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Big brother is watching - using digital disease surveillance tools for near real-time forecasting

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17.013

Big brother is watching - using digital disease surveillance tools for near real-time forecasting

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Purpose: In our increasingly interconnected world, it is crucial to understand the risk of an outbreak originating in one country/region and spreading to the rest of the world. Digital disease surveillance tools such as ProMed, HealthMap etc. can serve as important early warning systems as well as complement field surveillance data during an ongoing outbreak. While there are a number of systems that carry out digital disease surveillance, there is as yet a lack of tools that can compile and analyse the generated data to produce easily understood actionable reports.

The purpose of our work is to design and implement a flexible statistical model that uses different streams of data such as disease surveillance data, mobility data etc. for short-term incidence trend forecasting.

Methods & Materials: This is a modelling study making use of publicly available data. For incidence trends, we use data from ProMED and HealthMap. Other sources of data are Healthsites.io for information on health facilities and GADM for national and international administrative boundaries. The model will be made available as a R package as well as through a website for use by non-technical stakeholders.

Results: We will showcase the use of our model through the analysis of data from the 2014 West African Ebola Epidemic. We show that using only data obtained through digital surveillance (ProMED and HealthMap), we are able to forecast short term incidence trajectory that is consistent with that obtained using field surveillance data.

We will also highlight an example of disaggregating aggregated data to obtain incidence information at a fine spatial scale. This could be particularly important in instances where information at sub-national levels is lacking or incomplete.

Conclusion: Our work makes two key contributions:

- We provide a realistic appraisal of the strengths and limitations of data collected through digital surveillance in incidence forecasting.
- We infer incidence trends at finer spatial scales from aggregated data. Our work provided an example of the way in which data from digital surveillance systems can complement the data collected from traditional public health infrastructure.

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POSTER PRESENTATIONS: Late Breaker Abstracts

19.001

Assessment of the risk posed to Singapore by the emergence of artemisinin-resistant malaria

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Purpose: To assess the public health risk to Singapore posed by the emergence of artemisinin-resistant malaria across the Greater Mekong Sub-region (GMS).

Methods & Materials: The likelihood of importation of drug-resistant malaria into Singapore and the impact on public health of its subsequent secondary spread in Singapore were assessed to determine the overall risk. Epidemiology of malaria cases in Singapore was analysed. Vulnerability and receptivity of Singapore were examined, including the connectivity between Singapore and countries reporting artemisinin resistance (ART-R), as well as preparedness of the health authorities.

Results: The importation of ART-R malaria in Singapore is possible given the close proximity and significant travel volume between Singapore and the GMS countries reporting ART-R. Singapore's vulnerability is further enhanced by its high dependency on foreign workers from neighbouring endemic countries. Nonetheless, the overall likelihood of such an event is low based on the rarity and decreasing trend of imported malaria incidence over the past few years. From 2008 to 2017, 12 out of 209 (5.7%) *P. falciparum* cases detected in Singapore had mutations associated with artemisinin resistance. All cases had recovered without complications.

Conclusion: This risk assessment highlights the need for a high degree of vigilance over the local and global situation to be maintained to minimise the risk and severity of the public health threat of drug-resistant malaria to Singapore.

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19.002

Possible drivers for the increased West Nile virus transmission in Italy in 2018

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Purpose: To assess the consistency of the observed patterns of West Nile virus (WNV) during the last six years and possible drivers for the observed increased incidence in 2018.

Methods & Materials: The data on confirmed West Nile Neuro-invasive Disease (WNND) human cases notified in Italy since 2012 indicate an increase of incidence in 2018 (131 cases as of 30 August). An integrated surveillance system is in place in Italy since 2008, which includes RT-PCR testing of mosquito pools, birds belonging to three target species (magpie, hooded crow, jay) and wild birds of other species found sick/dead. Data from veterinary