

Projection of Scarlet Fever Infection in Hong Kong Under Climate Change

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Abstract

The reemergence of scarlet fever in Hong Kong over the past decades was believed to be partially attributed to the rising temperature, and projecting scarlet fever infection risk under climate change could help to prevent and control disease spread in advance. In this study, we evaluated scarlet fever incidence in Hong Kong in the future under different climate change scenarios. In conclusion, we found that the scarlet fever cases in Hong Kong would increase in the future, especially under high greenhouse gas emission scenario. Enhanced health surveillance would help to reduce a potential increase in scarlet fever spread in advance.

Introduction

- Some laboratory studies and epidemiological studies demonstrated a positive relationship among meteorological factors and scarlet fever transmission while others did not.
- Regardless of the inconsistent results, few of previous research has assessed the change of scarlet fever incidence in the future in Hong Kong.

Methods

- Monthly scarlet fever cases and meteorological data from 2000 to 2022 in Hong Kong were collected.
- Projected monthly temperature and rainfall in 2030s, 2050s, 2070s, and 2090s under low, middle, and high greenhouse gas emission scenarios (SSP126, SSP245, and SSP585).
- Statistical analysis: quasi-Poisson generalized additive models (GAMs).



Results

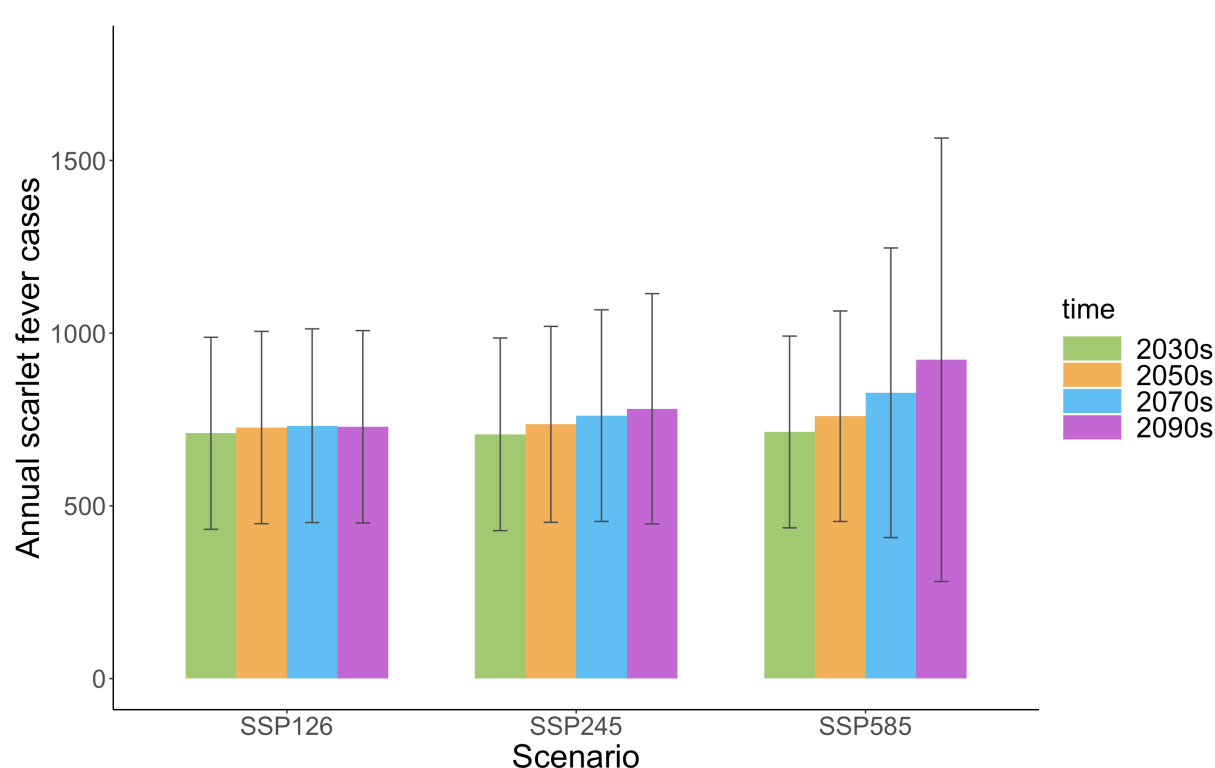


Fig 1 Projected annual scarlet fever cases in Hong Kong

- Temperature and rainfall were positively associated with the incidence rate of scarlet fever in Hong Kong.
- The annual scarlet fever incidence in Hong Kong was projected to increase from 701 (95% confidence interval [CI]: 432-988) cases in 2030s to 732 (452-1013) cases in 2070s under SSP126, and slightly decline to 728 (450-1007) cases per year in 2090s.
- The scarlet fever incidence would monopoly increase from 707 (428-986) cases in 2030s to 781 (448-1114) cases in 2090s under SSP245 and from 714 (436-992) cases to 923 (281-1565) cases under SSP585.

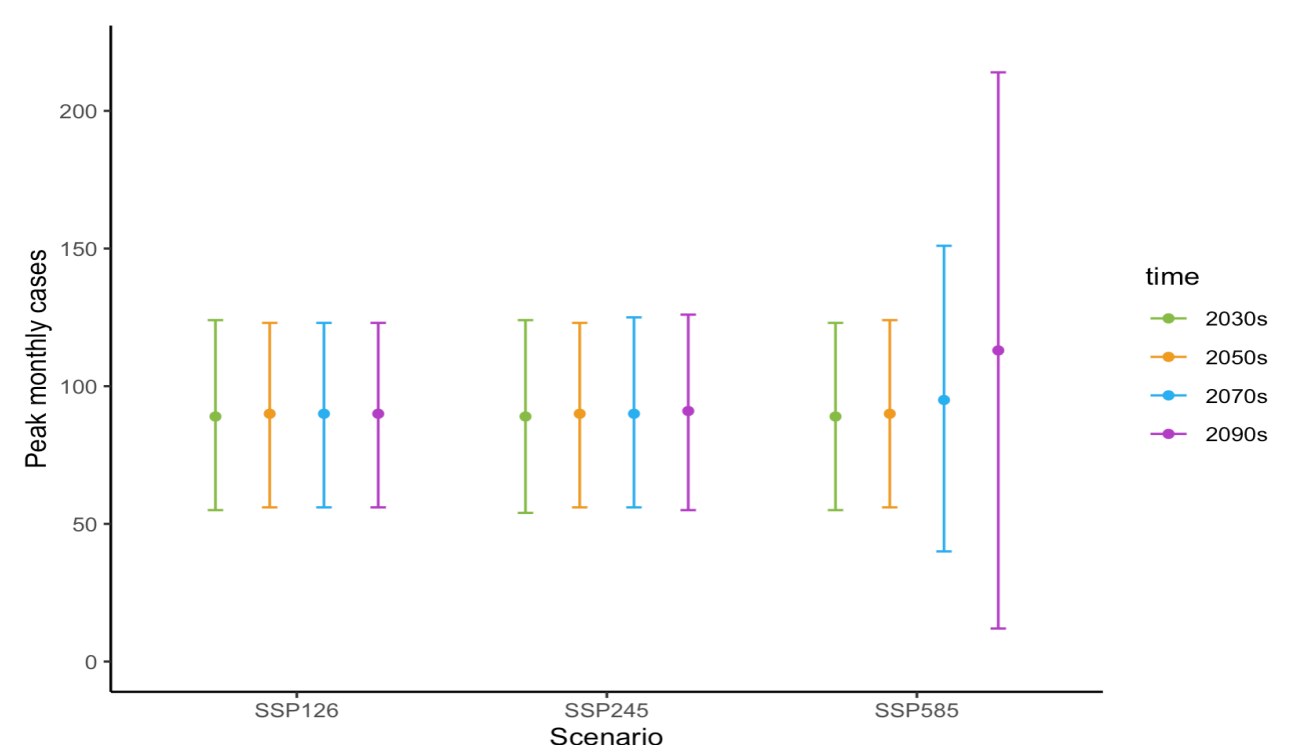


Fig 2 Projected peak monthly scarlet fever cases in a year

- The projected peak incidence and the peaking time in a year would also change from 89 (55-124) cases per month in Dec in 2030s under SSP126 to 113 (12-214) cases per month in Jun in 2090s under SSP585.

Conclusion

- The scarlet fever cases in Hong Kong would increase in the future, especially under high greenhouse gas emission scenario.
- Strengthening disease prevention and control interventions is needed to reduce scarlet fever infection risk in the future.

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