

Study: Risk factors for sporadic Shiga toxin-producing *Escherichia coli* O157 infections in FoodNet sites, 1999-2000

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Shiga toxin producing *E. coli* O157 (STEC O157) is a bacteria that causes acute gastroenteritis with abdominal cramps and profuse, often bloody, diarrhea. About 8% of those infected progress on to develop hemolytic uremic syndrome (HUS), a potentially life threatening condition comprised of acute renal failure, anemia and thrombocytopenia. Contaminated food in the United States is thought to be the main route to infection.

Between 1996 and 1999, the US Department of Agriculture's Food Safety Inspection Service implemented the Pathogen Reduction Hazard Analysis and Critical Control Point System (HACCP), which was designed to reduce bacterial contamination of meat and poultry to be sold in stores in the US. When HACCP was first implemented in 1996, the Centers for Disease Control and Prevention's Emerging Infections Program: Foodborne Diseases Active Surveillance Network (FoodNet) conducted a case-control study of sporadic (non-outbreak) STEC O157 cases and identified ground beef and farm visits as sources of sporadic infection. This paper summarizes risk factors identified during a subsequent case-control study, implemented from 1999-2000.

In 1999-2000, FoodNet conducted a study of risk factors for sporadic STEC O157 infections in Connecticut, Georgia, Minnesota, Oregon and selected counties in Maryland, California and New York. The study area covered about 11% of the US population and included 283 patients infected with STEC O157 and 534 healthy controls. The patients and controls were interviewed by telephone and asked about exposures to food, water and animals in the seven days before illness began.

STEC O157 infection was associated with eating undercooked (pink) hamburgers, drinking untreated water from ponds, lakes, rivers or streams, and contact with cattle, either living, working on, or visiting a farm. Infection was not associated with eating in restaurants, or purchasing meat from custom slaughter houses. This study also showed a protective effect of a diverse diet that was high in fruits and vegetables. Although contaminated produce has led to outbreaks of STEC O157, the benefits of a diet high in fruits and vegetables appear to outweigh the potential risk of consuming produce that may be contaminated with STEC O157.

Most study participants were aware of and practiced proper food safety techniques. The vast majority washed their hands and food preparation areas while preparing meat. About half of respondents placed ground beef into separate plastic bags at the grocery store before putting the meat into the cart with the other groceries. In spite of knowing proper techniques, consumption of undercooked ground beef continued to be an important route of infection through 2000. Only 2-3% of participants cooked with a meat thermometer to determine proper cooking temperatures, and education of consumers remains an important deterrent to infection.