

# Individual and contextual determinants of tobacco use and cigarette smoking in Kenya: a spatial analysis

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## Abstract

**Background:** Tobacco use occurs throughout the world and is accompanied by a host of diseases that threaten the health and shorten the life of the user. We examined the spatial distribution and clustering in self-reported tobacco use and cigarette smoking in Kenya.

**Methodology/Principal Findings:** The prevalence of tobacco use and cigarette smoking was investigated using the 2008 Kenya Demographic and Health Survey (KDHS) data. The survey used a multistage stratified random sampling plan to select women aged 15-49 years and men aged 15-59 years, with information on tobacco use obtained by face-to-face interviews.

A spatial scan statistical analysis was carried out using SaTScan™ to test for statistically significant clustering of tobacco use and cigarette smoking in the country. The risk of smoking was also modelled and mapped using a hierarchical zero-inflated binomial spatial model under the Integrated Nested Laplace approximation approach using the INLA library in R.

**Results:** The prevalence of tobacco use and cigarette smoking were 7.5% and 5.8%, respectively. Cigarette smoking was considerably higher among men (18.8%) than women (<1%). On the basis of the Deviance Information Criterion (DIC), a hierarchical spatial model with both spatially structured and unstructured random effects were found to best fit the data. Age, region, rural–urban classification, education, marital status, religion, socioeconomic status and media exposure were found to be significantly associated with smoking. Ethnic diversity, community socioeconomic status and media exposure were the contextual variables significantly associated with smoking. The Spatial scan statistics confirmed high risk cigarette smoking clusters in the Central and South-Eastern regions of Kenya ( $p < 0.001$ ).

**Conclusions:** To reduce the prevalence of tobacco use and smoking in Kenya, mass media campaigns, conducted in the context of comprehensive tobacco control programmes, must focus on regions where the epidemic is highly concentrated. The reach, intensity, duration and type of messages are important aspects of the campaigns but need to also address all forms of tobacco use.