



Letter to the Editor

The increasing prevalence of Japanese spotted fever in China: A dominant rickettsial threat

Dear editor,

The emergence and spread of tick-borne pathogens have become an increasingly significant public health concern globally. In China, Japanese Spotted Fever (JSF), caused by *Rickettsia japonica*, significantly increased in both the geographic spread and the number of human infections.

Although the first serological evidence of *R. japonica* in China was identified in fever patients from Hainan Province in 1989, the pathogen's nucleotide sequence was first detected in ticks from Zhejiang Province in 2010.¹ Since then, the pathogen's range has expanded significantly, with human cases reported from 14 provinces across China. Ticks in 19 provinces were confirmed to carry *R. japonica*, particularly in regions with humid climates. This distribution aligns with the climatic boundary between China's arid and humid climates, as shown in Fig. 1. The vast areas typically have humid climates and a variety of terrains, including plains, mountains, and hills, which provide suitable conditions for ticks' survival and the pathogen's spread.

Public health awareness of JSF was first triggered in 2013 following the report of human infections in Anhui Province.² Subsequently, cases began to be reported more frequently in Zhejiang and Anhui. In 2021 when the first fatal JSF case was reported in Zigui County, Hubei Province, where the patient died of multi-organ failure and disseminated intravascular coagulation (DIC), raising significant concern about JSF.³ We established the first large-scale initiative to trace spotted fever spread at 14 surveillance points across 7 provinces in response to the growing threat to investigate febrile illnesses of unknown origin in individuals with outdoor exposure. We identified 42 confirmed cases of JSF, including the Qinling Mountains in Shaanxi Province as a potential new endemic area. At the same time, no cases have been detected in regions such as Chongqing, Ningxia, and Xinjiang. The incidence of JSF has significantly increased since 2021, as observed through public reports and our surveillance. Nearly 104 cases spread from Langfang City,

Hebei Province, in the north to Mengla County in the south, located at the southernmost point of China's land boundary (Supplementary Table 1).

JSF cases have been documented in 14 provinces across China, including Hainan, Shandong, Taiwan, and Fujian, with serological evidence supporting the findings. The mountainous regions of Central and Eastern China, such as Hubei and Zhejiang provinces, have reported the highest number of cases. In contrast, plains areas report fewer cases, which may be attributed to differences in local environmental conditions and human activity. In rural mountainous regions, human-tick interactions are more frequent because of the higher exposure risk to ticks, the primary vectors of *R. japonica*, during field activities in dense vegetation environments. Supplementary Figure 1 illustrates typical living environments and tea-picking work in the areas, highlighting the ecological factors contributing to the disease's transmission. Interestingly, the expansion of the disease showed gradual westward extension.

Between 2014 and 2024, JSF has exhibited a significant increase in the number of reported cases. In particular, between 2021 and 2024, nearly 50 cases have been documented, marking a significant surge in incidence. In contrast, other rickettsial diseases, other rickettsial infections, such as *R. sibirica* (10 cases), *R. heilongjiangensis* (8 cases), and *R. raoultii* (36 cases, mostly in 2018), *Candidatus R. tarasevichiae* (71 cases found in 2012 to 2014) show significantly lower incidences (Supplementary Table 2), highlighting JSF has emerged as the dominant rickettsial disease in China.

JSF cases exhibit a distinct seasonal pattern, peaking between April and November, with the highest incidence observed in autumn. Individuals over 55 years old account for more than 70% of reported cases, indicating that older individuals living in rural areas are particularly at risk. The detailed epidemiological characteristics were summarized in the Supplementary Text.

In conclusion, *R. japonica* has become the dominant rickettsial pathogen in China. the rising incidence and expanding geographic distribution pose a significant public health threat. We propose that JSF be designated nationally notifiable infectious disease to facilitate systematic surveillance, case reporting, and public education which are essential to control the emerging tick-borne threat.

