

The short and long-term impact of non-pharmaceutical interventions on the prevalence of varicella in Xi'an during the COVID-19 pandemic

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Abstract

Varicella is a highly prevalent infectious disease with a similar transmission pathway to coronavirus disease 2019 (COVID-19). In the context of the COVID-19 pandemic, anti-COVID-19 non-pharmaceutical interventions (NPIs) have been implemented to prevent the spread of the infection. This study aims to analyze varicella's epidemiological characteristics and further investigate the effect of anti-COVID-19 NPIs on varicella in Xi'an, northwestern China. Based on the varicella surveillance data, search engine indices, meteorological factors from 2011 to 2021 in Xi'an, and different levels of emergency response to COVID-19 during the pandemic, we applied Bayesian Structural Time Series models and interrupted time series analysis to predict the counterfactual incidence of varicella and quantify the impact of varying NPIs intensities on varicella. From 2011 to 2021, varicella incidence increased, especially in 2019, with a high incidence of 111.69/100,000. However, there was a sharp decrease of 43.18% in 2020 compared with 2019, and the peak of varicella incidence in 2020 was lower than in previous years from the 21st to the 25th week. In 2021, the seasonality of varicella incidence gradually returned to a seasonal pattern in 2011-2019. The results suggest that anti-COVID-19 NPIs effectively reduce the incidence of varicella, and this reduction has spatiotemporal heterogeneity.

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