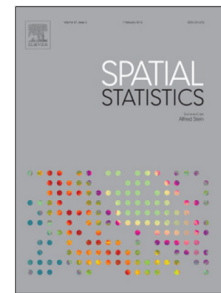


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Exploring risk factors in breast cancer screening program data using structured geoaddivitive models with high order interaction

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Abstract

When analyzing data from cancer screening programs, flexible regression specifications are required to account for the highly complex structure in such data. We analyzed data from a breast cancer screening program conducted in central Portugal and considered an extension of structured additive regression models where, in addition to the possibility to include nonlinear and spatial effects, we can include a trivariate interaction between attendance rate, detection rate and mortality rate in the screening program. While spatial effects capture unobserved heterogeneity at the municipality level, the trivariate interaction proves important for the understanding of the complex interaction effects resulting from the diversity in municipality coverage and attendance rates. The trivariate interaction is implemented based on a Markov random field representation which enables efficient Bayesian inference and, when modeling breast cancer incidence rates, showed a significant improvement in terms of model fit when compared to a simpler geoaddivitive regression model.

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