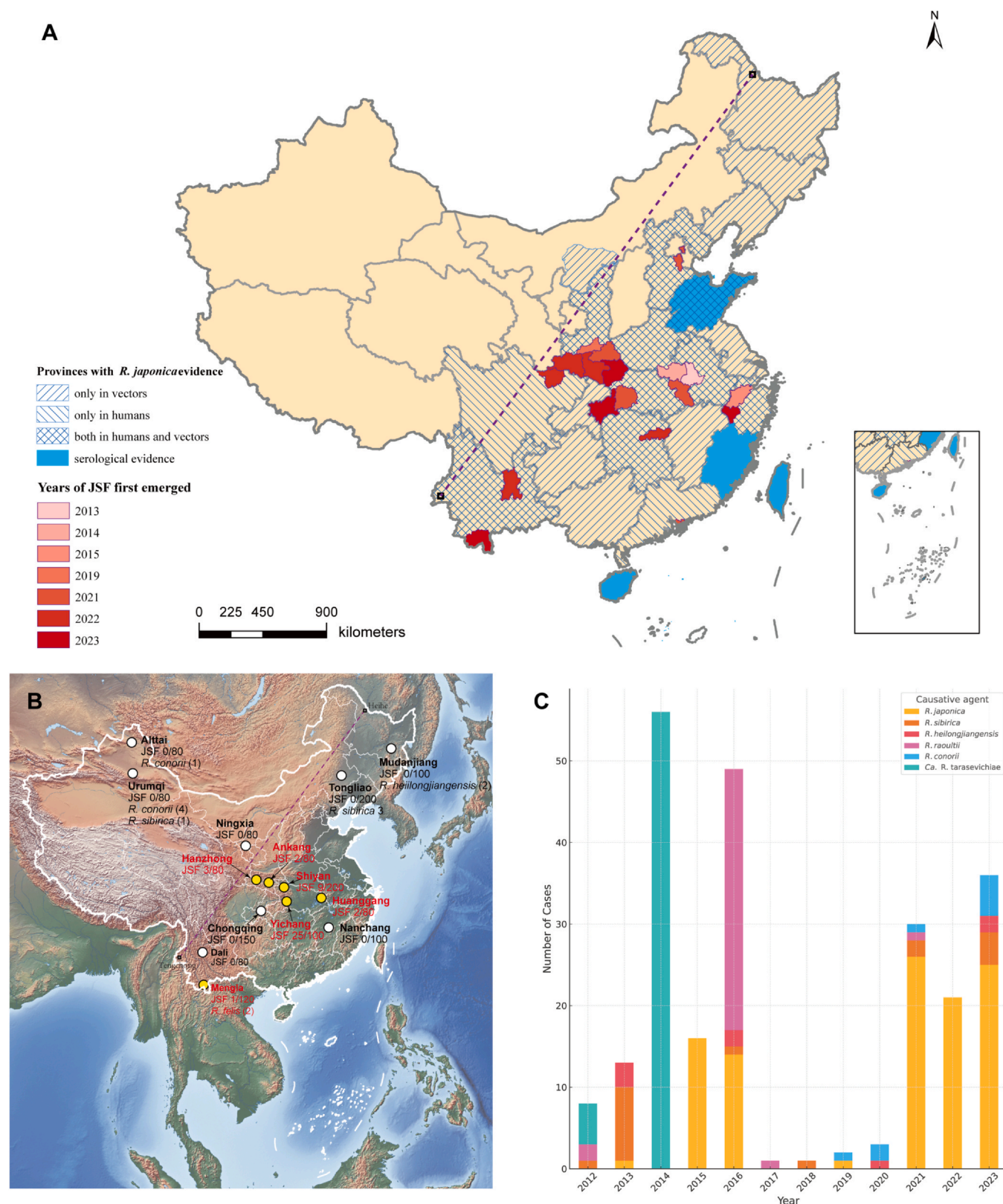


Fig. 1. JSF has become the dominant rickettsial disease in China. A. distribution of Japanese spotted fever and its pathogen, *Rickettsia japonica*, in China; B. Surveillance of Japanese Spotted Fever (JSF) across multiple provinces in China; C. Causative agents of major spotted fever cases in China. The purple line represents the Heihe-Tengchong Line, which demarcates the boundary between China's dry and humid climatic regions. Due to the significant climatic differences between the eastern and western parts of Inner Mongolia, only the prefecture-level cities with positive vector documents are shown.

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Author contributions

T Q designed and supervised the study. Z-Q T and X Z prepared and analyzed the data. Z-Q T, N Z, L-P D, and X-X Z conducted pathogen detection on specimens from monitoring sites. Z-Q T wrote the drafts of the manuscript. T Q commented on and revised the drafts of the manuscript. All authors read and approved the final report. All authors had full access to all the data in the study and had final responsibility for the decision to submit for publication.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.jinf.2024.106387](https://doi.org/10.1016/j.jinf.2024.106387).

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Zhongqiu Teng ¹, Xue Zhang ¹, Na Zhao, Lupeng Dai, Xianxian Zhang, Ling Han, Tian Qin ^{*}
National Key Laboratory of Intelligent Tracking and Forecasting for Infectious Diseases, National Institute for Communicable Disease Control and Prevention, Chinese Center for Disease Control and Prevention, Beijing, China

^{*}Corresponding author.

E-mail addresses: tengzhongqiu@icdc.cn (Z. Teng), 1486569393@qq.com (X. Zhang), zhaona@icdc.cn (N. Zhao), dailupeng1995@163.com (L. Dai), 3060202602@qq.com (X. Zhang), hanling@icdc.cn (L. Han), qintian@icdc.cn (T. Qin),

¹ Contributed equally.