**Too Hot, Too Wet: Bayesian Spatial Modelling of Climate-Driven Salmonella Risk in New South Wales, Australia, 1991–2022**

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Abstract

Background: Salmonella infections cause a significant number of hospitalisations due to bacterial gastrointestinal illnesses in Australia and substantially contribute to the global infectious disease burden. Evidence indicates that salmonella exhibits seasonal variation worldwide, but there is limited research on how rainfall and temperature influence these patterns, particularly in Australia. This study examined the trend of Salmonella cases and their relationship with climatic factors, including temperature, rainfall, and flood events, at the local health district (LHD) level across New South Wales (NSW), Australia.

Methods: Monthly Salmonella case numbers and climate data, including such as mean temperature, mean minimum temperature, mean maximum temperature, and rainfall, were matched to their respective LHDs in NSW. Results: All climate variables showed positive associations with Salmonella (all with p < 0.001), with mean monthly minimum temperature being most strongly linked (r = 0.404). The correlation between mean monthly temperature, total daily rainfall, and Salmonella was stronger in metropolitan LHDs than in rural or regional LHDs in NSW.

Conclusion: Rising temperatures, increased rainfall, and flood events are likely to lead to higher Salmonella rates in NSW. These findings carry important public health implications beyond NSW, underscoring the need for broader national and global preparedness in the face of climate change.

**Keywords:** Salmonella, Foodborne disease, Climate variability, Environmental drivers, Climate change and health, Spatial Bayesian

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Sources of funding: None