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EFFECTS OF ENVIRONMENTAL FACTORS ON INFLUENZA SEASONALITY IN THE SUBTROPICS

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Background and Aims: Environmental factors have been identified as an important driving force for influenza seasonality. But the results from previous studies were neither consistent nor conclusive. Almost all the studies were conducted in the temperature regions, which can barely apply to the subtropical and tropical regions with a distinct seasonal pattern of influenza. In this study, we assessed the dose-response relationship between environmental factors and influenza seasonality in two subtropical cities: Guangzhou and Hong Kong.
Methods: Influenza seasonality was measured by proportions of specimens positive for influenza from the surveillance networks of these two cities (termed influenza virus activity). We adopted a generalized additive model with variables for temperature, relative humidity and influenza virus activity, which allowed quantification of both linear and nonlinear relationships between these variables. The interaction between temperature and humidity on their effects on influenza virus activity was measured by a nonparametric bivariate response model.
Results: We did not find significant interaction between temperature and relative humidity in both cities. Influenza virus activity increased as temperature decreased and this linear relationship was consistent between these two cities. A positive linear relationship between relative humidity and influenza activity was found in Hong Kong, whereas a curvelinear relationship was found in Guangzhou with a turning point at 50%.
Conclusions: This study confirmed that seasonal environmental factors played an important role in determining influenza seasonality and for the first time revealed the dose-response relationship between environmental factors and influenza virus activity. Our findings provide key evidence for a future forecast model on influenza seasonality.