



# Review of the Adequacy of Ground Beef Production Records at Retail Markets for Traceback Activities During Foodborne Disease Investigations

Ihry T<sup>1</sup>, White P<sup>1</sup>, Green A<sup>2</sup>, Duryea P<sup>3</sup>

<sup>1</sup> Applied Epidemiology Division, Food Safety and Inspection Service, U.S. Department of Agriculture, Omaha, NE, <sup>2</sup> Applied Epidemiology Division, Food Safety and Inspection Service, U.S. Department of Agriculture, Minneapolis, MN, <sup>3</sup> Policy Development Division, Food Safety and Inspection Service, U.S. Department of Agriculture, Omaha, NE

## Abstract

**Background:** Consumption of undercooked ground beef contaminated with bacteria, typically *E. coli* O157:H7 or *Salmonella*, is a well known cause of foodborne illness. In order to recall product associated with illness from commerce and identify opportunities to improve product safety, the Food Safety and Inspection Service (FSIS) investigates reports of foodborne illness that may be associated with FSIS-regulated products. In many circumstances where ground beef was purchased at retail stores, investigators are provided only with purchase information (e.g., date and location of purchase, description of ground beef). Investigators must then rely heavily on retail production records (grinding logs) kept in retail stores and meat markets to gather the information needed to undertake traceback actions.

**Methods:** FSIS conducted a retrospective review of 28 investigations from October 2007 through September 2011 in which beef products were ground or re-ground at retail stores to describe their beef grinding and record-keeping practices. Case-patients included in the study provided information adequate to facilitate identification of the product in question, including the product identity and date and location of purchase. Investigators gathered this information through purchase receipts, shoppers' cards, and credit card records.

**Results:** 23 (82%) of the 28 investigations involved *E. coli* O157:H7; the remaining five (18%) investigations involved *Salmonella* spp. In 11 (39%) of 28 investigations grinding logs were kept and complete enough to determine the identity of products used to make ground beef at retail facilities. Production records were either incomplete or not kept at retail in the 17 other investigations. In 6 of the 11 (55%) investigations with complete production logs, FSIS successfully traced product back to source establishments and recalled potentially contaminated products. In contrast, FSIS conducted only 2 recalls in the remaining 17 investigations.

**Conclusions:** The review of ground beef production records in retail facilities during foodborne illness outbreaks shows that records are often not maintained so that investigators can identify the source product. Inadequate records impeded the agency's ability to quickly respond during foodborne disease investigations. Detailed retail grinding logs and policies that prevent cross-contamination between batches of ground beef products are crucial in the identification of contaminated beef products associated with foodborne illness. Clear guidance or best practices regarding proper in-store production records will facilitate needed changes in retail markets' ground beef policies and recordkeeping activities.

## Methods

Investigators from the FSIS Applied Epidemiology Division retrospectively reviewed outbreak clusters initiated from October 1, 2007 through September 30, 2011. Of the investigations associated with ground beef, the following selection criteria were used:

- The illnesses were presumptively or definitely caused by consumption of ground beef
- Beef was ground or re-ground at one or more retail meat markets, which was not an official establishment regulated by FSIS
- The name of the retail market that sold the ground beef, the name of the product, and the date that it was purchased were available

During the active investigation of the outbreaks, the retail markets selling implicated ground beef were identified by state or local investigators and shared with federal partners, including FSIS. Purchase information was available from receipts or credit card and shoppers' card summaries.

Purchase information was used, in conjunction with store policy, to determine the product type and time of production. In a number of outbreaks, more than one store production lot may potentially have been purchased by case-patients.



State or local health departments or FSIS collected retail production records (grinding logs) correlating to ground beef available for purchase. FSIS reviewed all records and the facility operations to determine the possible sources of ground beef or trim used. Supplemental investigative data were reviewed as necessary to determine the presence and adequacy of the grinding logs.

For each outbreak investigation, retail production records were categorized using the table below\*:

- Complete production records—logs from at least one implicated retail store contained the minimum necessary information to identify the product used to make the retail lot(s) of interest.
- Incomplete production records—logs from at least one retail store was available, but information was not adequate to identify the source and identity of products used to make the lot(s) of interest.
- No production records—logs from any implicated retail store were not available for review

\*If more than one store was the apparent source of contaminated ground beef, the records for that investigation were categorized by the record meeting the highest classification (e.g., if three stores were implicated and two did not keep production records but one kept records with all necessary information, the records were categorized as complete.)

### Retail Production Information Used to Identify Source Material

Required Information	Example
Description of product made by the retail market	85/15 Ground Chuck
Date/time of production by the retail market**	Sell by 02-14-2012**
Description(s) of source material	85% Ground Chuck or Choice beef rounds, IMPS # 185A
Establishment(s) that produced the source material, either name and address or official establishment number	Big Beef Processor, Anytown, Anystate or Est # 01234M
Product lot number(s) of source material	Lot # 20120209

\*\* Depending on store practices, multiple options exist to indicate when beef was ground.

