METRICS FOR EVALUATING EARLY DETECTION METHODS

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As timely spatial data relevant to public health become increasingly available, new statistical methods to identify events of public health interest have also proliferated. However, there is little information available regarding the relative strengths and weaknesses of such methods. In this presentation, we outline some approaches to evaluation: completely observed data, completely simulated data, and adding simulated events into real. The latter two cases are of particular interest, and resist evaluation via usual methods due to various complications, including both the limited spatial range of most events and the need for timely identification of events while maintaining good sensitivity and specificity. To address these issues, we propose and demonstrate three alternative metrics which can be used in comparing event detection methods. The methods, while rather different in formation, find similar and intuitively appealing results when applied to a simulation of a bioterrorist attack using anthrax spores. Finally, we argue that the methods can be profitably applied to all screening problems with an explicit or implicit time component in contrast to metrics which focus only on test characteristics. For example, cancer screening, where usual metrics ignore whether a screening test can identify cancers in an earlier stage.