Title: Spatial Clusters of Breast Cancer Mortality and Incidence in the Contiguous USA: 2000–2014

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Abstract

Clusters of breast cancer with varied incidence or mortality are known to exist. No national scale of analysis of geographical variation in breast cancer incidence has been published before for the contiguous USA. This was a spatial cluster analysis of incidence and mortality data on breast cancer in the contiguous USA at the county resolution. Data for the years 2000–2014 were downloaded and analyzed with the software SaTScan with the goal to identify significant spatial clusters of breast cancer. Regression analysis was used to then adjust breast cancer incidence and mortality for several key risk factors such as age, smoking, particulate matter air pollution, physical inactivity, urban living, education level, and race. RESULTS: Spatial clusters of counties for higher than expected breast cancer incidence and also for breast cancer mortality were identified. All identified clusters have $p<0.05$. The mortality clusters show the mean breast cancer rates inside the cluster, while the incidence clusters show the relative risk inside each cluster. This is the first study of the contiguous USA for breast cancer mortality and incidence together. The clustering for mortality is quite different from the clustering for incidence. Using the software JOINPOINT, it is shown that the annual US downward trend for breast cancer mortality slowed down in recent years. There exist several significant clusters in the contiguous USA, both for breast cancer incidence and for breast cancer mortality. Some of the clusters persisted even after adjusting for several key risk factors. These geographic areas warrant further investigation to potentially identify additional local concerns or needs to further address female breast cancer in those specific sites.