Medical Xpress

Decline in Chinese HFMD epidemic projected under new vaccination scheme

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Broad vaccination with newly available monovalent hand, foot, and mouth disease (HFMD) vaccines will decrease HFMD incidence in China, according to predictions from an epidemiologic model published this week in *PLOS Medicine*. The study, conducted by Saki Takahashi and Bryan T. Grenfell at Princeton University, New Jersey, USA, Hongjie Yu at the Chinese Center for Disease Control and Prevention, Beijing, China, and colleagues, further suggests that serotype replacement (spread of viruses that differ from those in a vaccine, replacing viruses to which the vaccine confers immunity) will not significantly deplete the benefits of a HFMD vaccination campaign.

China reported 9 million cases of HFMD between 2008 and 2013. In clinical trials, inactivated monovalent vaccines against enterovirus serotype EV-A71-associated HFMD were highly efficacious against infection with EV-A71 but did not cross-protect against serotype CV-A16-associated HFMD. To estimate the effects of broad vaccination, Takahashi and colleagues used HFMD incidence data collected in 31 Chinese provinces between 2009 and 2013 to develop a two-serotype time series susceptible-infected-recovered epidemic model. According to model outcomes, cross-protection following infection with EV-A71 or CV-A16 lasts 6.77 weeks on average (95% confidence interval: 2.50, 10.03), resulting in cross-serotype protection. Based on this and the estimated basic reproduction number (which represents the average number of people who will become infected by each individual infected person) for both serotypes (26.63 for EV-A71 (interquartile range [IQR]: 23.14, 30.40) and 27.13 for CV-A16 (IQR: 23.15, 31.34)),

Takahashi and colleagues predicted that EV-A71 vaccination will decrease EV-A71-associated HFMD incidence and leave CV-A16 incidence relatively unchanged, and that coverage above 96% will achieve population-level immunity.

The accuracy of these findings depends on the assumptions included in the model and the quality of the data. However, the modeling is conservative and tested within the study for its ability to replicate observed epidemic cycles. The authors state, "a mass EV-A71 vaccination program of infants and young children should provide significant benefits in terms of a reduction in overall HFMD burden."

More information: Saki Takahashi et al. Hand, Foot, and Mouth Disease in China: Modeling Epidemic Dynamics of Enterovirus Serotypes and Implications for Vaccination, *PLOS Medicine* (2016). DOI: 10.1371/journal.pmed.1001958

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