Introduction to Foodborne Illness Outbreak Investigations

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Each year, an estimated 76 million persons are diagnosed with a foodborne disease; accruing costs of $6.5 billion. Many of these can be attributed to pathogens associated with meat and poultry. Contamination of meat and poultry may occur at any and all points from farm to table; therefore education of producers and consumers is important in the implementation of prevention measures. Investigations to understand the potential mechanisms and sites of contamination, aid in preventing foodborne diseases. The Centers for Disease Control and Prevention (CDC) conducts and collects data on such investigations. An interdisciplinary group of epidemiologists, microbiologists, statisticians, and other public health professionals work to provide data and scientific assessment to other health professionals, industry, the public and regulatory agencies, thus assisting with the translation of knowledge into policy and practice.

The standard public health epidemiological approach to investigation of foodborne illnesses elucidates links between illness and preceding exposure through five stages. The first involves detection of disease and the collection of data that may include formal and informal reporting of illness. Stage two consists of developing possible explanations and hypotheses of the potential exposure and stage three involves testing these hypotheses by measuring the association between illness and exposure. During the fourth stage, investigators reconstruct when and where the exposure might have occurred and the fifth stage includes determination of how the contamination most likely occurred. Improvements in the ability to track the origins of food products are needed to pinpoint the causes of outbreaks and design targeted prevention measures. Cooperation and collaboration among public health partners, laboratories, and industry is essential in the implementation and evaluation of control and prevention strategies.

An integral component of outbreak identification is that of the laboratory investigation. A technique of molecular fingerprinting, pulsed-field gel electrophoresis (PFGE), contributes significantly to case detection and finding, adds precision to the case definition and enables linkage of isolates from patients with those from food products. PulseNet, a national network of public health laboratories, including members from local and state health departments and federal agencies facilitates real-time “fingerprinting” of clinical and food isolates; these fingerprints are submitted via the Internet into a dynamic national database at CDC. Reference to this database facilitates the early identification of common source outbreaks and investigation of known outbreaks.

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Dr. Shane, originally from Baton Rouge, LA received her MD from Louisiana State University School of Medicine, New Orleans, LA, in 1997, MPH from Columbia University School of Public Health, New York, NY in 1992, area of study Sociomedical Sciences, and BS from the University of Pennsylvania, Philadelphia, PA in 1990, area of study Biological Basis of Behaviour. From July 2001 to present, Dr. Shane has been the Epidemic Intelligence Officer, Foodborne and Diarrheal Diseases Branch, National Centers for Infectious Disease Centers for Disease Control and Prevention, Atlanta, GA. May 2000 to June 2001 she was the Pediatric Chief Resident, Children's Hospital at Montefiore, Albert Einstein, College of Medicine, Bronx, NY. In 1999, she was the recipient of grant to participate in Physician Exchange Program, Beijing Children's Hospital, Beijing, China

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