Forecasting Meningitis Epidemics in Sub-Saharan Africa

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Abstract. *In a variety of public health settings, the scope for the development of new spatio-temporal statistical methodology for spatio-temporal analysis is matched by the increasing availability of spatially and temporally referenced data-sets, often accruing in real-time. However, the analytic potential of these data-sets is currently under-exploited. In this talk, I will describe how contemporary ideas around spatio-temporal statistical mod- elling are being used to assist in the development of an early warning system for emergent meningitis epidemics in sub-Saharan Africa.*

Data available to the project include weekly incident case-counts at district-level in each of several African countries, and satellite-derived environmental covariate information in the form of digital images. Current intervention strategies use simple threshold-based local rules such as: declare an epidemic alert within a district when weekly incidence in that district first exceeds 10 cases per 100,000 population. However, and unsurprisingly, district-level incident counts show both spatial and temporal correlation, hence alert rules that borrow strength across space and time should be able to improve on the current rules. I will describe the formulation and fitting of spatio-temporal dynamic regression models that seek to capture the main features of historical incidence data, and will demonstrate a prototype system for automatic updating and web-reporting of the results.

Keywords. *Dynamic-regression models; Spatio-temporal analysis.*

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