

## Popular Article

# Emergence and Re-Emergence of Zoonotic Disease: Global Health Concern

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### Introduction

"Diseases that are produced either by a seemingly new agent or by a previously known organism that arises in regions or in species in which it was previously unknown" are the definitions of emerging zoonoses. 132 diseases are regarded as emerging zoonotic diseases out of the 175 recognised emerging diseases.

Major emerging zoonoses include, for instance, the 2019 coronavirus disease, avian influenza, bovine spongiform encephalopathy (BSE), feline cowpox, rotavirus infection, norovirus infection, Ebola, hantavirus infection, West Nile fever, canine leptospirosis, MRSA infection, cat scratch disease, severe fever with thrombocytopenia syndrome (SFTS), Middle East respiratory syndrome (MERS (COVID-19). On the other hand, many regions of the world regard rabies, brucellosis, Japanese encephalitis, TB (*M. bovis*), and *Schistosoma japonica* infection to be re-emerging zoonoses.

All the variables or circumstances that frequently interact synergistically and support the onset of emerging and reemerging diseases are considered emerging and re-emergence factors. The emergence rhythm's acceleration has become significantly more concrete in recent years.

### Important factors contributing to emerging and reemerging zoonoses

The causes of zoonotic disease's initial appearance and recurrence are typically complex and typically involve:

- a) The causative agent's own molecular changes, such as genetic drift and shift that increase virulence or the development of multidrug resistance;
- b) Population immunological status changes
- c) Environmental and social changes.

➤ Genetic diversity (small or significant mutations), which increases virulence and makes it harder to adhere to therapeutic and preventative measures, is one example of a microbial adaptation. Some of the most significant elements associated with the creation of new zoonoses include increasing virulence or acquiring multidrug resistance, genetic drift (bring modest and gradual changes in the structure), shift (sudden and full changes in the genome), and genetic instability.

For instance, new influenza virus variations and recombinant strains have emerged as a result of genetic drift and shifts that have caused pandemics to spread

- People's Activities Modern lifestyles, deliberate human actions, and the coexistence of people and animals in an environment with a failing sanitary system are all contributing elements to the threat of the introduction and reemergence of illnesses.
- Human population movements caused by migration or war are often essential factors in the emergence of a new disease.
  - As a result of urbanization, large numbers of people have moved from rural to urban areas. This offers rural migrants' possibilities, such as increased pay and better health care. Unfortunately, due to low educational levels and inadequate professional abilities, not everyone can find a fulfilling career in the city. For instance, brucellosis outbreaks have been reported in Lima, Peru's metropolitan regions as well as in a few of Israel and Palestine's West Bank and Gaza Strip war zones.
  - Another aspect to take into account in the emergence of new zoonoses is the ongoing expansion of human populations into new regions. For instance, significant vampire bat rabies outbreaks occurred in South America's Peru and Brazil after the establishment of new agricultural towns in the isolated jungle.
  - The raising of new animal species for farming may potentially cause the emergence of new diseases. For instance, a South African ostrich-specific abattoir saw an outbreak of Congo-Crimean hemorrhagic fever (CCHF).
  - Pathogens that had been controlled in the past have ecological niches thanks to the ongoing industrialization of food preparation. For instance, *Listeria monocytogenes*, *E. coli* 0157:H7, and *Campylobacter* spp. have all recently emerged as new food-borne diseases. The global market for meat and farm animals, the practice of eating raw or undercooked food or wildlife, and the rise in immune-compromised populations are only a few of the variables that contribute to the introduction and reemergence of food-borne zoonotic illnesses.
  - Salmonellosis, campylobacteriosis, and other enteric zoonotic illnesses are particularly susceptible to the spread that has been facilitated by increased worldwide trade in live animals and food.
  - Disease emergence and reemergence are also linked to the failure of public health initiatives and weaknesses in the infrastructure supporting public health. For instance, in 1994, two outbreaks of the plague in Gujarat and Maharashtra indicated a failure in public health procedures.

- The development of new diseases and the reappearance of old diseases will be made possible by the evolving pre- and post-harvest technology, industrial techniques, and food chain.
- Societal and environmental changes an imbalance results from the rise and reemergence of industrial civilization, which is the primary consumer of natural resources and the source of the environmentally destructive and polluting industries. In many cases, outbreaks of unknown diseases with high case fatality rates are caused by circumstances that change the natural balance or the natural "echo-niche."
  - The growth of extreme monocultures and the rise of urbanization are causes of deforestation. Deforestation is a result of increasing human population and overuse of the land, including logging, mining, building roads, and agricultural production. The natural biodiversity is directly impacted by forest fragmentation; for example, the extinction of predators upsets the food chain and favors some vectors that spread certain transmissible agents. For instance, Kyasanoor forest sickness first appeared in the state of Karnataka as a result of deforested areas.
  - Due to an increase in greenhouse gas emissions, climate change is making extreme weather events more severe, disrupting natural systems, and lowering air quality. Increased vector- and waterborne infections, excessive heat-related ailments, and inadequate sanitation during dry spells are examples of the world's imbalances. Many people may be exposed to possibly contaminated water during these times. Moreover, increased exposure to environmental contaminants has both direct and indirect negative impacts on health. Excessive rainfall and flooding can also lead to epidemics of waterborne infectious diseases, including bacterial and protozoan diarrheal disorders.
  - The building of dams to supply more drinking water is encouraging the growth of mosquitoes and other vectors.
  - Overcrowding encourages simple human-to-human disease transmission and creates the ideal environment for the genesis of novel diseases.
  - The rapid population growth and industrial pollution (increased greenhouse gas production, ozone layer depletion, etc.) are the causes that continue to foster the creation of new diseases.

## **Prevention and control strategies**

- ❖ Implementation of special projects for major infectious diseases
- ❖ Surveillance of exotic diseases
- ❖ Creation of laws and regulations
- ❖ Establishment of disease reporting systems
- ❖ Emphasis on interdisciplinary and international cooperation
- ❖ Establishment of monitoring of specific parameters of emergence factors
- ❖ Development of scientific and technical capacities for issues related to the modernization and efficient integration of environmental issues.

## **Conclusion**

In order to combat emerging and re-emerging zoonotic dangers, it will be crucial to develop creative and dynamic methods as the world's population grows and public health issues become more complex. Among these initiatives should be the enhancement of public health systems, surveillance tools, diagnostic tests, vaccines, and treatments through fundamental, better cross-disciplinary and international collaborations, translational, and applied research for zoonotic disease emergence and reemergence. One Health is a cutting-edge interdisciplinary strategy that aims to concentrate hard effort on challenging public health issues like the development and re-emergence of zoonotic diseases.

## **References**

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