Habitat destruction, loss of biodiversity and the emergence of zoonotic diseases

Nicola Oliver
Director, Life & Health Research,
Medical Intelligence

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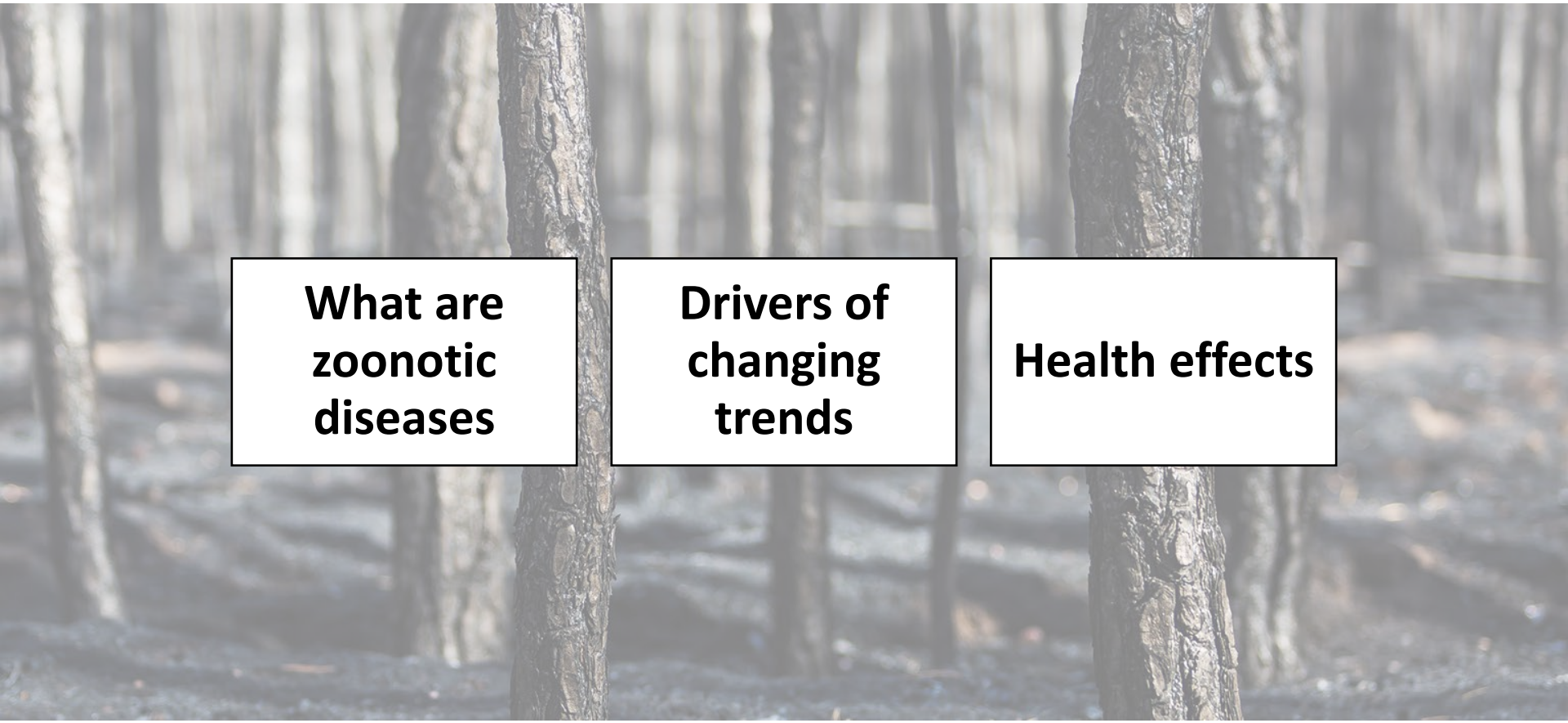

