El Niño Southern Oscillation and Leptospirosis outbreaks in New Caledonia

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Abstract:
Leptospirosis is an important cause of seasonal outbreaks in New Caledonia and the tropics. Using time series derived from high-quality laboratory-based surveillance from 2000-2012, we evaluated whether climatic factors, including El Niño Southern Oscillation (ENSO) and meteorological conditions allow for the prediction of leptospirosis outbreaks in New Caledonia. We found that La Niña periods are associated with high rainfall, and both of these factors were in turn, temporally associated with outbreaks of leptospirosis. The sea surface temperature in El Niño Box 4 allowed forecasting of leptospirosis outbreaks four months into the future, a time lag allowing public health authorities to increase preparedness. To our knowledge, our observations in New Caledonia are the first demonstration that ENSO has a strong association with leptospirosis. This association should be tested in other regions in the South Pacific, Asia or Latin America where ENSO may drive climate variability and the risk for leptospirosis outbreaks.

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Resource Description

Exposure: weather or climate related pathway by which climate change affects health
Ecosystem Change, El Nino Southern Oscillation, Precipitation, Temperature, Other Exposure, Specify, Water Quality

Temperature: Variability

Water Quality / Contamination: Marine or Freshwater pathogen

Other Exposure: sea surface temperature

Geographic Feature: resource focuses on specific type of geography
Ocean/Coastal

Geographic Location: resource focuses on specific location
Non-United States
Non-United States: Australasia

Health Impact: specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Waterborne Disease

Waterborne Disease: Leptospirosis

Model/Methodology: type of model used or methodology development is a focus of resource

Outcome Change Prediction

Resource Type: format or standard characteristic of resource

Research Article

Cross-cutting Themes: Adaptation

Timescale: Inter-Annual (1-10 years)