AB030. Characterizing and forecasting common infectious diseases in China: a time series analysis

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Background: Common infectious diseases affect over 5 million people in China every year. In this study, we characterized the 10 most common infectious diseases, and performed a short-term forecast of the disease burden.

Methods: We analyzed the monthly cases of the 10 most common notifiable infectious diseases from the Chinese Center for Disease Control and Prevention, from January 2004 to April 2021. Autoregressive integrated moving average (ARIMA) model and Holt-Winters' multiplicative damped trend method was fitted and used to forecast the monthly cases in the following 5 years. Spectral analysis was used to characterize the spectral density.

Results: Hand-foot-and-mouth disease, influenza, hepatitis disease, tuberculosis, syphilis, epidemic parotitis, gonorrhea, dysentery, scarlet fever and acquired immune deficiency syndrome (AIDS) ranked the top 10 infectious diseases with the highest total number of cases in China in the past five years. The annual number of cases of the 10 top infectious diseases has increased by 160% from 2004 to 2019 with 8.8 million people infected but dropped by 48% in 2020 during the coronavirus disease (COVID-19) pandemic. Holt-Winters' multiplicative damped trend method and spectral analysis were used to model hepatitis A virus and influenza respectively, while the other 8 infectious diseases were modelled using ARIMA model. We predicted the annual cases of AIDS and syphilis will increase by 34% and 17% in the next 5 years, whereas dysentery would see a dramatic decrease of 55%. Other diseases were predicted to remain stable over the next 5 years. The spectral analysis suggested strong annual seasonality in influenza.

Conclusions: AIDS and syphilis are predicted to increase, whereas dysentery is predicted to decrease in the next 5 years in China. Other top infectious diseases would likely remain stable in the near future. Enhanced control measures may be needed to reduce the disease burden.

Keywords: Infectious disease; time series analysis; forecast

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Footnote

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Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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