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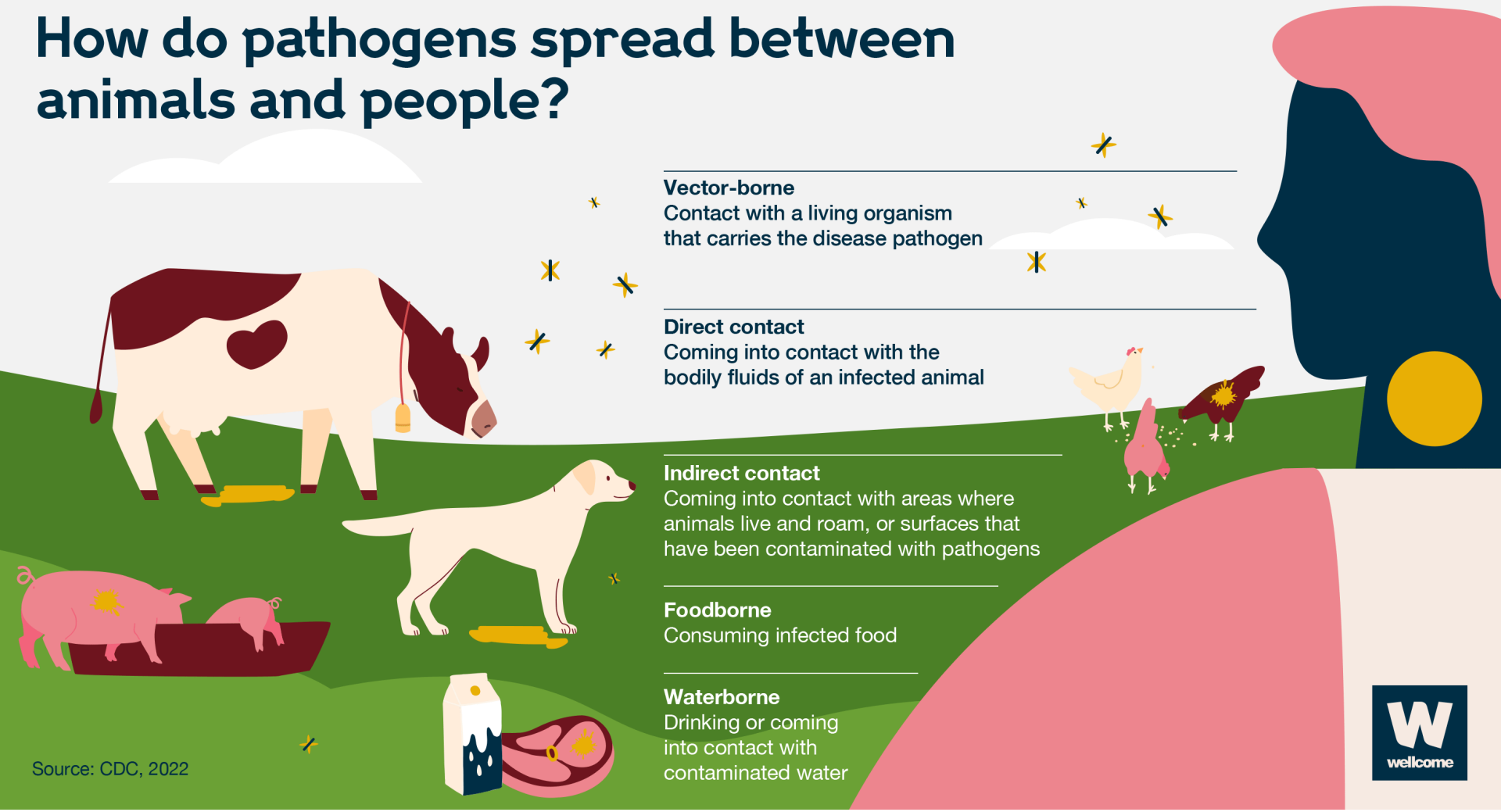
How do pathogens spread between animals and people?



“An infectious disease which can be transmitted from an animal to a human.”

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	Zoonotic Diseases	Vector Borne Diseases
DEFINITION	Zoonotic diseases are infectious diseases that are transmitted form animals to humans	Vector borne diseases are infectious diseases that are transmitted due to the bites of arthropods such as mosquitoes, flea, ticks, etc.
TRANSMISSION	From animals to humans through different ways including direct contact, foods, vectors, etc.	Through arthropod vectors
HOSTS	Humans	Humans or other animals
EXAMPLES	Rabies, lyme disease and rocky mountain spotted fever, dengue, malaria, and chikungunya, Salmonella infection, E. coli infection, psittacosis, anthrax, avian influenza or bird flu, bovine tuberculosis, ebola and leprosy	Malaria, yellow fever, dengue, chikungunya, lyme disease, plague, relapsing fever, rocky mountain spotted fever, tularemia, typhus, west nile virus and zika virus disease

