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Detection of a Swine Erysipelas Outbreak Using Enhanced Passive Surveillance

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Objective

To describe detection and response for an erysipelas outbreak in market swine in the United States (U.S.) using Food Safety and Inspection Service (FSIS) slaughter condemnation data, and coordination with the swine industry in an Enhanced Passive Surveillance (EPS) pilot project.

Introduction

EPS is a comprehensive effort to complement other types of surveillance and provide early detection and situational awareness of significant endemic, zoonotic, and emerging diseases of livestock. The concept for EPS involves gathering syndromic and observational data from multiple animal health surveillance sources, including private practitioners, livestock markets, livestock harvest facilities, and veterinary diagnostic laboratories. A signal indicating a potential animal health event in one data stream can be corroborated in the other streams. For swine surveillance in the U.S., USDA-APHIS monitors the number of swine condemned for specific reasons. Likewise, industry practitioners share front-line clinical information within their practitioner network to detect anomalies. This case summary demonstrates the successful outcome of implementing an EPS pilot program through Federal and industry partnership.

Methods

FSIS Animal Disposition Reporting System swine condemnation data are monitored by USDA-APHIS Veterinary Services (VS) for several condemn conditions, including erysipelas, a bacterial disease of swine. Typically, slaughter condemnations for erysipelas are rare. The monitored data represent 83 market swine harvest facilities throughout the U.S. A modification of the 'C3'CUSUM aberration detection method from the Early Aberration Reporting System (EARS) is applied to the data at both the slaughter plant level and at a larger multi-plant swine catchment basin level which represents separate swine production areas. The National Pork Board (NPB), a U.S. swine producer association, hosts a quarterly conference call with a sentinel network of swine veterinarians to exchange information about anomalies in swine health observed by practitioners. During mid-February 2012, several practitioners suspected a local increase in erysipelas in finishing swine. Absent baseline data on erysipelas occurrence nationally, the scope of the problem was uncertain. Following the call, the NPB in collaboration with VS attempted to validate the information reported by swine practitioners.

Results

Beginning the week of January 8, 2012, VS analysts noted a slight increase in erysipelas CUSUM signaling activity in the greater Iowa catchment basin slaughter plants. During the seven-week period between January 8 and February 25, eight weekly plant-level CUSUM signals were observed, while the previous 36-week period yielded only fourteen plant-level signals. On average, 0.39 signals per week were noted in the weeks prior to the outbreak period while the corresponding average for the seven-week outbreak period was 1.14 plant signals per week. Seven of the eight plants that signaled during the outbreak period did not report large weekly spikes; however, the weekly accumulation of condemns were sufficient to trigger concern. Since the erysipelas signals were not large compared to the background noise, there was uncertainty whether the increased signaling activity truly represented a disease event. After cross validating the slaughter surveillance data with front line practitioner information, a swine health alert regarding the increase in erysipelas cases was issued by the American Association of Swine Veterinarians. Intervention measures were initiated as deemed appropriate by each private veterinarian.

Conclusions

This example of an Enhanced Passive Surveillance Program demonstrates use of independent streams of information from government and private industry to detect an outbreak of erysipelas in market swine. The communication process was facilitated by the NPB and the American Association of Swine Veterinarians, and coordinated with the industry resulting in an appropriate response to prevent swine losses at very early stages of the outbreak. Corroboration and validation between the two data streams (slaughter and practitioner) provided confidence that an outbreak was beginning and assisted the swine industry in decision making to enhance disease prevention activities. This type of early warning and response can reduce the cost of disease outbreaks to swine producers as well as provide confidence in the national disease status for swine in the United States.

Keywords

animal health surveillance; Federal and industry partnership; enhanced passive surveillance; swine erysipelas

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