Weather and disease: closer than we think

Enya O' Connell-Hussey

Research Impact Officer | TRILATERAL Research

In the year 1613, a Polish physician named Dr Sebastian Petrycy published an instruction manual to surviving the plague. Amid some questionable advice, like filling your house with apples and tree branches, he detailed how to recognise when an outbreak of plague was near:

"Where there is the slightest sign of the plague, close off and mark the house, separate the sick from the healthy, and give orders to protect oneself against the danger. The plague air can either be home-born, or brought from another land. It will be preceded by exceedingly hot and humid air... a large number of mice, frogs, lizards and other beasts which are born of humidity [appear], when birds and animals are escaping their nests and burrows, refusing to live there"

Although Dr Sebastian Petrycy's explanation was not quite accurate, he may have been on to something.

The bacteria that causes plague circulates at low levels within fleas and rodents, especially species who live in burrows. A plague outbreak is much more likely to happen if the weather has been favourable to flea populations, or if the climate stimulates plague-infested rodents to leave their burrows and come into contact with other animals, including humans. Dr Petrycy's theory was based on the science of his time, which, without our modern tools and methods, was mostly observations and noticing patterns. This hunch that human diseases are entwined with our environment was an early example of epidemiology.

For a long time, people have known that our natural environment and climate affects the spread of disease. Before germ theory, western medicine blamed damp, bad air for generating diseases like smallpox and plague. Wetness and heat, coldness and dryness and the balance between them were the

Co-funded by the European Union

UK Research and Innovation

climate-health cluster

CLIMOS

source of all ills. With advancements in medicine, technology and research, we now understand that weather doesn't create disease out of thin air, but does have a crucial role in their spread.

Heat is a foundation of life on Earth, because it sets the pace of an organism's growth. Organisms, including bacteria, fungi, parasites and creatures that carry diseases, have evolved to grow in a certain temperature range. Anything colder or hotter than their ideal range will hinder how fast they grow, their health, and how much they reproduce. Other climatic factors like humidity, affect this as well.

This means there are thousands of diseases people are safe from contracting, provided their climate is the right one. But as climate change is turning up the global thermostat, organisms can live in new places, closer to people who have never been exposed to their dangers, with unprepared healthcare systems. Modern life has separated us from our environment, and we often forget that we are still at the mercy of the weather and seasons.

Climate change induced disease outbreaks are a reality. But we have come a long way from Dr Petrycy's guesswork with frogs and muggy weather. With new tools that predict weather and climate change, we can predict the spread of disease-carrying organisms, and monitor their spread in real time. Predictions give us the gift of time, and preparation.

The CLIMOS project is doing just that, by modelling the spread of sandflies and sandfly-borne diseases across the Mediterranean, to create an early warning system for climate change induced diseases.

Our team at Trilateral Research are working to explore potential outbreak scenarios with government bodies, vets, local health authorities and citizen associations, to capture the potential impacts of climate-induced outbreaks on society, healthcare systems and the economy of the Mediterranean. At the core of Trilateral Research's ethos in our climate work is matching the people to the data.

Co-funded by the European Union
UK Research and Innovation
climate-health cluster

CLIMOS

We have within our disposal the power to enact great good. Rather than letting ourselves be gripped by helplessness in the face of climate change, the CLIMOS team is using talent, tools and technology to protect people from natural disaster — a privilege built by the work of generations.

Follow us:

Co-funded by the European Union

UK Research and Innovation

climate-health cluster