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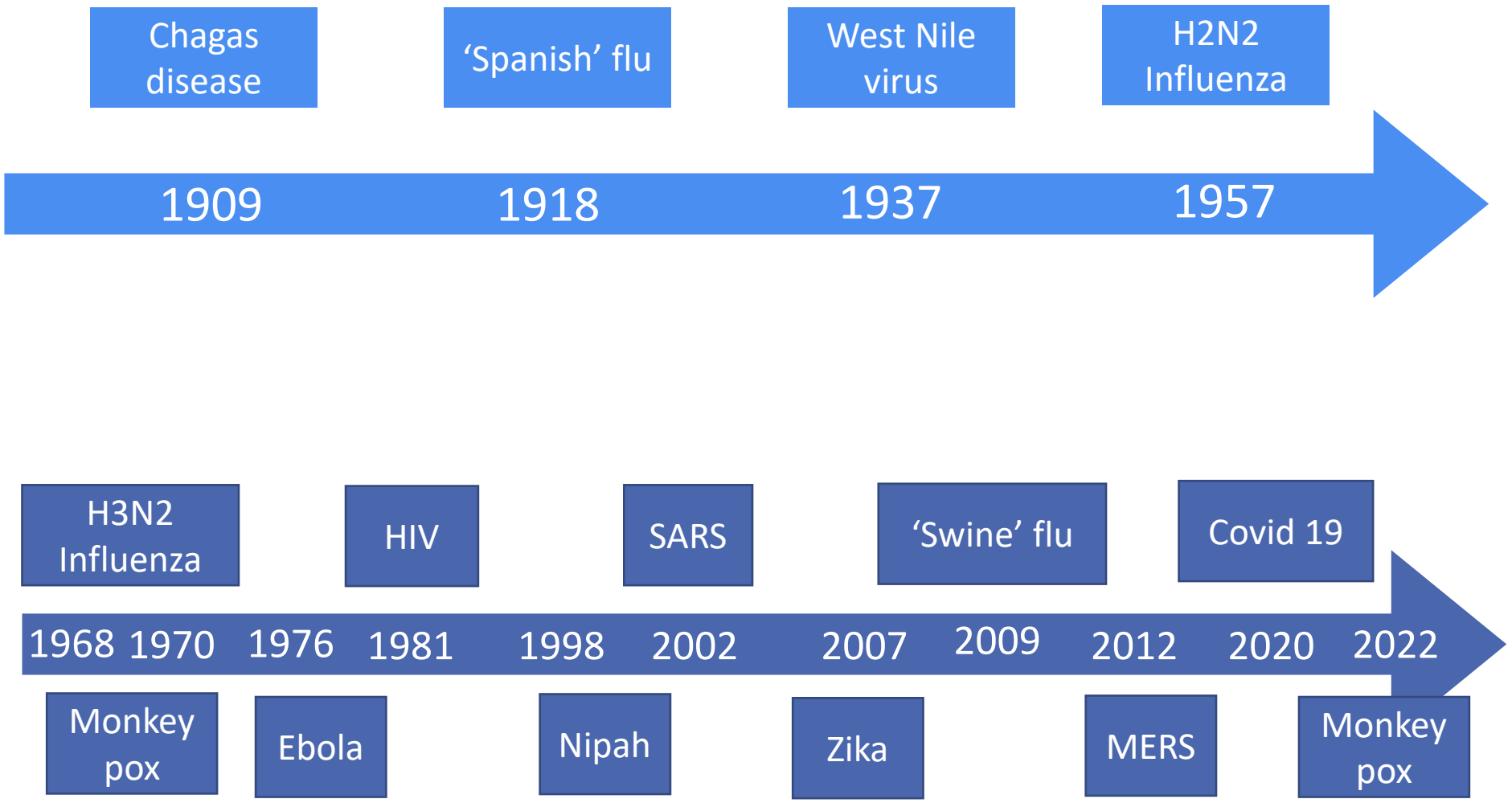

Adapted from 'The Importance of Biodiversity Risks: Link to Zoonotic Diseases' IFoA

