



Analysis of the spatial link between vaccination rates for measles and meningitis C vaccinations

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Abstract

Background:

This analysis examines the extent to which there is a link between how widespread vaccinations against measles and vaccinations against meningitis C are at a district level. The current data indicate that there are regions in which the vaccination rates for different vaccinations are particularly high or low, which could indicate region-specific vaccination behaviour. This could be caused, among other things, by regional differences in attitudes to vaccination both among parents and among doctors.

Method:

The rates for measles and meningitis C vaccinations at a district level published in the “Versorgungsatlas” (Health Care Atlas) were checked for spatial links. In order to do this, firstly the Pearson correlation coefficient was calculated; secondly LISA models (Local Indicators of Spatial Association) were calculated for the vaccination rates and then compared with one another; thirdly a cluster analysis was carried out with both vaccination rates in order to identify clusters with high, medium and low vaccination rates; and fourthly a variance analysis was carried out for the clusters identified in order to check the extent to which there are significant differences between the clusters in terms of certain socioeconomic indicators.

Results and conclusions:

At a district level (N = 399), a Pearson correlation coefficient of 0.81 was calculated for the link between vaccination rates for measles and meningitis C. A moderate positive spatial autocorrelation was able to be identified for both vaccination rates. The neighbour effect was found with regard to vaccination rates in Southern Germany. This was demonstrated by means of the analysis of the Local Moran's I. No significant spatial pattern could be identified for the clusters with high or medium vaccination rates, but a cluster in a linked region in southern Bavaria and Baden-Württemberg was identified for low vaccination rates. The variance analysis showed significant differences between the clusters in terms of socioeconomic indicators. This implies that the lowest socioeconomic levels were to be found in the clusters with the lowest vaccination rates.

The analysis makes clear that consistent vaccination behaviour can occur which has an effect on the take-up or failure to take up several vaccinations. Whereas no neighbour effects were able to be identified in the vaccination rates between most districts, there were also clearly identifiable cross-regional areas with identical vaccination behaviours.

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Keywords

Autocorrelation, cluster analysis, correlation, measles, measles vaccination, meningitis C vaccination, Moran's I global, Moran's I local, vaccination

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