



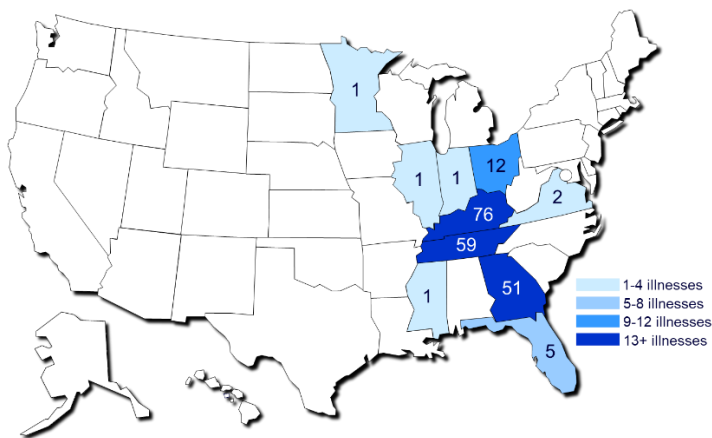
E. coli O103 Outbreak Linked to Ground Beef

Outbreak Investigation After Action Review, Report 2019-07

Highlights

- This outbreak of 209 *E. coli* O103 illnesses was the largest outbreak of non-O157 Shiga toxin-producing *E. coli* ever involving an FSIS-regulated product in the United States.
- Complex traceback efforts identified 253 firms throughout the supply chain, including point-of-purchase locations, warehouses, distributors, federal establishments, and live animal suppliers. This includes facilities that grind beef sourced from numerous suppliers. Ground beef traceability throughout the supply chain is essential to investigate ground beef-associated outbreaks.

People infected with *E. coli* O103 by state of residence



Outbreak at a Glance

Illnesses	209
States included	10
Hospitalizations	29
Hemolytic uremic syndrome (HUS) cases	2
Deaths	0

Response at a Glance

Ill people with information to trace ground beef	21
Firms identified through traceback	253
In-plant assessments	5
Samples tested by FSIS	98
Recall or Public Health Alert	Yes

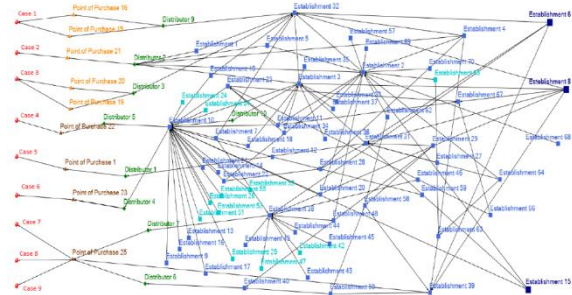
Process improvements

During this outbreak, FSIS began using editor's notes (like in recall [047-2019](#)) to highlight what is known about the relationship between recalls and ongoing investigations.

Using feedback from state partners, FSIS updated [Directive 10,000.1](#) to streamline the review process for the Agency to use results from non-FSIS laboratories to take a regulatory action.

What happened?

From March 29 to June 20, 2019, public health officials in multiple states, the Centers for Disease Control and Prevention (CDC), and the Food Safety and Inspection Service (FSIS) investigated an outbreak of 209 *E. coli* O103 illnesses linked to ground beef. The outbreak strain of *E. coli* O103 was identified in a ground beef sample and the product was recalled. A second ground beef sample collected as part of the investigation also tested positive for *E. coli* O103, but genetic characterization showed this was a non-outbreak strain and there were no human illnesses linked to this product.



Traceback diagram used during the E. coli O103 outbreak investigation. These diagrams allow investigators to visualize connections among suppliers of foods consumed by ill people.

Although investigators carried out an extensive traceback investigation, they did not identify a common source of ground beef consumed by ill people. Based on traceback evidence, FSIS identified five FSIS-regulated establishments of interest to conduct in-plant assessments and collect beef trim samples. All samples collected from these establishments tested negative for *E. coli* and in-plant findings did not indicate that conditions in the establishments contributed to the outbreak.

What we learned from this outbreak

Recordkeeping



The traceback investigation during this outbreak was complicated, with ground beef incorporating source materials from several suppliers and passing through multiple federal establishments prior to being available for purchase by consumers. Adequate recordkeeping throughout the ground beef supply chain is imperative to identify commonalities during outbreak investigations and prevent additional illnesses.

Communication



Editor's notes, like those included in FSIS recall announcements during this outbreak, are an effective way to inform consumers about new developments since the recall was published. Editor's notes are updated as more information, such as genetic sequencing data, become available to provide consumers with updated information.



Collaboration

When reviewing and evaluating complex traceback information, FSIS found that working in small teams with representatives from the CDC made collaboration more efficient and effective.

What can you do to prevent or solve the next outbreak?

Industry	Public Health Partners	Consumers
<p>Federal establishments and retail stores that grind raw beef products are required to maintain complete and accurate records, including information on the source of raw beef (lot codes, establishment number, production dates), dates and times when ground beef is produced, and when grinding equipment is cleaned and sanitized. This information allows investigators to trace ground beef purchases during outbreaks.</p>	<p>Continue to work closely with local, state, and federal partners to detect and investigate outbreaks. Email FoodborneDiseaseReports@usda.gov to notify FSIS if FSIS-regulated products may be involved in an outbreak.</p>	<p>Always handle ground beef safely and cook to an internal temperature of 160 F. Documentation (e.g., receipts) showing what you purchased can provide useful information to help determine what is making people sick and help solve outbreaks. Consider how you purchase food and what types of information (shopper cards, delivery apps, receipts) could help public health partners investigate.</p>

Helpful Links

- [Kentucky Health Alert](#), March 29, 2019
- [FSIS Recall 047-2019](#), April 23, 2019
- [FSIS Recall 048-2019*](#), April 24, 2019
- [CDC Food Safety Alert](#), June 19, 2019
- [Report a Problem with Food](#)
- [More information about FSIS' response to foodborne outbreaks](#)
- [Ground Beef and Food Safety](#)

*Recall occurred during the outbreak investigation as a result of a product positive; however, the isolate did not match the outbreak strain and the recalled product was not linked to human illnesses