

Global climate change could create more opportunities for rise and spread of new cholera strains, analysis suggests

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Rice fields flooded with riverine water from Meghna river, close to Dacca.
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New research suggests that an El Niño event may have aided the establishment and spread of a novel cholera strain during an early 20th-century pandemic, supporting the idea that climate anomalies could create opportunities for the emergence of new cholera strains.

Xavier Rodo of Instituto de Salud Global de Barcelona, Spain, and colleagues present these findings in the open-access journal *PLOS Neglected Tropical Diseases*.

Since 1961, more than 1 million people worldwide have died in an ongoing cholera [pandemic](#), the seventh cholera pandemic to have occurred since 1817.

The drivers of past cholera pandemics have been unclear, but one hypothesis holds that anomalous climate conditions may act synergistically with genetic changes of *Vibrio cholerae*—the bacterium that causes the [disease](#)—to facilitate the spread and dominance of new strains.

To help clarify potential links between climate and cholera, Rodo and colleagues applied a variety of statistical and computational tools to historical records of climate conditions and cholera deaths in various regions of former British India during the sixth cholera pandemic, which lasted from 1899 to 1923. They also compared past conditions with climate and cholera data for the ongoing pandemic.

This analysis revealed that anomalous patterns of cholera deaths from 1904 to 1907 occurred alongside out-of-the-ordinary seasonal temperatures and rainfall levels associated with an El Niño event; the timing of these occurrences correlates with the establishment of a new invasive strain during the sixth pandemic. In addition, these historical climate conditions show similarities to strong El Niño events that have been associated with cholera strain changes during the ongoing

pandemic.

These findings support the possibility that anomalous climate events could help facilitate the establishment and spread of new cholera strains.

The researchers then explored future possibilities for climate-facilitated emergence of new cholera strains using standard climate prediction models. They found that climate change-driven increases in climate variability and extremes could boost the chances of the emergence of novel strains through the end of the current century.

Meanwhile, to deepen understanding of this deadly disease, the scientists call for further research focused on the interplay of [cholera](#) evolution and climate anomalies.

Dr. Rodó and co-author Dr. Mercedes Pascual summarize, "Variation in [climate conditions](#) or the evolutionary change of a pathogen can be important drivers of major epidemics and pandemics.

"But these two drivers are typically considered separately in studies seeking to explain the emergence of unusually large outbreaks...here, we present indirect evidence that the two can act together to synergistically underlie the establishment and widespread transmission of a new strain."

More information: Rodó X, Bouma MJ, Rodríguez-Arias M-À, Roy M, De Yebra P, Petrova D, et al. (2024) Strain variation and anomalous climate synergistically influence cholera pandemics, *PLoS Neglected Tropical Diseases* (2024). [DOI: 10.1371/journal.pntd.0012275](https://doi.org/10.1371/journal.pntd.0012275)

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