

Climate variability and malaria incidence in the Solomon Islands: Towards an operational early warning system

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Introduction

Malaria is one of the leading causes of morbidity in the Solomon Islands – with a malarial death rate of approximately 8% of total deaths.

This pilot project has demonstrated the close link between malarial incidence, rainfall and temperature.

COSPPac is working in partnership with the Solomon Islands Meteorological Service to develop and deliver an early warning system for malaria using seasonal climate forecasts.

Malaria incidence and climate in the Solomon Islands

The peak malaria season in the Solomon Islands occurs in the wet summer months – when rainfall, temperature and humidity create optimal conditions for mosquito breeding. There is significant year to year variability due to the effects of the ENSO phenomenon on local climate.

Above median rainfall during the peak period tends to reduce the number of malaria cases because their breeding sites are flushed out by the heavier than normal rainfall. Conversely, below median rainfall during the wet season tends to be associated with an increase in malaria incidence. These results indicate that malaria tends to be more prevalent during El Niño events and less so during La Niña events.

The incidence of malaria lags behind rainfall by approximately two months. This makes rainfall a useful parameter for forecasting malaria incidence with sufficient lead time for the healthcare sector to plan.

Temperature influence on the number of malaria cases tends to have a shorter lag period. Lower than normal rainfall from November to January followed by higher than normal temperatures in December and January triggers a high incidence of malaria.

How this project will help

The long term aim of this project is for the Solomon Islands Meteorological Service develop and deliver seasonal climate forecasts and “malaria alerts” to the healthcare sector and communities.

Specifically the project aims to:

- Develop malaria outlooks based on the historical relationship between malaria incidence and rainfall and temperature. The outlooks could alert the health industry and communities when conditions are conducive periods of high malaria risk, giving them sufficient time to take mitigation measures and prepare.
- Strengthen the relationships between the Solomon Islands Meteorological Service and the health sector to allow for rapid information sharing.

Progress so far

Several outcomes have already been achieved:

- Malaria incidence data across 9 provinces from 1975 to 2007 was mapped against the corresponding climate data for this period, including rainfall, maximum and minimum temperature and relative humidity.
- Health data was analysed and the malarial incidence was calculated as a Positive Incidence Ratio, which is the number of positive films per 1000 head of population.
- A prototype early warning system has been developed, allowing the Solomon Islands Meteorological Service to issue bulletins for periods where upcoming climate conditions are favourable for high malaria incidence, thus allowing medical services and residents to take measures to minimise risk of infection.
- The project has raised the profile of the National Meteorological Service in the Solomon Islands and has fostered closer collaboration between the NMS and health service organizations in the country.

How this project is contributing the Global Framework for Climate Services in the Pacific

This pilot project has contributed to the GFCS by:

- Enhancing the capacity of the Solomons Islands Meteorological Service in producing customized climate forecasts which enable the health sector to incorporate climate information into their malaria control strategies.
- Facilitated the exchange of data and expertise between the Solomons Islands Meteorological Service and health sector.
- Working towards the implementation of operational systems in developing countries.



Anopheles Mosquito



Children on the river in the Solomon Islands. Rivers often provide prime mosquito breeding habitats.



Pilot Project Workshop in the Solomon Islands, unknown, but sourced from COSPPac photo folder, August 2005.



Trial bulletin for prototype early warning system, Lloyd Tahani, December 2009.



Newspaper report covering results of malaria study performed for the PICPP pilot project, Solomon Star, 1 August 2009.

References

- [1] UNDP Millennium Development Goals #6: Combat HIV/AIDS, Malaria and other diseases
- [2] 'Success in the Solomon Islands', World Health, May 1998
- [3] 'World Malaria Report 2011'
- [4] 'Better surveillance key to malaria early warning systems' <http://www.scidev.net/en/opinions/better-surveillance-key-to-malaria-early-warning-s.html>
- [5] Image courtesy of Royal Perth Hospital (RPH)
- [6] Millennium Development Goals Progress

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