

Title: USE OF DIRECTIONAL DERIVATIVE METHODS IN DETECTING  
CHANGES IN DISEASE MAPS.

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**Abstract:**

Methods for the production of individual (address) level disease maps are often retrospective; they estimate a map of the average relative risk of disease over a study period. However, recently epidemiology has started to look at weekly or monthly reports of disease and assessing them for any change in the distribution of relative risk. For example, in the United States of America the Centre for Disease Control and Prevention now routinely collect information on over 50 notifiable diseases every week. In this paper we present a method for the detection of a sudden change in the geographical distribution of disease in a prospective study. The method is based on an estimate of the directional derivative of the conditional probability of a case, given either a case or control has occurred. It is based on standard kernel approaches to nonparametric regression and it readily applied in any standard statistical software package. The results of a simulation study will be presented.