Escalating risks of infectious diseases due to climate change: Preventing future outbreaks and controlling transmission

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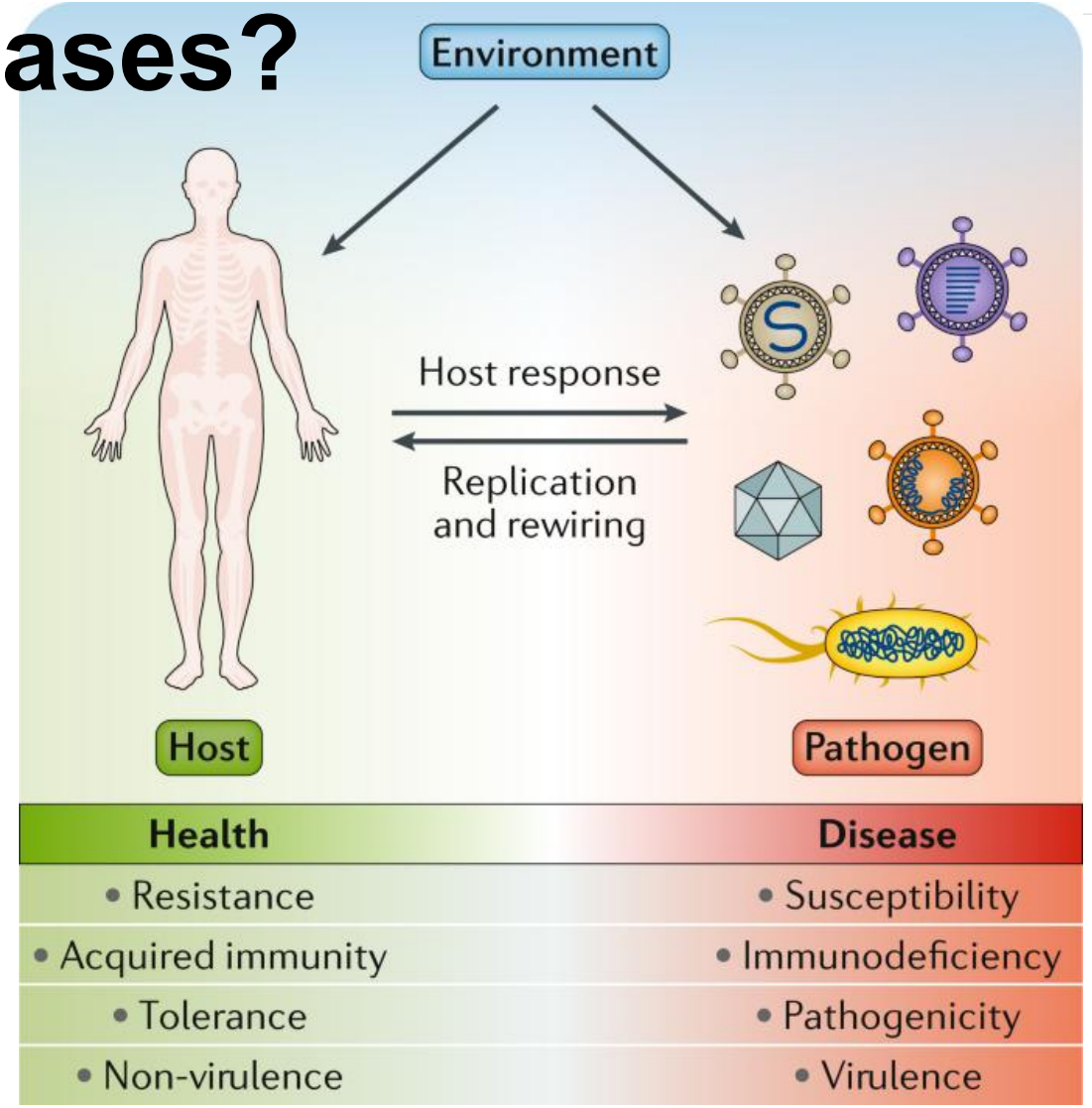
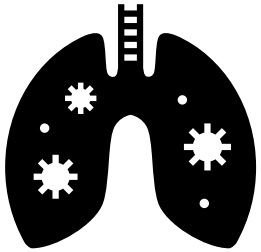
What are infectious diseases?

