POSTER PRESENTATION



Open Access

Consistent mapping of government malaria records across a changing territory delimitation

Ricardo Andrade-Pacheco^{1*}, Martin Mubangizi², John Quinn², Neil D Lawrence¹

From Challanges in malaria research: Core science and innovation Oxford, UK. 22-24 September 2014

Background

Health Management Information Systems (HMIS) are a crucial tool for supporting planning and decision-making. The benefits of such systems will depend on the quality of the data they provide and on the response capacity of the decision-makers [1]. The analysis of malaria incidence records of the HMIS, in Uganda, faces two main complications. First, artificial trends induced by a non-negligible and variable rate of non-reporting hospitals. Second, lack of comparability across time, due to changes in the districts boundaries.

Materials and methods

We propose a method for estimating the incidence of malaria for the different district definitions across time. Although we have information for the whole country across many years, this task requires making estimates for periods where data is not available for a specific district delimitation. We provide disease maps based on HMIS information by exploiting the relationship with its environmental drivers. Our approach relies on the Gaussian process framework. In particular, we use multiple output kernel techniques [2] to achieve consistency between the totals and subtotals of incidence records at different levels of territory aggregations. In the case of map generation, this approach allows us to combine information from different sources at different spatial resolution. We use the HMIS malaria records from 2003 to 2013. The records consist of weekly information aggregated within districts. The information available also includes the number of hospitals reporting each week. We use the normalized difference vegetation index and land surface temperature measurements, both commonly used for identifying suitable habitats for mosquito breeding [3].

Results

For recently created districts, our method allows comparability between the current malaria incidence and periods before they started reporting to the HMIS. The probabilistic model defined allows HMIS users to generate samples from a incidence distribution to develop further analysis. We also generate disease maps by combining administrative records with remote sensing data.

Acknowledgements

 RAP is funded by CONACYT and SEP scholarships. MM is partially funded by Google.

Authors' details

¹Department of Computer Science, University of Sheffield, Sheffield, UK. ²Department of Computer Science, Makerere University, Kampala, Uganda.

Published: 22 September 2014

References

- World Health Organization: Country health information systems: a review of the current situation and trends. Technical report, WHO Press, Geneva; 2011.
- Mauricio Alvarez, Lorenzo Rosasco, Neil D Lawrence: Kernels for vectorvalued functions: a review. Foundations and Trends in Machine Learning 2012, 4:195-266.
- Archie Clements CA, Heidi Reid L, Gerard Kelly C, Simon Hay I: Further shrinking the malaria map: how can geospatial science help to achieve malaria elimination? *The Lancet Infectious Diseases* 2013, 13:709-718.

doi:10.1186/1475-2875-13-S1-P5

Cite this article as: Andrade-Pacheco *et al.*: Consistent mapping of government malaria records across a changing territory delimitation. *Malaria Journal* 2014 **13**(Suppl 1):P5.

¹Department of Computer Science, University of Sheffield, Sheffield, UK Full list of author information is available at the end of the article



© 2014 Andrade-Pacheco et al; licensee BioMed Central Ltd. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. The Creative Commons Public Domain Dedication waiver (http://creativecommons.org/publicdomain/zero/1.0/) applies to the data made available in this article, unless otherwise stated.