Title:	Epidemiological Compartment Modelling of Malaria and Analyses of P. falciparum Prevalence Data in India
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Abstract:	Malaria is an endemic infectious disease in India and continues to be a significant public health concern. Mathematical and statistical methods have been used to study the complex behaviour of infectious diseases, through different modelling and data analysis techniques. This thesis embodies work in both the aspects and presents results in epidemiological compartment modeling, and analysis of a his- torical data set of Plasmodium falciparum induced malaria in India. Usually in epidemiological compartment models, the population in each compartment is con- sidered to be homogeneous in many biological and environmental factors. I have focused on an existing mathematical model to explore and investigate the behav- ior of hypothetical immunological responses, owing to heterogeneity in immunity in host population, and studied temporal equilibrium properties and disease preva- lence patterns. I have analysed the emergence and establishment of P. falciparum as the dominant malarial parasite in India, through visualization and descriptive statistical analysis such as, spatial time series, temporal correlation heat maps, and principal component analysis, of a historical data-set (1965-1995). The re- sults clearly demonstrate the spatio-temporal patterns of its evolution and, the hot-spots of falciparum malaria prevalent states. These approaches can be used for the analysis of any other infectious disease data.
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