The potential of mobile phone data against malaria: A source/sink map for Senegal and the potential for incidence surfaces

Background:

With the impressive success in malaria control programs over the last years, many countries re-orientate towards elimination.[1] [2] Movement of the population is one factor making elimination challenging, as the eradication attempts in the 60s have shown.[3] Targeting strategies that take human movement into account are required.

The amazing growth in mobile phone ownership in Sub-Sahara Afrika over the last years holds the potential of Call Detail Records (CDRs) providing information on mobility behaviour on an unprecedented scale.[4] The Orange D4D Data for Development Challenge Senegal made one such dataset available for research.[5]

Priority 1: Malaria Risk Connectivity Matrix Senegal

Effective targeting requires knowledge about transmission foci and importation/exportation risk. Tatem et al. 2014 have suggested an integrated risk mapping approach to these challenges.[6] They calculated source/sink maps for Namibia using mobility patterns derived from mobile phone data to identify areas exporting/importing infections.

Goal:

Create a source/sink map for Senegal and explore possibilities to extend the approach.

Priority 2: Improving Malaria Maps Through Mobile Phone Derived Behavioural Indicators

Mobile phone data has contributed to successfully predict poverty, literacy, disease and many other things.[7] [8] [9] Despite this success, to the best of my knowledge, there have been no studies exploring the potential contribution of mobile phone data to malaria maps.

Goal:

Explore the usefulness of a range of indicators computed from CDR's to improve malaria mapping. Indicators of importation risk computed for Malaria Risk Connectivity Matrices under Priority 1 are one promising example. The process could also indicate a new way of quantifying the number of imported malaria cases, making an integration of the separated modes of previous methods possible.[6]

The Thesis will be written in collaboration with Dr. Kenneth Harttgen (Chair for Development Economics), Dr. Ewan Cameron (Malaria Atlas Project) and Prof. Feuerriegel (Chair for Management Information Systems).

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