

# Geographical high-risk cluster of dental caries among 3-year-old children in Japan

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## Abstract

### Background

Dental caries is a serious public health concern for children which can affect them throughout the course of their life. It has been described that there is a regional difference of dental caries prevalence among Japanese children. However, information is limited and old. The objectives of this study were to update the latest trend data and detect high risk areas of dental caries among children at the municipality level in Japan.

### Methods

In total, the data of dental caries prevalence of 94.1% of Japanese children was collected from Health Checkup for Infants. SES index and Smoking rate at the prefecture level were recorded as covariate factors. SES index created by Yoneoka et al. (2017) was used. Smoking rate at the prefecture level was obtained from the National Health and Nutrition Survey. Hierarchical Bayesian Poisson model with spatial random effect was used to estimate the risk of dental carries. In addition, spatial (circular) scan statistic method and log likelihood-based test were used to identify the geographical clustered regions of dental caries among Japanese children.

### Results

Dental caries prevalence among children was higher in rural areas of Japan after adjusting for SES index and Smoking rate at prefecture level. The first most likely cluster was in the Okinawa region, with relative risk (RR) = 1.787. The second likely cluster was in the central to southern areas of the Kyushu region with RR = 1.432. The third was in the rural part of the Kanagawa, Shizuoka and Yamanashi prefectures with RR = 2.003. The fourth was in the eastern part of the Tohoku region with RR = 1.576. The fifth was in the northeastern part of the Shikoku region with RR = 1.306. The sixth was in northwestern part of the Kyushu region with RR = 1.365.

### Conclusion

We revealed that regional differences in dental caries prevalence among children exists in the Tohoku, Kyushu and Okinawa regions. Municipalities in these high-risk areas need to take action to solve this inequality and improve oral health for children.