

Ocean temperatures give early warning of Indian malaria

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[NEW DELHI] Researchers have developed a model that allows malaria epidemics in arid northwest India to be predicted four months in advance, helping authorities prepare for them much earlier than before. The seasonal malaria outbreaks in the region are known to be driven by higher rainfall, which allows the mosquitoes that transmit the disease to breed, and can currently be forecasted up to around a month in advance. But a study published today (3 March) in *Nature Climate Change* has found a strong association between malaria outbreaks in the desert fringe of northwest India and sea surface temperatures in the tropical South Atlantic Ocean. **SPEED READ** Lower Atlantic Ocean temperatures correlate with malaria in arid northwest India This is because it drives air circulation that brings rain and malaria to the area The finding allows extension of rain-based forecasting, giving four months' warning The team of researchers from India, Spain, the United Kingdom and the United States correlated data on malaria epidemics and sea surface temperatures from 1985 to 2010. They showed that rises in malaria incidence in northwest India in October and November tended to be preceded by lower

sea surface temperatures in the tropical South Atlantic in June and July."The variation in the size of malaria epidemics across different years showed an association with sea surface temperature in a somewhat unexpected part of the oceans," Mercedes Pascual, a professor of ecology and evolutionary biology at the University of Michigan, and one of the study authors, tells SciDev.Net. The reason for this is that the tropical South Atlantic is linked to the Indian Ocean basin, and northwest India in particular, by air circulation. D.R. Pattanaik, a scientist at the India Meteorological Department says that when the temperature of the sea surface falls in the tropical South Atlantic the changes in air disturbance at different heights lead to "precipitation throughout that region, which extends to northwest India". Based on the correlation, the researchers have developed a mathematical model to predict malaria in states such as Gujarat and Rajasthan four months in advance. "One main motivation to look at the oceans and not at regional rainfall itself is to take advantage of a longer lead time," Pascual says. "Other models we have developed for malaria in this region rely on observations of total monsoon rainfall or, alternatively, remote sensing observations of a vegetation index that reflects water conditions on the ground and — therefore the availability of habitats for the recruitment of mosquito vectors." "This means we need to wait until the end of the monsoon season, until August or

September, to predict epidemics that might start in September and peak in October and November. This gives very short lead times to act on mobilising prevention measures," she adds. [Link to full paper](#)