

Zoonotic Diseases

What are zoonotic diseases?

75% of all emerging infectious diseases in humans are zoonotic.

Emerging pathogens are more likely to be viruses than other kinds of pathogen and more likely to have a broad host range.

The interaction of humans or livestock with wildlife exposes them to the risk of spillover of potential pathogens. For many zoonoses, livestock serve as an epidemiological bridge between wildlife and human infections.

What are some examples of zoonotic diseases?

Zoonoses that emerged or re-emerged recently include Ebola, bird flu, Middle East respiratory syndrome (MERS), Rift Valley fever, sudden acute respiratory syndrome (SARS), West Nile virus, Zika virus disease, and, now, COVID-19.

Why are zoonotic diseases happening now?

The risk to human health from zoonotic disease is not new. The AIDS virus is believed to have been transmitted to humans from primates, probably chimpanzees. It is thought that fruit bats are Ebola virus hosts and that Ebola was introduced into the human population through close contact with the blood, secretions, organs or other bodily fluids of infected animals such as fruit bats, chimpanzees, gorillas, monkeys, forest antelope or porcupines found ill or dead or in the rainforest. Middle East respiratory syndrome (MERS) was transmitted from camels to humans in 2012.

Accelerating deforestation and habitat destruction are providing the conditions for the emergence of

new zoonotic diseases, to which humans have little resistance.

What causes zoonotic diseases?

Three types of changes have allowed virulent pathogens to initiate new moves from animal hosts to human hosts:

1. Changes in the environment. Changes in the environment are usually the result of human activities, ranging from land use change (agriculture, settlement, deforestation, habitat fragmentation) to changing climate. Changes in ecosystems can lead to increased pathogen transmission between hosts.
2. Changes in animal or human host. Changes in animal or human hosts are often the result of human action. Changes in human host behaviors including travel, conflict, migration, wildlife trade, urbanization, and changing dietary preferences, can result in disease emergence.
3. Changes in the pathogen itself. Pathogens always evolve to exploit new hosts.

What is the connection between the environment and zoonotic diseases?

Emergence and re-emergence of zoonotic diseases are closely interlinked with the health of ecosystems.

Anthropogenic (human-caused) environmental changes modify the balance of different wildlife populations reduce biodiversity (distribution of species), resulting in new environmental conditions that favour particular hosts, vectors, and/or pathogens.

In pristine ecosystems, biological systems have an inherent capacity for both resilience and adaptation, but the current pace of change caused by, for example, rapid deforestation or climate-linked extreme droughts or wildfires may be too fast to allow ecosystems to adapt and therefore overwhelm resilience.

Environmental protection can help regulate diseases by supporting a diversity of species so that it is more difficult for one pathogen to spill over, amplify or dominate.

What do we know about the new coronavirus (COVID-19)?

COVID-19 originated from human-wildlife transmission and has since spread to nearly all countries in the world.

The novel coronavirus is named SARS-CoV-2 and responsible for COVID-19.

SARS-CoV-2 is a relative of a coronavirus called SARS-CoV responsible for Severe Acute Respiratory Syndrome (SARS).

Genome sequencing suggests that SARS-CoV-2 is 96% identical to a coronavirus in horseshoe bats.

Bats are known ecological reservoirs for a large number of zoonotic viruses including SARS-related coronaviruses. These viruses cause Ebola, Hendra, MERS, Nipah and SARS. Because of coevolution, bats can host these viruses without getting sick.

In the past, coronaviruses that circulated in humans caused only mild infections. This changed in 2002 when SARS broke out in China.

A decade after SARS, there emerged an outbreak of the new Middle East Respiratory Syndrome (MERS) caused by a coronavirus called MERS-CoV.

There is no evidence yet to confirm the transmission chain of SARS-CoV-2 and what animal was the intermediate host.

Did COVID-19 come from wet markets?

The origin of the outbreak and its transmission pathway are yet to be discovered.

A wet market is not to be confused with a wildlife market. A wet market (also called a public market) is a marketplace selling fresh meat, fish, produce, and other perishable goods as distinguishable from “dry markets” that sell durable goods such as fabric and electronics. Not all wet markets sell live animals, but the term wet market is sometimes used to signify a live animal market in which vendors slaughter animals upon customer purchase. Wet markets are common in many parts of the world, notably in China and Southeast Asia, and include a wide variety of markets, such

as farmers’ markets, fish markets, and wildlife markets. They often play critical roles in urban food security.

Most wet markets do not trade in wild or exotic animals, but trade in wild or exotic animals has been linked to outbreaks of zoonotic diseases

How can we protect ourselves from zoonotic diseases?

It is impossible to predict where the next outbreak will come from or when it will be. Without addressing the causes of zoonotic diseases, which is the increasing disruption and destruction of habitats and ecosystems by human behavior, we are certain that the current pandemic will not be the last one. Growing evidence suggest that outbreaks, epidemic or pandemic diseases may become more frequent as climate continues to change.

What is UNEP doing to stop zoonotic diseases?

UNEP is seeking to complement the work of its partners to advance a One Health approach that links the health of people, agricultural systems and nature, to explore how the deterioration of the world’s ecosystems is fuelling the rise of zoonotic disease pandemics; and to offer practical recommendations to de-escalate this risk.

Unless we rethink our relationship to nature, zoonotic pandemics could be repeated, again and again so UNEP is committed to effective communication to help people understand that environmental protection is human health protection.

UNEP’s Response Zoonotic disease transmission is a global, regional and local challenge, so our solutions are context specific. UNEP is supporting targeted, site-specific strategies to reduce the threat of such diseases by considering the impacts on equity, indigenous communities and vulnerable groups.

This will take the form of three key interventions: (i) zoonotic early warning system; (ii) national zoonotic risk reduction action plans, and; (iii) ambitious new biodiversity targets.

Building back better must include greater protection of the environment and rebalance our relationship with nature, for the greater protection of human health.