Mathematical modeling of Ebola Virus Disease outbreak in the Republic of Korea

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ABSTRACT

Ebola virus disease (EVD) has been frequently reported since 1976. There was large scale EVD epidemic in West Africa from 2014 to 2016 with approximately 20000 EVD cases. Countries with well-developed healthcare system, such as U.S. or U.K, deployed healthcare workers (HCW) to support EVD suffering countries. There were also imported EVD cases in U.S. and U.K. In our study, we developed mathematical model and set various scenarios to measure the risk of the EVD outbreak when an infected individual arrives before symptom onset. We simulated the model by using the Gillespie algorithm to observe the stochastic events. As results, we found that there will be one secondary HCW infected case as median and 10 total secondary cases as upper limit within 95% C.I., if there is no diagnosis delay and case missing. However, if there is 6 days diagnosis delay for the first hospitalized patient, there will be 6 secondary cases as median. In the case missing scenario, 14 secondary cases are expected to be occurred if two cases are missed. We also presented sensitivity analysis results to emphasize the risk of not-isolated EVD patients in the hospital.

REFERENCES