

FSIS Foodborne Illness Outbreak Investigations Overview

Introduction

The United States Department of Agriculture's Food Safety and Inspection Service (FSIS) is the public health regulatory agency responsible for ensuring the nation's commercial supply of meat, poultry, and egg products is safe, wholesome, and correctly labeled and packaged. The Office of Public Health Science's Applied Epidemiology Staff coordinates the FSIS response to foodborne illness outbreaks that may involve FSIS-regulated products. This includes outbreaks that involve four foodborne pathogens that most frequently affect FSIS-regulated products—*Salmonella*, Shiga toxin-producing *Escherichia coli* (STEC), *Listeria monocytogenes* (Lm), and *Campylobacter*.

Outbreak Notification

FSIS may be notified of foodborne outbreaks from federal, state, or local public health partners, including the Centers for Disease Control and Prevention (CDC). FSIS also monitors CDC's [PulseNet database](#) and [Epidemic Information Exchange](#) (Epi-X), media reports, foodborne listservs, and consumer complaints to identify illnesses that may be associated with FSIS-regulated products.

Investigating Outbreaks

A foodborne outbreak occurs when two or more persons experience a similar illness after ingestion of a common food, and epidemiologic analysis implicates the food as the source of the illness. An outbreak may occur in a restricted geographical area or may extend over multiple states or countries. For more information about foodborne outbreaks, visit the [CDC Foodborne Outbreaks Web Page](#).

When there is compelling evidence that reported foodborne illnesses are possibly associated with FSIS-regulated products, FSIS collaborates and coordinates investigative activities with public health partners in accordance with [FSIS Directive 8080.3](#), *Foodborne Illness Investigations*. For outbreaks involving ill people from more than one state, FSIS investigates in coordination with the CDC and state and local public health partners. Outbreak investigations involving ill people from a single state are coordinated with the state or local health department.

FSIS collects and evaluates epidemiologic, laboratory, and traceback information to determine if there is an association between an FSIS-regulated product and human illnesses. When that determination is made, FSIS may initiate response actions to prevent additional illnesses.

Epidemiologic Information

Epidemiologic information includes details from ill people such as where they live, when they got sick, what foods they consumed, and where and when they purchased these foods. Additional specifics on food exposures, for example, reports of eating ground beef that was undercooked, are also helpful when trying to determine a food vehicle. Health officials conduct interviews with ill people to gather epidemiologic information and use interview data to identify potential commonalities that may point to the illness source. In addition to looking for common food exposures among ill people, health officials also compare interview data to historical food exposure data to determine if ill people are reporting an exposure (e.g., ground beef) more than would normally be expected.

Laboratory Information

Laboratory information includes a comparison of bacteria collected from people, foods, animals, or the environment to see if the bacteria are genetically similar. FSIS, CDC, and other federal, state, and local public health partners collect and analyze samples, and use laboratory technology to identify and investigate outbreaks of foodborne illness. In April 2019, FSIS laboratories discontinued use of pulsed-field gel electrophoresis (PFGE) and fully transitioned to whole genome sequencing (WGS), a powerful tool that assesses genetic similarities between foodborne bacteria. WGS is used to detect differences (mutations) within the genetic code (genome) that distinguish how closely, or distantly related bacteria are from each other. Generally, a pair or group of bacteria distinguished by very few mutations are more closely related and more likely to share a common source. WGS helps scientists and investigators generate ideas about what food product might be making people sick and can help to direct resources and guide next steps during an investigation.

Traceback Information

When detailed information about the foods ill people consumed is available (e.g., purchase information and packaging details such as brand name, lot codes, and establishment number), investigators conduct traceback to determine if there is a common source, such as where the products were sold, distributed, or produced. Food purchase information such as paper receipts and transaction records from store loyalty programs or meal delivery services can provide details about what people ate prior to becoming ill. Additionally, credit card transactions pulled from a store system can provide purchase records. In some cases, consumers may have leftover packaging in their home with details that can be shared with public health investigators. Public health investigators limit information requests to information relevant to the investigation, protect personally identifiable information, and only share information with other public health partners on a need to know basis to investigate the outbreak. Once the purchase location and product details are available, investigators may collect additional records and conduct an environmental assessment at a restaurant or retail location to determine if there are factors that may be related to the outbreak. For example, environmental assessment findings may reveal that a product was not properly cooked or handled and if there were opportunities for cross-contamination.

Detailed product information, along with invoices, are important for investigators to trace a product from a retail location or restaurant back to a federally-inspected slaughter or processing facility. Once an FSIS-regulated establishment is identified, investigators may gather additional information and review processes at the establishment to determine if there are any findings that may be related to the outbreak.

FSIS Response Actions

Depending on the evidence collected during an investigation, FSIS may have enough detailed exposure and product information to take actions to prevent additional illnesses. Actions may include requesting an establishment to recall product associated with the outbreak from commerce and issuing a press

release announcing that a federal establishment is voluntarily recalling product(s) linked to human illnesses or notifying the public of potential food safety concerns through the issuance of a public health alert. FSIS will verify that the establishment takes corrective actions to address any problems and verify the establishment produces safe and wholesome meat or poultry products. If the establishment has significant problems, FSIS may suspend inspection services or can withhold the mark of inspection until the establishment implements corrective actions that support continued production of products that meet regulatory requirements.

Learning from Outbreaks

Assessment of outbreaks associated with FSIS-regulated products is crucial to the Agency's mission to protect public health. FSIS conducts after-action reviews at the conclusion of foodborne outbreak investigations in accordance with [FSIS Directive 8080.3](#) to identify lessons learned that can improve response and prevent future illnesses. Applying and sharing outbreak lessons learned can inform [food safety research priorities](#), lead to improved food safety policies, strengthen collaborative investigations with public health partners, and improve transparency with the public.

To view FSIS after-action review reports and examples of how FSIS applies outbreak lessons learned toward illness prevention, visit [Outbreak Investigations: Response](#).

Contact and Questions

For more information, contact [askFSIS](#).