- Diseases caused by harmful microorganisms (pathogens) like bacteria, viruses, fungi, and parasites that enter and multiply in the human body.
- Also known as communicable diseases that can be transmitted from one person or animal to another.

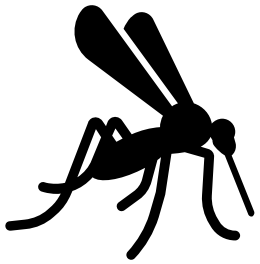


Source: Hultquist et al. 2020

The highest burden globally in 2019



Tuberculosis



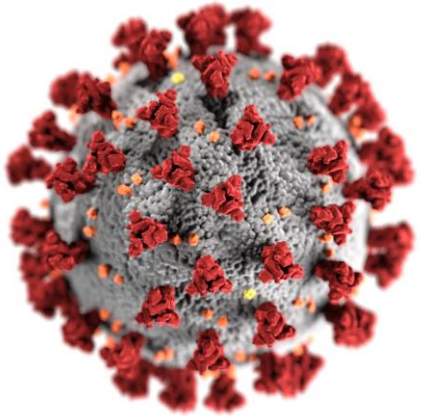
Malaria

HIV / AIDS

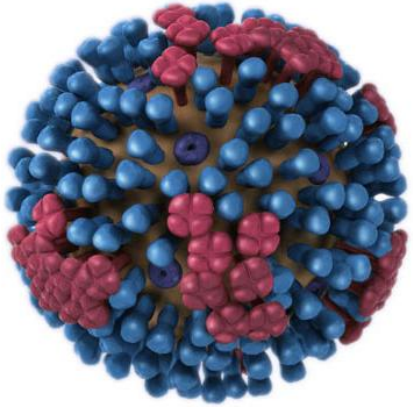
Source: IHME, 2024

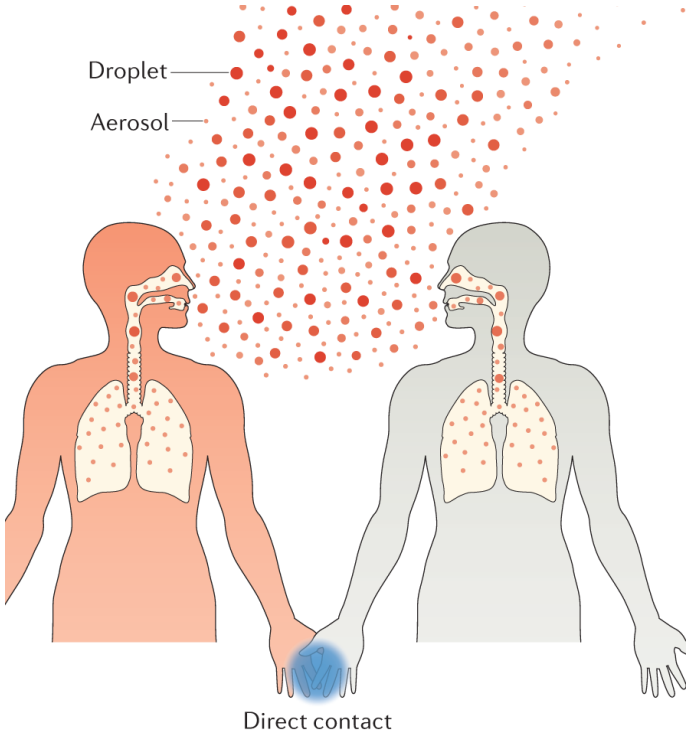
Source: Leung 2021

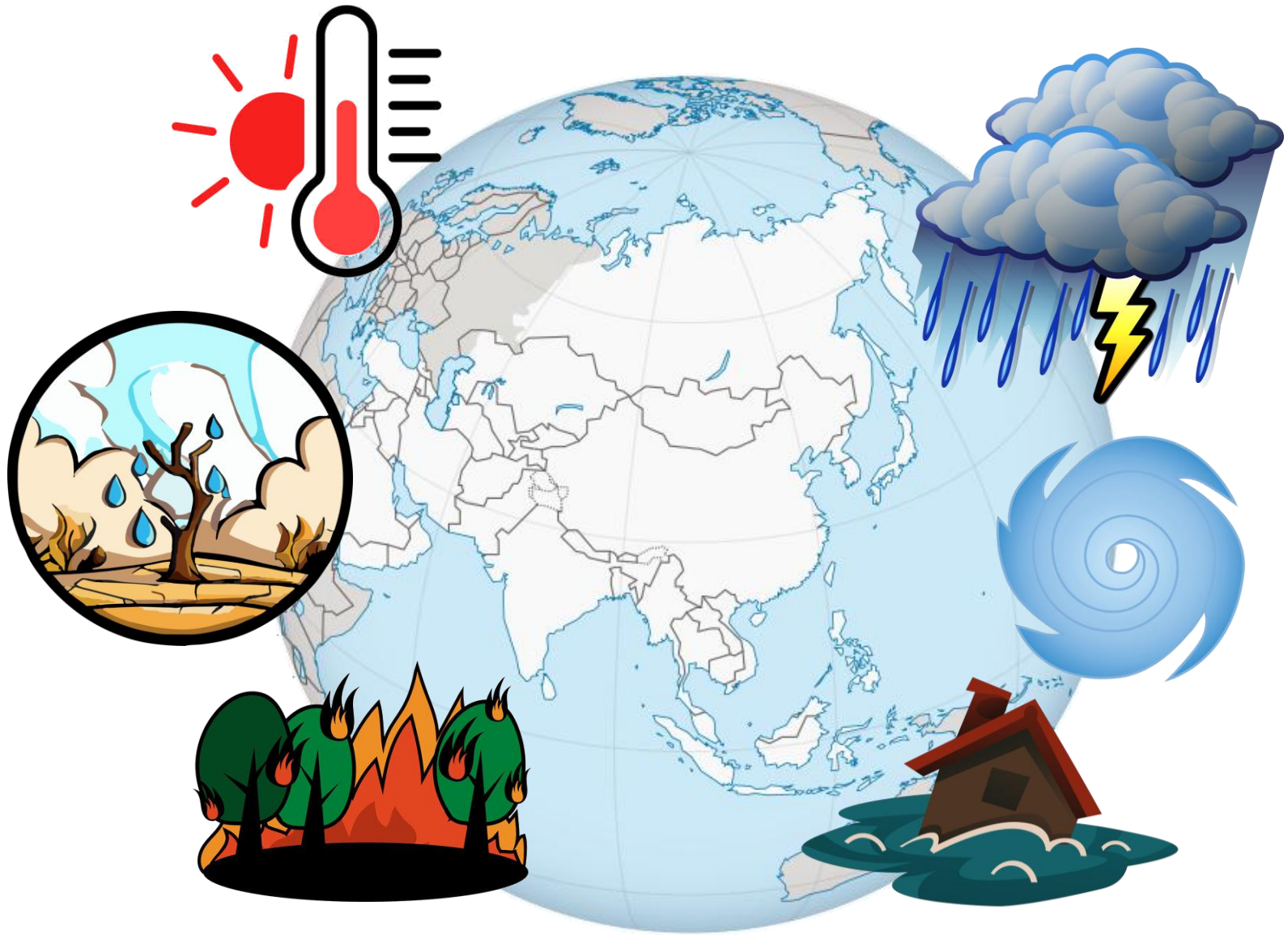
