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Center for Biomedical Research member Libin Rong models the Ebola virus

Center for Biomedical Research member **Libin Rong**, of the **Department of Mathematics and Statistics**, is known for his modeling of the **human immunodeficiency virus** (the cause of AIDS) and the **hepatitis C virus**.

He has now turned his talents to understanding the **Ebola Virus**, which caused such havoc earlier this year in Africa. The objective of his study is “to assess the effect of all possible intervention strategies (isolation, media impact, safe burial, and vaccination) on controlling the spread of Ebola virus in Guinea, Sierra Leone, and Liberia.”

In a paper published recently in Scientific Reports (**Volume 5, Article number 15818**), he and his coauthors conclude that “early and massive diagnosis of pre-symptomatic individuals with rapid testing may remain beneficial to reduce the transmission of the disease. Shortening the duration between death and burial and improving the effectiveness of isolation are two effective interventions for controlling the [Ebola Virus Disease] outbreak.” The abstract of the paper is given below.



Since the re-emergence of Ebola in West Africa in 2014, comprehensive and stringent interventions have been implemented to decelerate the spread of the disease. The effectiveness of interventions still remains unclear. In this paper, we develop an epidemiological model that includes various controlling measures to systematically evaluate their effects on the disease transmission dynamics. By fitting the model to reported cumulative cases and deaths in Guinea, Sierra Leone and Liberia until March 22, 2015, we estimate the basic reproduction number in these countries as 1.2552, 1.6093 and 1.7994, respectively. Model analysis shows that there exists a threshold effectiveness of isolation, below which increasing the fraction of latent individuals diagnosed prior to symptoms onset or shortening the duration between symptoms onset and isolation may lead to more Ebola infection. This challenges an existing view. Media coverage plays a substantial role in reducing the final epidemic size. The response to reported cumulative infected cases and deaths may have different effect on the epidemic spread in different countries. Among all the interventions, we find that shortening the duration between death and burial and improving the effectiveness of isolation are two effective interventions for controlling the outbreak of Ebola virus infection.

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