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*Mathematical Model to Estimate Underreporting and Asymptomatic Visceral Leishmaniasis Cases  
in Bihar, India.* Preliminary report.

Visceral Leishmaniasis (VL), also known as ‘kala-azar’, is a vector-borne disease that primarily affects impoverished tropical regions of the world. The WHO reports 300,000 new cases of VL world-wide each year. Although VL is curable if treated, it causes over 20,000 deaths in developing countries annually. These statistics are highly under-estimated mainly due to ignorance and lack of proper surveillance. In regions with limited resources where authorities are struggling to combat several other infectious diseases, annual flooding, infrastructural deficiencies etc., it is important to bring attention to the actual morbidity and mortality due to VL, so that the problem is handled with appropriate urgency. In this project we apply two ordinary differential equation models to official count of VL cases from 21 worst affected districts in Bihar (state which hosts 90% of VL cases in India) from 2003-2012. We estimate the infection rate, rate of cure and percentage of underreporting of deaths due to VL for each district. This model also aims at estimating the count of the asymptotically infected people in the population, data on which is very limited. Least-square parameter fitting along with local sensitivity analysis is performed to achieve these estimation. (Received September 12, 2016)