Host regional interdisciplinary working groups.
- Involve cross discipline epidemiologist when investigation disease clusters.
- Develop joint interagency communication strategies.

**REFERENCES**

- 1 World Health Organization. (2008) WHO global burden of disease: 2004 update. Available from: [www.who.int/healthinfo/globalburdendisease/2004reportupdate/en/index.html](http://www.who.int/healthinfo/globalburdendisease/2004reportupdate/en/index.html)
- 2 Marsh Inc. (2008) The Economic and Social Impact of Emerging Infectious Disease.