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Implications from Modeling of Visceral Leishmaniasis Transmission: A Region-dependent Characterization of Risks.

Approximately 500,000 new annual cases with more than 50,000 deaths occur globally as a result of Visceral Leishmaniasis (VL), a Neglected Tropical Infectious Disease. VL is the second deadliest parasitic killer after malaria, and is endemic in 47 countries, with India and Sudan having the highest burden. The risk factors associated with VL are either unknown in some regions or vary drastically among empirical studies. In this talk, I will present a new dynamical vector-borne epidemic model motivated by alternate field data from India and Sudan, which captures multiple VL risks. The model allows us to identify and quantify the impact of region-dependent risks on VL transmission dynamics. Our analysis shows that VL prevalence of symptomatic and asymptomatic host population depends highly on the progression of disease via development rates of symptoms and rates of treatment. Sensitivity analysis suggests that these two parameters are highly sensitive for both countries. In addition, we find that the mean estimates of transmission probability are significantly different for India and Sudan. I will discuss the implications of our results for VL prevention policy and control programs both in India and Sudan. (Received September 27, 2017)