Modeling the Present and Future Incidence of Pediatric Hand, Foot, and Mouth Disease Associated with Ambient Temperature in Mainland China

Qi Zhao, Shanshan Li, Wei Cao, De-Li Liu, Quan Qian, Hongyan Ren, Fan Ding, Gail Williams, Rachel Huxley, Wenyi Zhang, and Yuming Guo

Table of Contents

Table S1. 28 general climate models of the 5th phase of Coupled Model Intercomparison Project.

Table S2. Reference temperatures used for each prefecture/CJP for estimating the relative risk of HFMD in association with daily mean temperature.

Table S3. Results of Cochran Q test and values of I² statistic for each estimate pooled at province level.

Table S4. Projected percentage change (and 95% eCIs) in HFMD incidence among children aged 0–14 years due to climate change (RCP 4.5 and 8.5 scenarios) by site and decade relative to baseline estimates for 2009–2014, holding population sizes and temperature-HFMD associations constant over time.

Table S5. Projected percentage change (and 95% eCIs) in HFMD incidence among children aged 0–14 years due to climate change (RCP 4.5 and 8.5 scenarios) by region and decade relative to baseline estimates for 2009–2014, accounting for projected changes in population sizes.

Table S6. Projected percentage change (and 95% eCIs) in HFMD incidence among children aged 0–14 years due to climate change (RCP 4.5 and 8.5 scenarios) by site and decade relative to baseline estimates for 2009–2014, accounting for projected changes in population sizes.

Table S7. Projected percentage change (and 95% eCIs) in HFMD incidence (national level) among children aged 0–14 years due to climate change (RCP 4.5 and 8.5 scenarios), relative to baseline estimates for 2009–2014, estimated using models including natural cubic splines (seven to nine degrees of freedom per year) to control for seasonality and long-term trend.

Figure S1. Distribution of the lowest daily mean temperature at which HFMD cases were diagnosed across 362 sites in China during 2009–2014. Abbreviation: HFMD, hand, foot, and mouth disease.
Figure S2. Daily HFMD counts and mean temperature in representative cities in nine Chinese regions during 2009–2014. Data on daily HFMD and weather for each city were extracted from the China Information System for Disease Control and Prevention (http://www.cdpc.chinacdc.cn) and China Meteorological Data Sharing Service System (http://data.cma.gov.cn), respectively. Abbreviation: HFMD, hand, foot, and mouth disease.

Figure S3. Pooled associations between daily mean temperature and HFMD in each province or municipality in the Northeast, Inner Mongolia, and North over a 0–14 day cumulative lag during 2009–2014. Sold lines represent province- or municipality-specific associations; shaded areas indicate 95% confidence interval bands. Grey-dashed lines indicate associations estimated for individual prefectures or CJP's. Natural cubic splines (with three degrees of freedom) were used to model temperature and lag days, respectively. I² statistics for each pooled estimate are provided in Table S3. Patterns of associations are irregular for some prefecture- or CJP-specific associations because of small numbers of HFMD cases. Abbreviations: HFMD, hand, foot, and mouth disease; CJP, county under the jurisdiction of province; RR, relative risk.

Figure S4. Pooled associations between daily mean temperature and HFMD in each province or municipality in the East over a 0–14 day cumulative lag during 2009–2014. Sold lines represent province- or municipality-specific associations; shaded areas indicate 95% confidence interval bands. Grey-dashed lines indicate associations estimated for individual prefectures or CJP's. Natural cubic splines (with three degrees of freedom) were used to model temperature and lag days, respectively. I² statistics for each pooled estimate are provided in Table S3. Patterns of associations are irregular for some prefecture- or CJP-specific associations because of small numbers of HFMD cases. Abbreviations: HFMD, hand, foot, and mouth disease; CJP, county under the jurisdiction of province; RR, relative risk.

Figure S5. Pooled associations between daily mean temperature and HFMD in each province or municipality in the Northwest and Central regions over a 0–14 day cumulative lag during 2009–2014. Sold lines represent province- or municipality-specific associations; shaded areas indicate 95% confidence interval bands. Grey-dashed lines indicate associations estimated for individual prefectures or CJP's. Natural cubic splines (with three degrees of freedom) were used to model temperature and lag days, respectively. I² statistics for each pooled estimate are provided in Table S3. Patterns of associations are irregular for some prefecture- or CJP-specific associations because of small numbers of HFMD cases. Abbreviations: HFMD, hand, foot, and mouth disease; CJP, county under the jurisdiction of province; RR, relative risk.

Figure S6. Pooled associations between daily mean temperature and HFMD in each province or municipality in the Southwest, South and Qingzang regions over a 0–14 day cumulative lag during 2009–2014. Sold lines represent province- or municipality-specific associations; shaded areas indicate 95% confidence interval bands. Grey-dashed lines indicate associations estimated for individual prefectures or CJP's. Natural cubic splines (with three degrees of freedom) were used to model temperature and lag days, respectively. I² statistics for each pooled estimate are provided in Table S3. Patterns of associations are irregular for some prefecture- or CJP-specific associations because of small numbers of HFMD cases. Abbreviations: HFMD, hand, foot, and mouth disease; CJP, county under the jurisdiction of province; RR, relative risk.

Figure S7. Pooled associations between daily mean temperature and HFMD for all locations (national level) during 2009–2014 for models with the maximum lag set at 14 days (the primary model) and 15-19 days. The grey-shaded areas indicate the 95% confidence interval bands, which are negligible due to the narrow values. Natural cubic splines (with three degrees of freedom) were used to model temperature and lag days, respectively. Abbreviations: HFMD, hand, foot, and mouth disease; RR, relative risk.
**Figure S8.** Pooled associations between daily mean temperature and HFMD for all locations (national level) during 2009–2014 based on the primary model, and with additional adjustment for daily wind velocity and daily sunshine hours, respectively. The grey-shaded areas indicate the 95% confidence interval bands, which are negligible due to the narrow values. Natural cubic splines (with three degrees of freedom) were used to model temperature and lag days, respectively. Abbreviations: HFMD, hand, foot, and mouth disease; RR, relative risk.

**Figure S9.** Pooled associations between daily mean temperature and HFMD for all locations (national level) during 2009–2014 based on the primary model (with indicator terms for year and month) and alternative models using natural cubic splines (with seven to nine degrees of freedom per year) to control for seasonality and long-term trend. The grey-shaded areas indicate the 95% confidence interval bands, which are negligible due to the narrow values. Natural cubic splines (with three degrees of freedom) were used to model temperature and lag days, respectively. Abbreviations: HFMD, hand, foot, and mouth disease; RR, relative risk.