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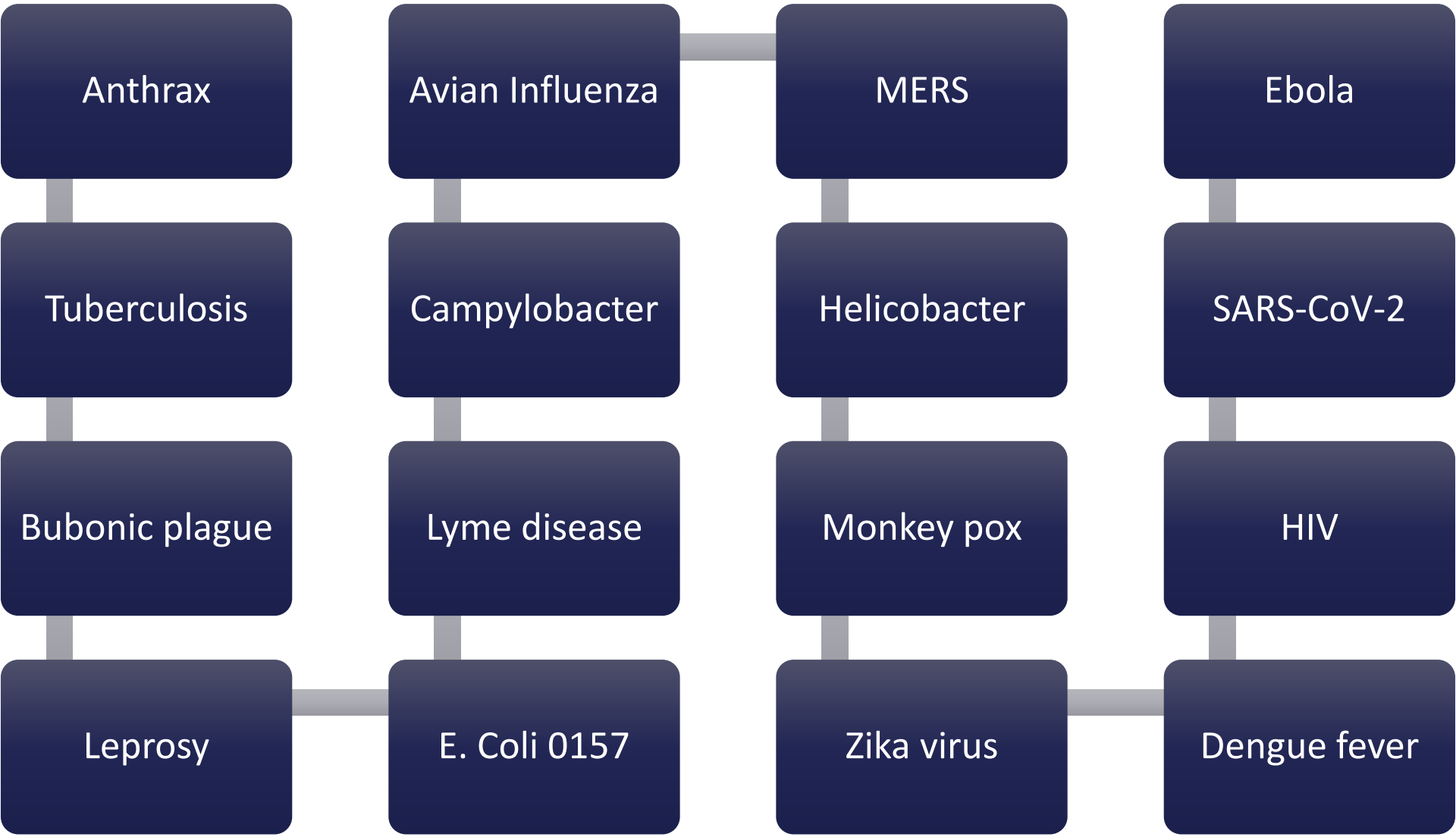