COVID-19 / SARS-CoV-2

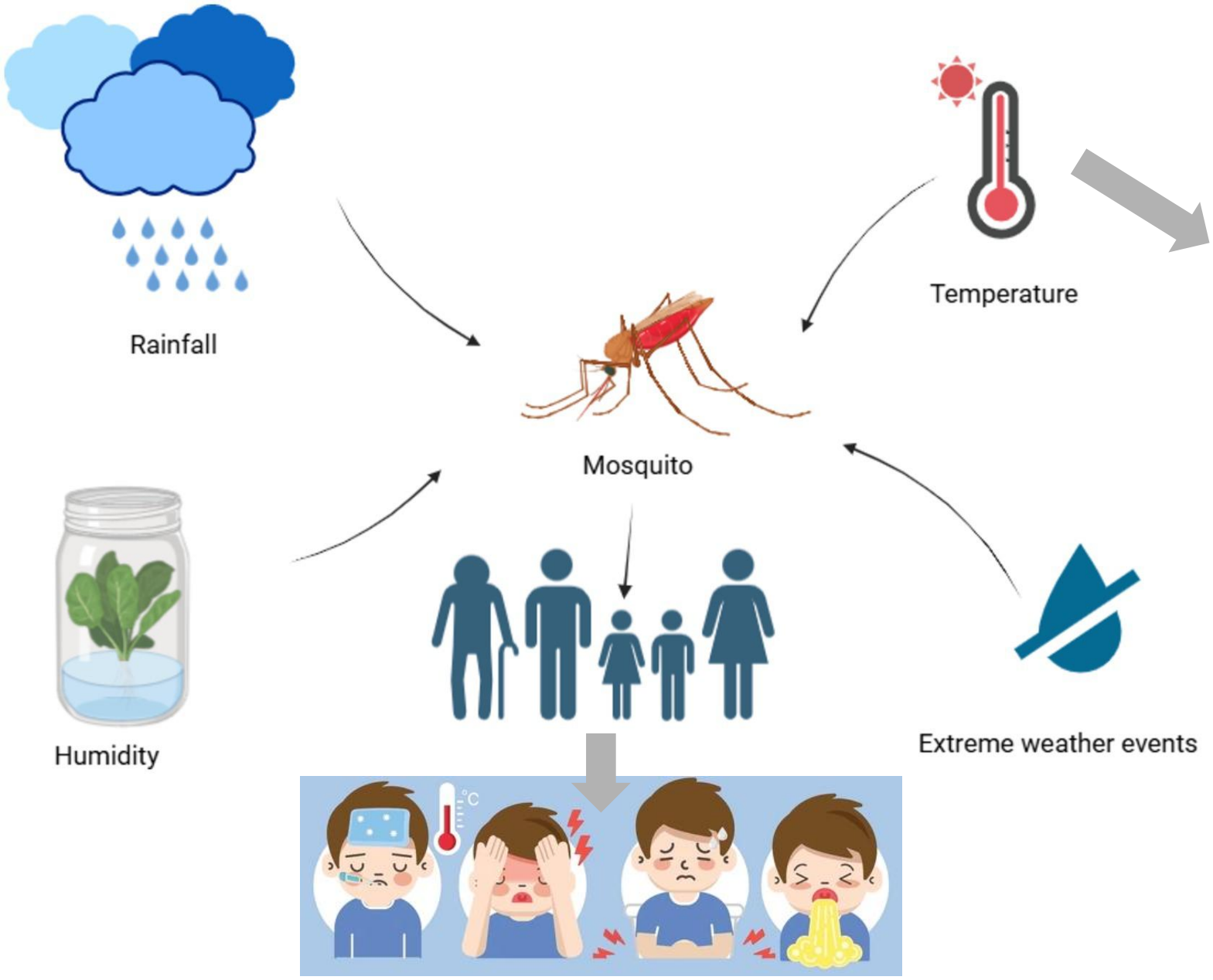


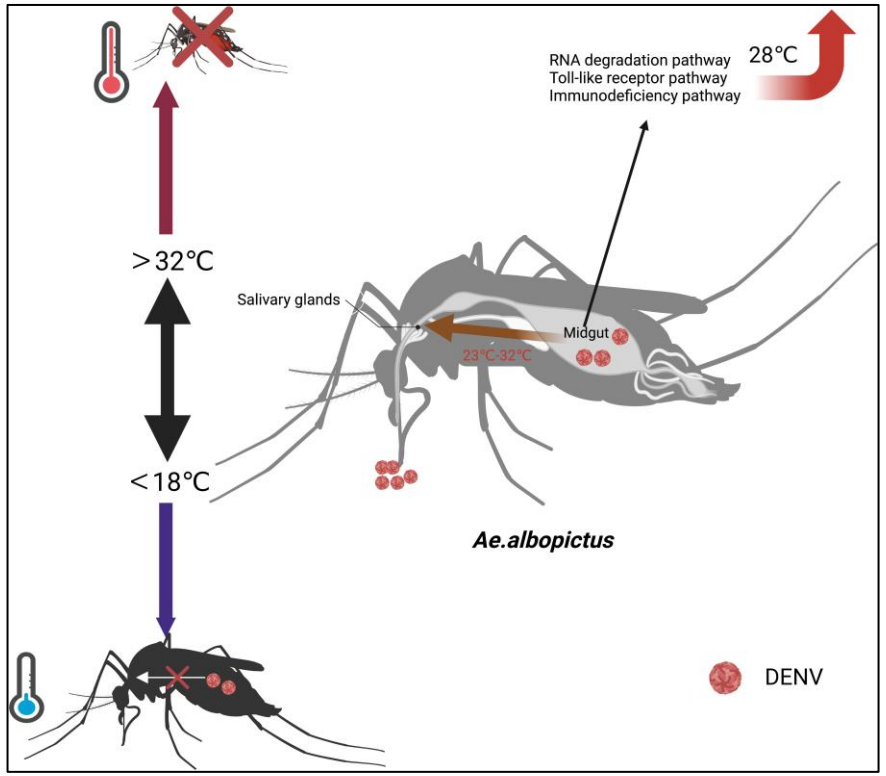
Influenza virus



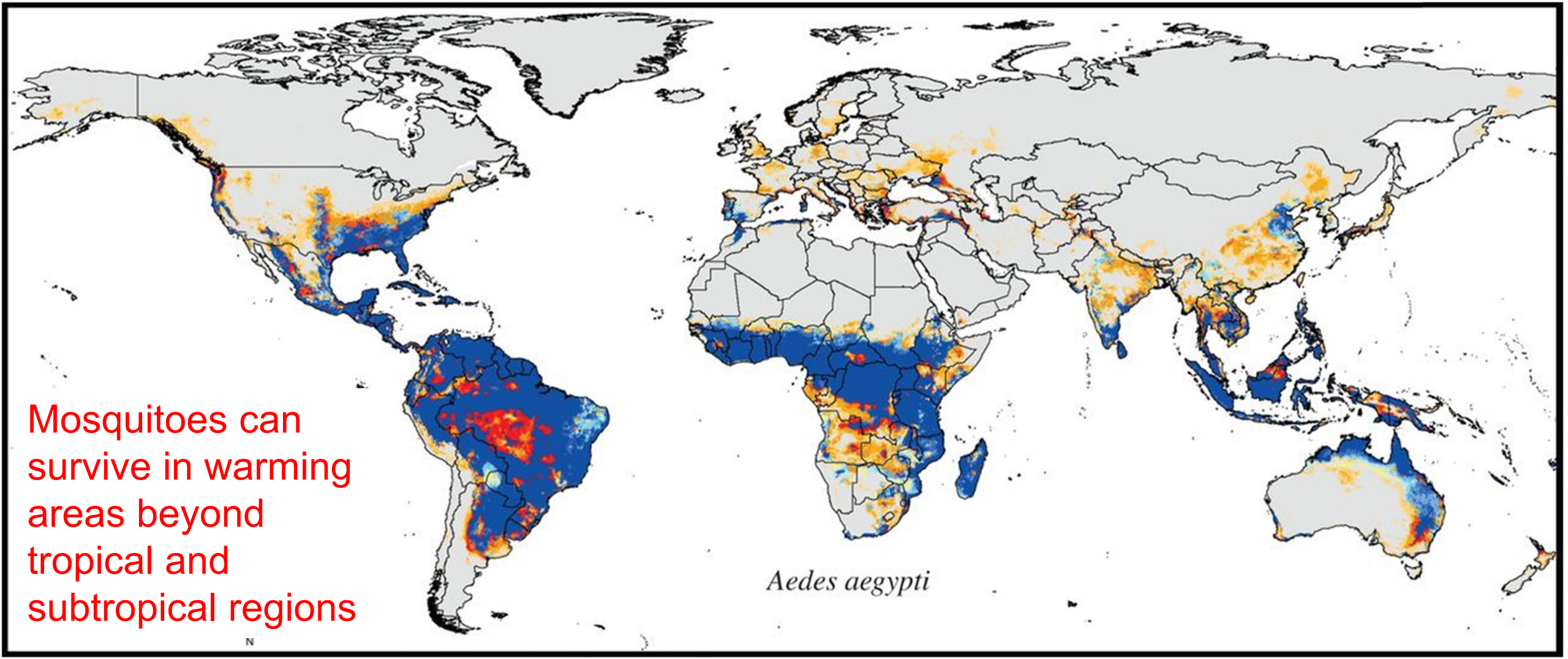








Sources: Liu et al. 2023; Zhang et al. 2024



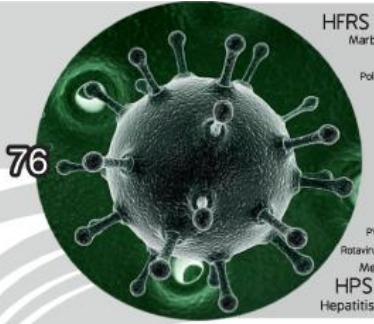
- Shades of blue refer to present-day distributional areas
- Shades of orange refer to future distributional potential

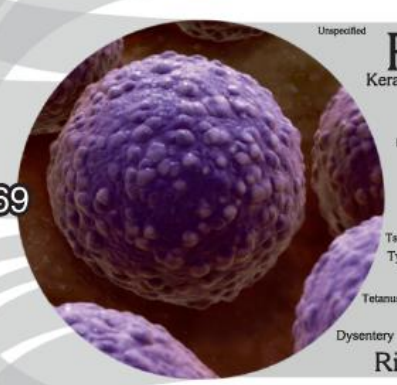
Sources: Ebi & Nealon, 2016

160 Warming
122 Precipitation
121 Floods
81 Drought
71 Storms
61 Natural cover change
43 Ocean climate change
21 Fires
20 Heatwaves
10 Sea level

