Stochastic analysis of a new epidemic model with incorporating media coverage

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The information intrusion (media coverage, health, education) as a kind of non-drug treatment is a very useful method for the prevention and treatment of epidemics. Currently, there have been many works that considered taking information intrusion into series epidemic models including SIR, SEIR, SIRS (see e.g. [1,2]). Furthermore, the isolation of the infective individuals can serve as an effective way to prevent and control the dissemination of infections such as Measles, Smallpox, Ebola, and Lassa fever (see e.g. [3]). In this work, we shall investigate the dynamic behavior of a new SIQS epidemic model which considers the influence of information intrusion and environmental noise. Denote the stochastic reproduction number R_0^s, we shall prove that the R_0^s is threshold of our stochastic model, which determines the extinction and persistence of disease. If $R_0^s \leq 1$, the disease will die out almost surely. On the other hand, if $R_0^s > 1$, the disease will persist in mean. In the case of persistence, we show that the information intrusion has a great impact on the spread of diseases and we establish a value, witch can help to reduce the peak of infective population.

References

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