COVID-19 and Zoonotic diseases

Part of: GS-III- Health (PT-MAINS-PERSONALITY TEST)

It is found that the coronavirus outbreak certainly comes from the animal world. However, it is said that humans are to be blamed for the pandemic.

Concerns:

- “The emergence of zoonotic diseases is often associated with environmental changes or ecological disturbances, such as agricultural intensification and human settlement, or encroachments into forests and other habitats,” says a UNEP report.
- According to the UN Environment Programme (UNEP), 60% of human infectious diseases originate from animals.
- This figure climbs to 75% for “emerging” diseases such as Ebola, HIV, avian flu, Zika, or SARS, another type of coronavirus. The list goes on.
- It is human activity that enabled the virus to jump to people, and specialists are warning that if nothing changes, many other pandemics of this nature will follow.
- A key area of concern is deforestation to make way for agriculture and intensive livestock farming.
- In terms of endangered wildlife, a study by American researchers shows that those who share the most viruses with humans are precisely populations declining due to exploitation and loss of habitat.

Note:

- The name given to diseases transmitted from animals to humans is zoonoses, based on the Greek words for “animal” and “sickness”.
- Tuberculosis, rabies, toxoplasmosis, malaria, are all zoonoses.


Zoonoses or Zoonotic diseases are infectious diseases that can naturally be transmitted/spread between animals (usually vertebrates) and humans. These diseases can be caused by viruses, fungi, parasites, and bacteria. This topic finds relevance under the GS-II paper of the UPSC exam.

What are Zoonotic Diseases?

Zoonosis refers to the transmission of diseases between animals and humans. Such diseases are termed as Zoonotic Diseases. Zoonotic diseases range from mild to severe, while in extreme cases can even be fatal.

- Zoonoses may be bacterial, viral, or parasitic, or may even involve unconventional agents for the transmission of the disease.
- WHO in 1959 defined Zoonoses as “those diseases and infections which are naturally transmitted between vertebrate animals and man.”
The World Zoonoses Day is observed every year on July 6 to create awareness on zoonotic diseases, how to prevent them and what actions to take when exposed.

Classification of Zoonotic diseases

The classification of diseases is usually done on the basis of the pathogen causing the disease. With the advancement in science, scientists and medical professionals have been able to identify and study in detail the etiological agents causing the diseases. **Etiological agents usually refer to the causative agent of a diseased condition.** The zoonoses are classified on the basis of three factors:

1. According to the etiological agents
2. According to the mode of transmission
3. According to the reservoir host

- **According to the etiological agents** - there is a further classification under this as:
  - Bacterial zoonoses: e.g. anthrax
  - Viral zoonoses: e.g. rabies
  - Rickettsial zoonoses: e.g. Q-fever
  - Protozoal zoonoses: e.g. toxoplasmosis
  - Helminthic zoonoses: e.g. echinococcosis
  - Fungal zoonoses: e.g. cryptococcosis
  - Ectoparasites: e.g. scabies

- **According to the reservoir host**: A reservoir is usually a living host of a certain species, such as an animal or a plant, inside of which a pathogen survives, often (though not always) without causing disease for the reservoir itself. A cascading effect is caused by the extinction of a species, leading to an increase in the population of the reservoir species.
  - **Anthropozoonoses**– Infections transmitted to men from lower vertebrate animals e.g. rabies.
  - **Zooanthroponoses**- Infections transmitted from man to lower vertebrate animals e.g. diphtheria
  - **Amphixenoses**- Infections maintained in both man and lower vertebrate animals and transmitted in either direction e.g. salmonellosis

Transmission of Zoonotic Diseases

Zoonotic diseases are transmitted through various means. The chances of diseases getting transmitted increase due to the expansion of transition zones between adjacent ecosystems when forests are cleared off for agricultural purposes. This is because the environment is overlapped for wild and domesticated animals. Some of the most common ways of transmission of the diseases are:

- **Direct zoonoses**- These are transmitted from an infected vertebrate host to a susceptible host (man) by direct contact, by contact with a fomite or by a mechanical vector. E.g. Rabies
- **Cyclozoonoses**– These require more than one vertebrate host species, but no invertebrate host for the completion of the life cycle of the agent. E.g. echinococcosis.
**Metazoonosis** - These are transmitted biologically by invertebrate vectors, in which the agent multiplies and/or develops and there is always an extrinsic incubation (prepatent) period before transmission to another vertebrate host. E.g. plague

**Saprozooonosis** - These require a vertebrate host and a non-animal developmental site like soil, and plant for the development of the infectious agent e.g. cryptococcosis

**Note:**

- **Pathogens** are the organisms responsible for causing the disease. These are of five main types: viruses, bacteria, fungi, protozoa, and worms.
- **Vectors** are organisms that do not cause the disease in itself but spread infection by conveying pathogens from one host to another. E.g. bats in the case of NIPAH virus and mosquitoes in the case of Malaria.

**Causes of Zoonotic Diseases**

The zoonotic diseases can be transmitted from animals to humans in multiple ways, most often, people with a weakened immune system are at risk. A few of the factors responsible for causing zoonotic diseases are:

- Deforestation could be the primary reason as it increases the contact between humans and wild animals.
- Through direct contact with bodily fluids such as blood, saliva, etc. of an infected animal or human.
- The disease can also be transmitted through the intake of infected or contaminated food.
- Global climate change, the overuse of antimicrobials in medicine, and more intensified farm settings can also contribute to the spread of Zoonotic diseases.