103 Vector−borne
78 Waterborne
60 Airborne
56 Direct contact
50 Food−borne

Many infectious diseases are affected by climate change!





Source: Mora et al. 2022

What are examples of businesses or startups for climate-sensitive infectious diseases?

HeHealth

AI-powered sexual health screening/ diagnosis platform using computer vision-based tools and Otiz, an LLM-based sexual Health companion

VIRUSIGHT DIAGNOSTIC

AI algorithm to interpret spectral signatures of samples through an innovative miniaturized Spectrophotometer device, enabling fast and affordable diagnosis

Santé builds an AI-driven epidemic intelligence platform to predict, prevent, and mitigate infectious disease outbreaks using AI and GIS to map disease risks, enabling early detection and targeted interventions at scale

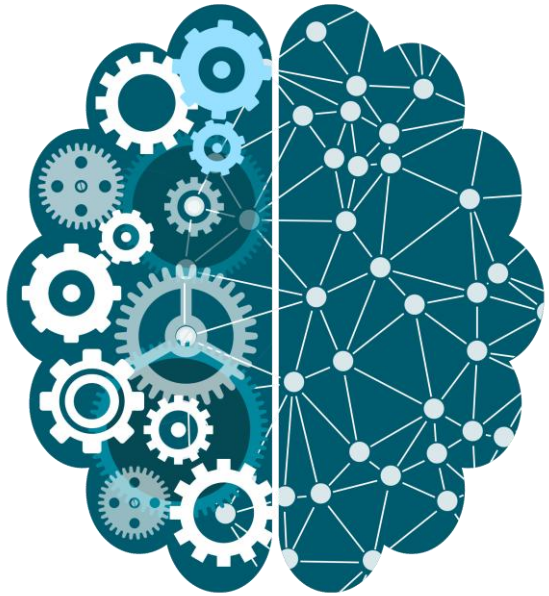
SORA TECHNOLOGY

Drones and AI to manage mosquito breeding sites and prevent mosquito-borne diseases

What are the general challenges in addressing climate change impacts on infectious diseases?

Disclaimer: Scientist’s perspective

Data are limited and rely on surveillance systems operated by governments, which present significant challenges to the quality and timeliness of the information.



Models detecting outbreaks or forecasting spread based on climate-related factors are imperfect, not adopted, or maintained by governments.

Adaptation interventions to prevent the possible rise may be planned, but never implemented, or at least receive investments.

How should I target climate-sensitive infectious diseases?

Disclaimer: Scientist’s perspective

Understand how transmission occurs

Improve diagnostics and treatment

Prevention is better than cure

Return of investment

THANK YOU!

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