The Practicality of Spatio-temporal Surveillance in a Scottish Health Board

LE Wilson, D Roseburgh, J Miller

NHS Lanarkshire, Scotland

Background: There is increasing recognition of the importance of spatial and spatio-temporal analysis within public health medicine. Often such analysis is performed at a national centre, or in an academic setting. Our health board, NHS Lanarkshire, serves a population of around 560,000. Its catchment is both urban and rural, with areas of marked deprivation. We decided to introduce spatial and spatio-temporal analysis by focusing on communicable disease notifications, as temporal analysis of such notifications was already routine.

Objective: To explore the practicality of using a spatio-temporal scan statistic within a health board, rather than academic or national setting.

Methods: Spatio-temporal analysis was performed using SaTScan software (1). This programme aims to detect a local excess of events, and test if this has occurred by chance. The software was selected for its versatility and practicality.

Results:
We piloted the software on our communicable disease dataset, which includes notifications for salmonella, campylobacter, cryptosporidium and tuberculosis. Using historical data, SaTScan detected clusters, which could be matched to historical outbreak control reports.

We then set-up standard operating procedures to allow routine analysis to be performed. These included details on data set formatting, data importation and mapping of output. Information officers were then able to prepare the data, and run the programme. Interpretation was undertaken in conjunction with the public health medical staff. Three monthly reports are produced for discussion at communicable disease control meetings.

Talks were given on spatio-temporal analysis, and as familiarity was gained with the concept it quickly became recognized that it could potentially add value to other areas of public health activity. For example, local practitioners raised concerns that there was an area where patients with breast cancer were presenting at an advanced stage of disease. To supplement the routine public health investigation, spatial analysis was requested. Early and late presentations of cases of breast cancer were defined. Analysis of cancer registration data, and local audit data was undertaken using SaTScan. Both data sets identified no significant spatial focus of late presentation. Results of the analysis were presented to local breast surgeons, and the local practitioners who had raised the concerns.

Conclusions: A major aim of this study was to assess the practicality of using these techniques in a 'clinical' rather than 'research' setting. The software proved to be user friendly, and readily adaptable to a variety of uses. However, consideration of the type of spatial data requiring analysis, and careful interpretation of the output is required. This is the first spatial analysis that has been routinely incorporated into our NHS board communicable disease report. The additional benefit of the software to the standard process control charts will require evaluation. The unexpected benefit has been the requests for practical application to other areas of public health medicine. We hope that when spatio-temporal syndromic surveillance data is available from Scottish national datasets, our health board will be well placed to interpret and utilize the information.

References:
1. Kulldorff M. A spatial scan statistic. Communications in Statistics: Theory and Methods, 26:1481-1496, 1997