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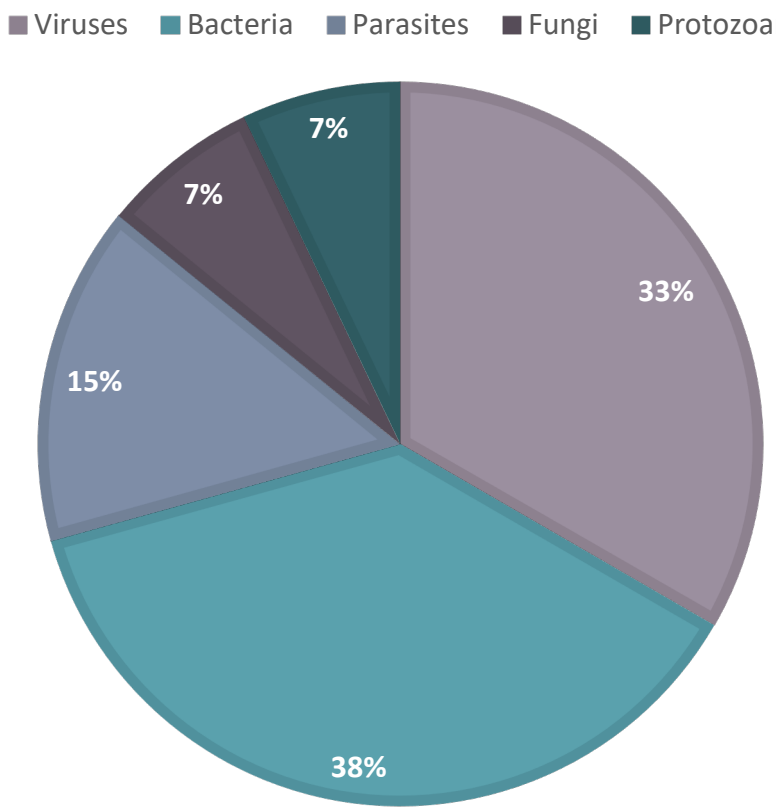
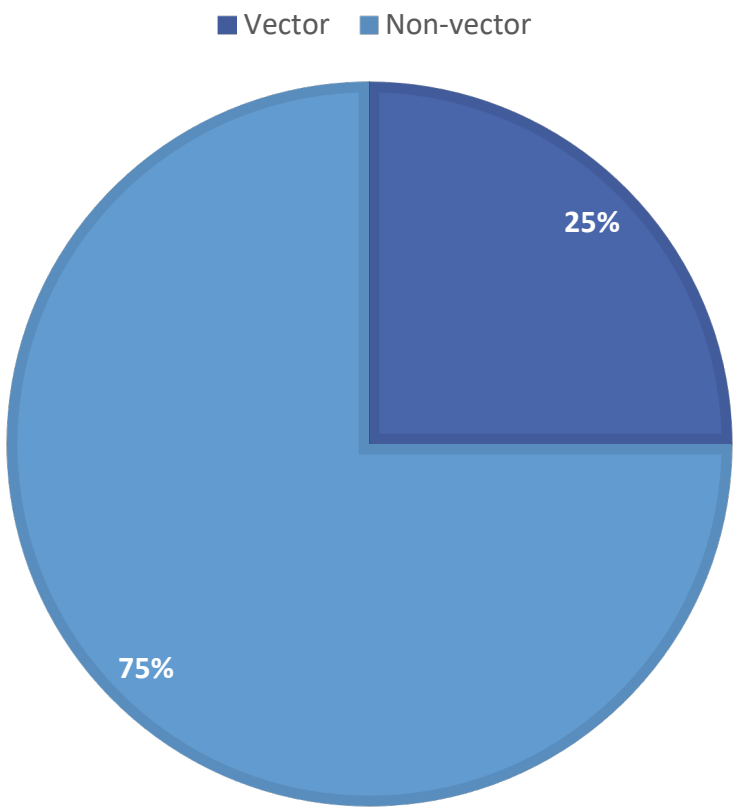
Summary of human infectious disease outbreaks by origin





