A Note on COVID-19 Diagnosis Number Prediction Model in China

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Abstract

Objective: In December 2019, pneumonia infected with the novel coronavirus burst in Wuhan, China. We aimed to use a mathematical model to predict number of diagnosed patients in future to ease anxiety on the emergent situation.

Methods: According to all diagnosis number from WHO website and combining with the transmission mode of infectious diseases, the mathematical model was fitted to predict future trend of outbreak. Our model was based on the epidemic situation in China, which could provide referential significance for disease prediction in other countries, and provide clues for prevention and intervention of relevant health authorities. In this retrospective, all diagnosis number from Jan 21 to Feb 10, 2020 reported from China was included and downloaded from WHO website. We develop a simple but accurate formula to predict the next day diagnosis number: ΔN_i where N_i is the total diagnosed patient till the i th day, and was estimated as 0.904 at Feb 10.

Results: Based on this model, it is predicted that the rate of disease infection will decrease exponentially. The total number of infected people is limited; thus, the disease will have limited impact. However, new diagnosis will last to end of March.

Conclusions: Through the establishment of our model, we can better predict the trend of the epidemic in China.

Full Text

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Figures

Figure 1

Estimation of Alpha Parameter.

Figure 2

Observed (Blue) and Predicted (Orange) number of daily new diagnosis.

Figure 3

$\ln(N_t/N_{t-1})$ against time.