Evaluation of Veterinary Diagnostic Laboratories as a Possible Data Source for Prospective Outbreak Surveillance

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OBJECTIVE

To study the value of data from veterinary diagnostic laboratories as an initial step in developing an early outbreak surveillance system for animals.

BACKGROUND

Current veterinary surveillance systems may be ineffective for timely detection of outbreaks involving non-targeted disease [1,2,3]. Earlier detection could enable quicker intervention that might prevent the spread of disease and limit lost revenue [3,4]. Data sources, similar to those used for early outbreak surveillance in humans, may provide for earlier outbreak detection in animals [5]. Veterinary diagnostic laboratories (VDLs) are a source of data that might be valuable to such efforts.

METHODS

We completed a retrospective study of microbiology records from two VDLs serving a seven county region in Central Ohio from January 2001 through December 2003. We used descriptive statistics to characterize the timeliness and representativeness of data. Serfling's regression method was used to determine baseline indices of isolates. Detecting clusters of increased isolate counts from the aggregate of orders was explored using CuSum, EWMA, and Serfling statistical methods.

RESULTS

Potential improvement in timeliness ranged from a median of 3 to 5 days compared to traditional reporting methods. Companion animals and equines were found to be the better represented species in both datasets. The volume of orders was stable over the study period. Determination of baselines for laboratory submissions and pathogen isolates was possible using regression methods to account for seasonal influences. Many of the cluster periods were detectable through the analysis of total counts of microbiology orders although there was marked difference in performance between the two datasets.

CONCLUSIONS

Baselines, important for prospective outbreak detection, can be determined from historic VDL records. Periods where counts of certain isolates are greater than expected can be detected, with varied accuracy, from the aggregate set of microbiology orders. Veterinary diagnostic laboratories may be an important data source for the early detection of infectious disease outbreaks. We demonstrate the value of these data beyond their anecdotal "face value" using quantitative measures and methods.

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