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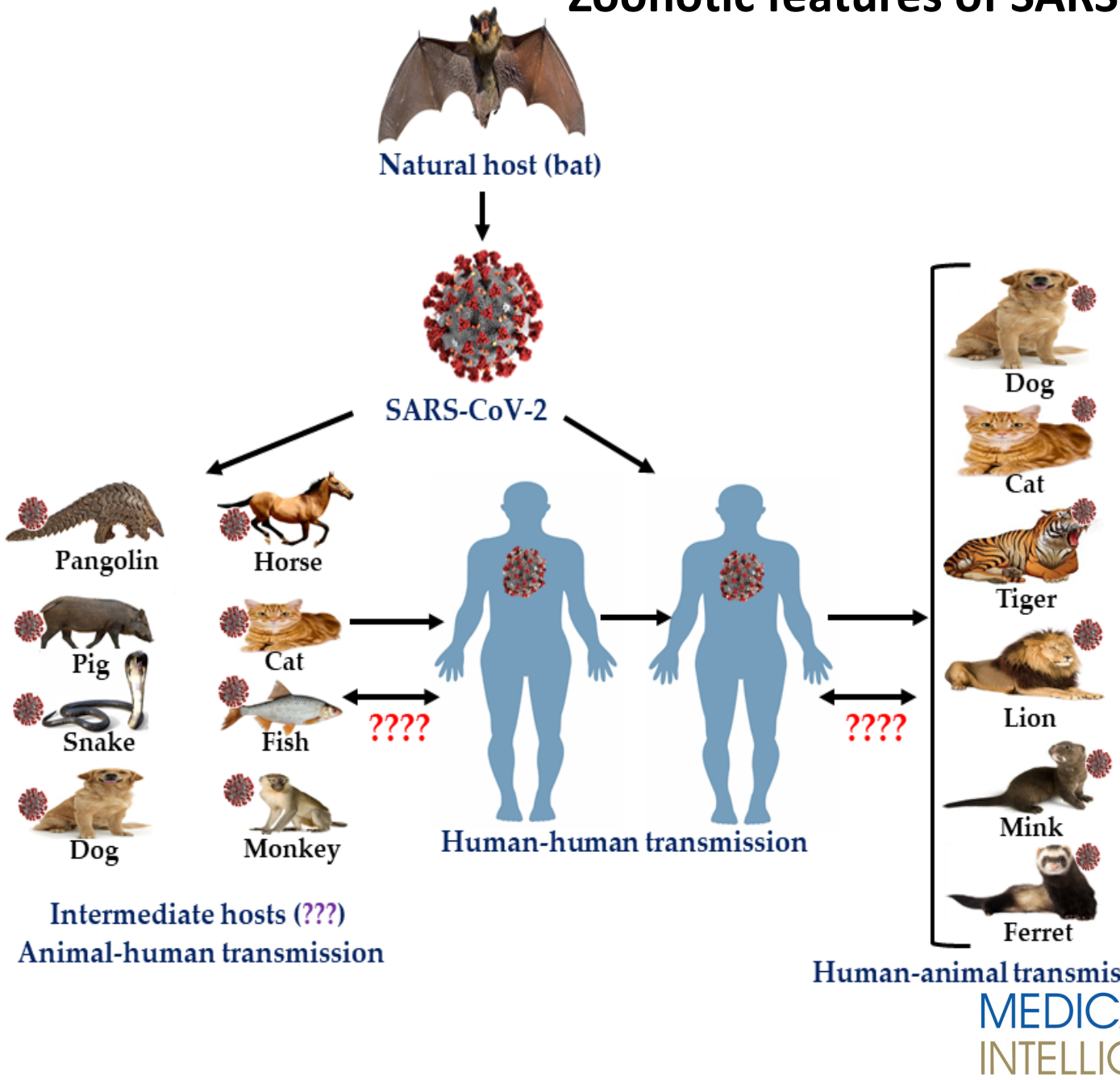
Zoonotic features of SARS-CoV-2



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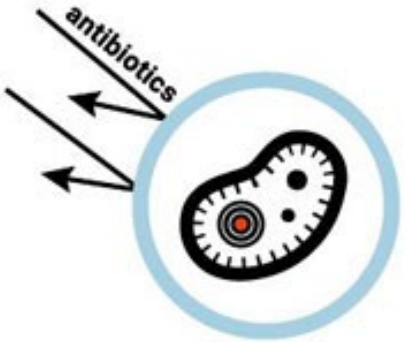
What factors are increasing zoonosis emergence?

(Diseases transmitted from animals to humans)

Deforestation and other land use changes

Intensified agriculture and livestock production

Illegal and poorly regulated wildlife trade



Antimicrobial resistance

Climate change

Source: UNEP Frontiers 2016 Report

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Human activity

Climate change

Habitat loss

Biodiversity loss

Zoonotic diseases

Adapted from 'The Importance of Biodiversity Risks: Link to Zoonotic Diseases' IFoA

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Favours reservoir and vector populations

Affects disease transmission

Increasing human contact

palm oil plantation

deforestation

Outbreaks of Vector-Borne and Zoonotic Diseases Are Associated With Changes in Forest Cover and Oil Palm Expansion at Global Scale (2021) Frontiers in veterinary science

