# Emerging and Re-emerging Viruses & Climate Change

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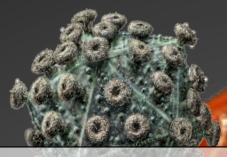

## Introduction

The impact of the human being on climate is unequivocal. Warming of the climate system is a real fact that is directly and indirectly affecting human health. Among other effects, viruses are increasing their incidence due to the fact that climatic factors influence the emergence of viral diseases through multiple effects that affect the means by which the viruses are transmitted. These include vectors, zoonotic hosts, water and air.

**Climate Change**

## Vector-borne Viruses

**Environmental Changes**

- Temperature
- Rainfall patterns
- Humidity

| **Vector dynamics** | **Pathogen dynamics** |
|---|---|
| Migration | Reproduction |
| Breeding | Transmission |
| Physiology | Virulence |
| Behaviour | |

Changes in transmission biology

**Vector-borne Viral Emergency**

[1][2][3][4]

## Zoonotic Viruses

**Environmental Changes**

- Rainfall patterns
- Flooding

| **Ecologic Changes** | **Sociologic Changes** |
|---|---|
| Changes in host population | Changes in human behaviour |
| Changes in host behaviour | |
| Host Stress | |
| Changes in host immunity | Increase in host-human contact |

**Zoonotic Viral Emergency**

[1][2][3][4][5]

## Waterborne Viruses

**Environmental Changes**

- Rainfall patterns
- Flooding
- Temperature

**Water viral pollution**

- Host's excretions
- Overflow wastewater treatment plant
- Viral transportation and dissemination
- Human-water contact

**Waterborne Viral Emergency**

[1][2][3][6]

## Airborne Viruses

**Environmental Changes**

- Humidity
- Temperature
- UV radiation
- Desertification

| **Aerosols** | **Dust-borne agents** |
|---|---|
| Viral particle and vehicle survival | Transport and transmission |
| Transport and transmission | |

Spread and distribution

**Airborne Viral Emergency**

[1][2][3][7]

## Control and Prevention

| **Control and Prevention** | | **Prediction** |
|---|---|---|
| Well-developed public health infrastructure | Surveillance | Ecological Niche Modelling |
| | Early warning | |
| | Control & Prevention | Tool to investigate the potential distributions of species under scenarios of environmental change |
| Integration of new data | Climatic | |
| | Environmental | |
| | Socioeconomic | |

**Control and prevention of viral emergence and Re-emergence**

[1][8]

## Conclusions

The fact that the climate of our planet is changing is a real issue that exacerbates viral emergence and re-emergence. Viral transmission cycles are affected by environmental, ecological and social changes caused by climate change, altering viral disease incidence and distribution.

Currently, it is not very clear what impact climate change will have on the emergence and the re-emergence of viruses in a particular geographic area and in the world, due to the fact that there are many questions about the impact of climate change and its relation with the complexity of many viral diseases. Thus, a major research on all this data is needed to control and prevent one of the big concerns of the 21st century.

## References

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