

# Evaluating the Role of Treatment Interruptions and Non-adherence on the Transmission Dynamics of Visceral Leishmaniasis in Indian subcontinent

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Visceral Leishmaniasis (VL) is a neglected tropical diseases with an estimated 50,000 to 90,000 new cases per year worldwide and an estimated over 20,000 to 40,000 deaths annually worldwide [1]. Although elimination campaign has been deployed since 2005 with three target deadlines till now, India has been unable to achieve elimination targets in anyone of the these three. Availability of drugs, their efficacy, patients behaviors to treatment and growing parasite resistance may be some of the major challenges in the elimination process. Promoting treatment adherence and sustained monitoring of cases may play a critical role in achieving the VL elimination targets [2]. This work is first study of its kind where we understand the impact of mechanisms related to patients' treatment behaviors on the transmission dynamics of VL via a data-driven mathematical model. The goals of the study are to understand: (a) how improvement in VL treatment adherence in India shapes patterns of VL and what is its implications to VL elimination by next target deadline? and (b) how different assumptions on patients' behaviors on treatment interruption (exponentially distributed and gamma-distributed) impact VL transmission dynamics? The model analysis is supported by empirical information from Bihar (state having 90% of VL cases in India), a highest prevalent region in the world. The results suggest that improvement in treatment adherence significantly enhances the efforts of the current vector control strategies speeding up the process of elimination upon combination with the current integrated vector control program. People who default from the treatment seem to pose more risk by becoming hidden from the surveillance than the people who delay seeking the treatment. Non-adherence to treatment is detrimental to success of control programs for VL and calls for attention.

## References

- [1] World Health Organization: Media, Leishmaniasis (2017April).  
<http://www.who.int/mediacentre/factsheets/fs375/en/>
- [2] Singh, Om Prakash et al. "Current challenges in treatment options for visceral leishmaniasis in India: a public health perspective" *Infectious diseases of poverty* vol. 5 19. 8 Mar. 2016, doi:10.1186/s40249-016-0112-2