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The human and economic loss epidemics leave in their wake has led to improved methods to model and study these occurrences. The increase in global travel, and the mass movement of people and things has not only improved nation's economies but also the spread of diseases. The use of big data in modeling epidemics can prove to be instrumental in studying the spread of this diseases and how to best combat it while saving time, money, and lives. Considering large volumes, variety, and velocity of data on human interaction can help make informed predictions about the spread of diseases. This paper proposes a modified SIR model, using big data, in order to predict future diagnoses of a disease, to assess the quality of the model, to evaluate the parameters of the model, and to suggest recommendations to improve the quality of the model and its parameters. The paper introduces real-life scenarios by introducing quantifiable intervention strategies and a budget constraint in order to develop a model which minimizes newly infected individuals. The use of predictive analysis in the form of big data in responding to epidemics can help better allocate resources to specific populations in order to reduce mortality. (Received September 20, 2016)