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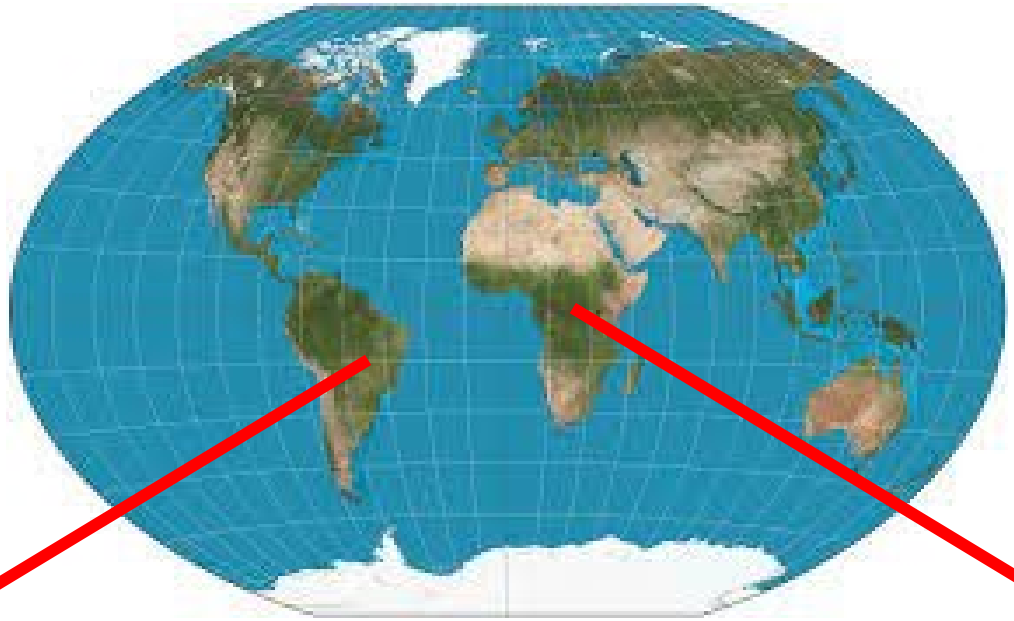
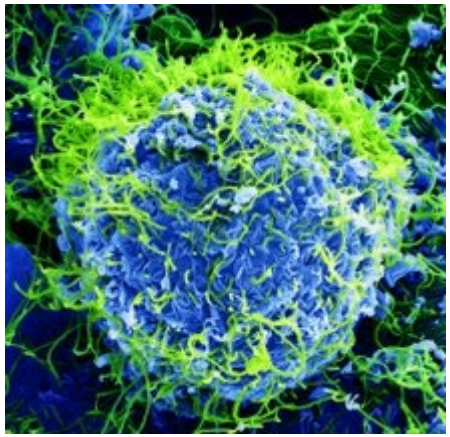


Dengue
Zika
Chikungunya
Malaria
Yellow fever



Ebola

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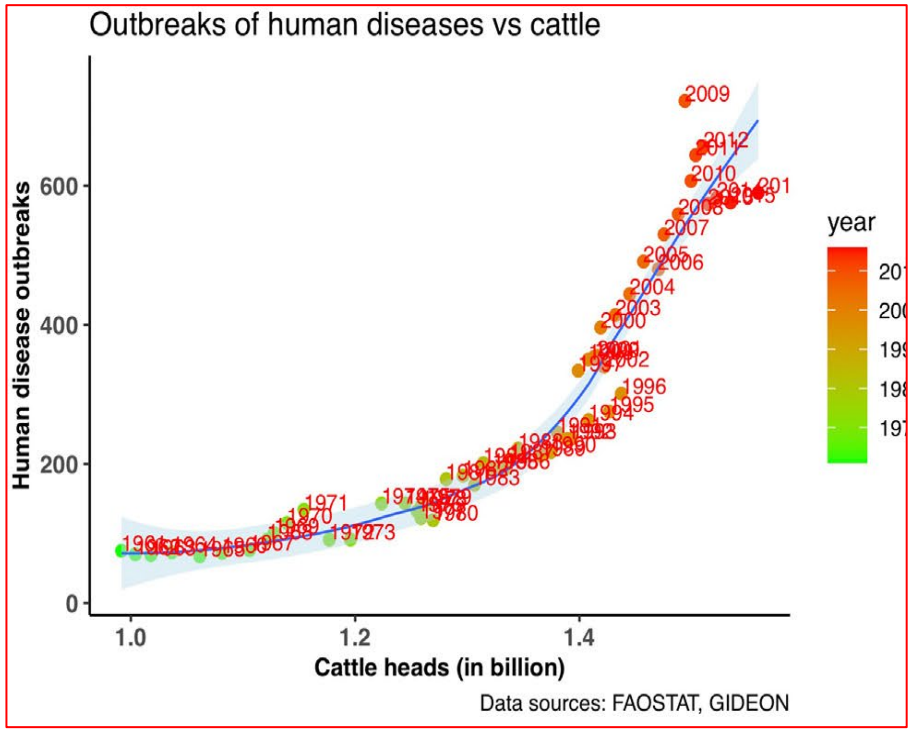

