

Late detection of breast and colorectal cancer in Minnesota counties: an application of spatial smoothing and clustering.

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Cancers detected at a later disease stage are associated with significantly higher mortality risk. Lack of uniformity in county-level cancer detection rates is thus of substantial interest to state health departments and other public health professionals. In this paper, we perform several spatial analyses of breast and colorectal cancer detection data for Minnesota counties for 1995-1997. We look for outliers and clusters in the late detection rates using a number of techniques: (i) applying various mapping schemes, (ii) smoothing the data using Bayesian methods implemented via Markov chain Monte Carlo, and (iii) applying maximum likelihood techniques to test for the presence of clusters and to identify the most likely clusters. Our results suggest a fairly uniform spatial pattern in both sets of detection rates. Spatially smoothed rates did not reveal clusters of counties with significantly higher late detection risk, nor were county-level covariates (such as income, education, and race) particularly helpful in explaining the rates. However, our spatial clustering approach (using the scan statistic) did produce statistically significant clusters of counties which may indicate differences of practical importance for public health. Copyright 2003 John Wiley & Sons, Ltd.

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