



Climate change and health: Stemming the rising tide of Vibrio disease

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Abstract

Human activity has irreversibly changed the climate with impacts at all ecological scales. The oceans are today capturing more than 90% of all the heat generated by human-made emissions with deep consequences for a broad range of marine ecosystems on a planetary scale with impacts on biodiversity, composition and life cycles of marine communities. Among all the species affected by climate change, one tropical bacterium is becoming a barometer of climate change. Globally, the diverse bacterial genus *Vibrio* is the most important group of bacterial pathogens found in marine and coastal waters. These bacteria can cause an array of human infections via direct exposure to seawater or through the consumption of seafoods grown and cultivated in coastal and estuarine settings. Crucially, we appear to be on the cusp of an alarming global increase in *Vibrio* disease. A worldwide increase in seafood consumption, the globalization of the seafood trade, the more frequent use of coastal waters for recreational activities, and climate change all contribute to greatly increased human health risks associated with *Vibrio* bacteria. We have been applying a new generation of tools combining genomics, ecology, climate, demography and socioeconomic projections to understand the drivers of the observed emergence of *Vibrio* infections and map past, present and future scenarios of ecological suitability for *Vibrio* disease. Results from our ongoing projects are deciphering the responses of pathogenic populations of *Vibrio* to the new climate context, and how these new conditions are affecting long-range dispersals and colonization of new geographical areas, key elements in the geographical expansion and global scalation of *Vibrio* infections. Projections anticipated an expansion of both the temporal and spatial disease burden for *Vibrio* infections, in particular at high latitudes of the Northern Hemisphere. However, the largest extent occurred from 1980 until 2020 and a more moderate increase is expected for the future. The most positive outcome is that projections showed that *Vibrio* morbidity will remain relatively stable over the coming decades.

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