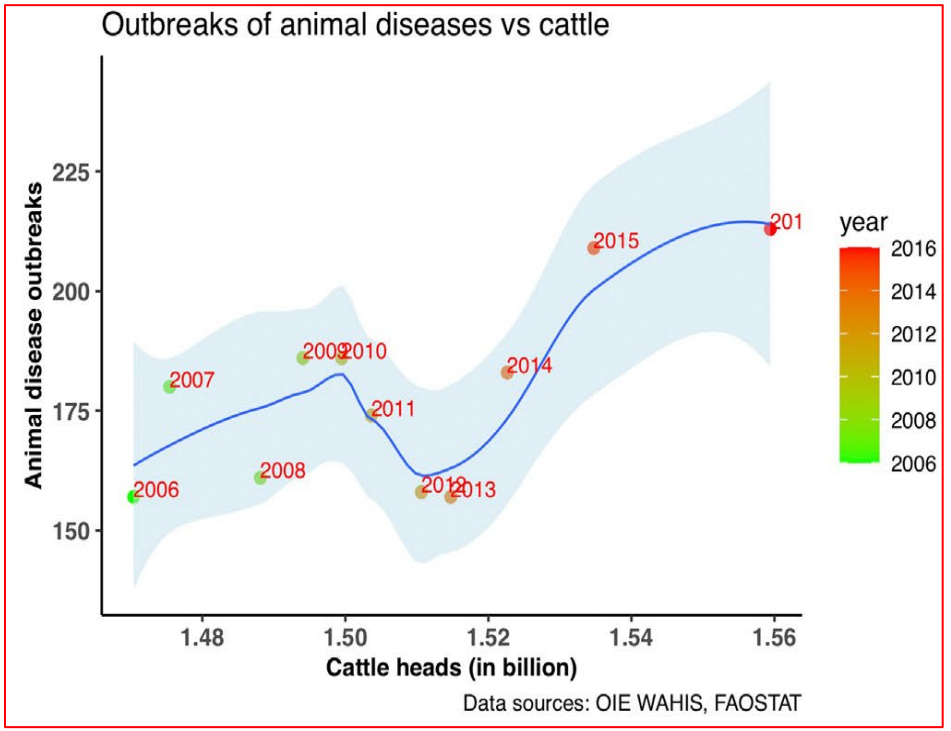

Emerging diseases, livestock expansion and biodiversity loss are positively related at global scale (2020) Biological Conservation

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It is estimated that zoonoses are responsible for 2.5 billion cases of human illness and 2.7 million human deaths worldwide each year

Virus	Deaths	Deaths per million
'Spanish' influenza (1918)	50,000,000	27,322
H2N2 Influenza (1957)	1,100,000	383
Hantaan virus (1951)	46,430	18
H3N2 influenza (1968)	1,000,000	282
Lassa fever (1969)	250,000	69
Ebola (1976)	12,930	3.11
HIV (1980)	10,700,000	2400
COVID-19 (2020)	4,000,000	496

Mortality from zoonotic viral emergence since 1918

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SCIENCE ADVANCES | REVIEW

EPIDEMIOLOGY

The costs and benefits of primary prevention of zoonotic pandemics

What can we do to minimize the risk of future outbreaks and increase the speed of detecting novel pathogens before they spread locally and globally?

First, expand viral discovery and surveillance.

Second, monitor wildlife hunting and trade as well as large, high-density animal husbandry for viral infections.

Last, prevent deforestation and other land-use changes associated with agricultural expansion.

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"The 'wild' must be kept 'wild.' It is time to restore our forests, stop deforestation, invest in the management of protected areas, and propel markets for deforestation-free products. Where the legal wildlife trade chain exists, we need to do a far better job of improving hygiene conditions. And of course, there is the urgent need to tackle the illegal wildlife trade, the fourth most common crime committed worldwide".

Inger Andersen, head of the United Nation's Environment Program (UNEP)

Dr Aaron Bernstein, director of the Center for Climate, Health, and the Global Environment at Harvard T.H. Chan School of Public Health.

"If COVID-19 taught us anything, it is that testing, treatments, and vaccines can prevent deaths, but they do not stop the spread of viruses across the globe and may never prevent the emergence of new pathogens. As we look to the future, we absolutely cannot rely on post-spillover strategies alone to protect us"

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Nicola Oliver
Mortality and Longevity Expert
n.oliver@medicalintelligence.uk

+44 7770990044

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Thank You

Questions?

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