## Results

- 46 outbreaks were attributed to consumption of contaminated ground beef
- 28 outbreaks met the inclusion criteria
- 23 (82%) were caused by *E. coli* O157:H7; 5 (18%) were caused by *Salmonella* serotypes
- Records for 11 (39%) of 28 investigations were available and complete enough to identify the supplying FSIS regulated establishments and the causal vehicle.
- FSIS conducted a recall of the implicated product in 6 (55%) of 11 investigations with complete records.
- FSIS conducted a recall of the implicated product in 2 (12%) of 17 investigations without complete records. In both investigations, source product with PFGE indistinguishable to clinical isolates was found.

### FSIS Product Recalls by Record Status

Record Status	# of Records	# (%) of Recalls
Available and complete	11	6 (55%)
Records not available	11	1 (9%)
Records incomplete	6	1 (17%)



## Discussion

Consumption of undercooked ground beef is a well-recognized cause of illnesses. However when beef is ground at retail, FSIS actions are often limited because production records are not available or are inadequate to identify the source and specific product that caused illnesses.

FSIS determined production records were adequate to identify the specific implicated product and its source establishment in 11 (39%) of 28 outbreaks in which beef was ground or re-ground in retail markets.

This issue has been noted previously by others as well.

- A FoodNet survey of 125 retail stores producing ground beef found that 61 (49%) of the retail stores kept grinding logs. However, only 22% of records included all information necessary so that investigators could have completed a trace back.<sup>1</sup>
- Three published ground beef-related outbreaks from 2002 through 2011 showed that poor production records, compounded with failure to clean and sanitize equipment between grinds, precluded determination of the causal product.<sup>2,3,4</sup>

FSIS needs complete production records during trace back to identify the source establishment, the implicated product, and its production lot.

Complete production records allow FSIS to take action, often resulting in a voluntary establishment-level recall of implicated product. In addition, complete records allow investigators to assess operations to determine whether there were food safety lapses.

Less-specific information reduces FSIS's ability to take action. However some actions, such as store-level recalls or food safety assessments in the implicated establishments, may still be taken.

FSIS is considering whether to publish federal rules and best-practices to provide more explicit guidance on the use of retail production records.

## Recommendations

FSIS recommends

- Retail stores develop policies and procedures to accurately record and keep information;
- Include production records, product stocking- and pull-times, sanitizing techniques, and procedures to determine customer purchases; and
- While not required, the example production record coupled with appropriate store policy and procedures; make it likely that retail stores could identify the specific product they sold as necessary.

Further information is available from FSIS at the Web site:

[http://www.fsis.usda.gov/PDF/Sanitation\\_Guidance\\_Beef\\_Grinders.pdf](http://www.fsis.usda.gov/PDF/Sanitation_Guidance_Beef_Grinders.pdf)

## Example of Recommended Retail Production Record

Output: Product made in store for sale						Input: Product used by store			Grinder Cleaned and Sanitized Between Source Materials? If Y, Date and Time	Comments/Employee Initials
Time of Grind	Lot/ Batch Number (lot = same source material)	Exact Name/ Type of Product Produced	Package Size of Product Produced	Amount (in pounds) of Product Produced	Production Code of Product Produced	Manufacturer, Name of Source Material Used for Product Produced	Supplier Lot Numbers, Product Code and/or Pack Date of Source Material Used	Establishment Information from label of Source Product Used (Est. #, ph #, contact info)		
0700-1000 AM	Lot 001	91/9 New Wave Ground Chuck	Catch-weight retail trays	1,250 lbs total of 91/9 Ground Chuck	121511-01 NWGB Sell-by 12/20/11	Boneless Chuck, twenty-one 60 lb boxes from USA Beef Company	@B120311USA Packed on 12/03/11; @B120411USA Packed on 12/04/11	Est. 00321 M (202)-123-4567, 898 Dodge St. Omaha, NE. 68104	Yes 12/14/11 10:15AM	Cleaned and sanitized grinder after Lot 001 JSW



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## References

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## Background

FSIS is the public health agency in the U.S. Department of Agriculture responsible for ensuring that the nation's commercial supply of meat, poultry, and egg products is safe, wholesome, and correctly labeled and packaged.

During the production of ground beef, contamination from the surface of carcasses may be translocated to the interior of the ground product. It is thus protected from thermal destruction, unless the ground beef is cooked to a safe internal temperature.

## Beef trim



During investigations that implicate ground beef that was ground or re-ground at a retail meat market, production records (grinding logs) are critical in leading investigators to the source of the contaminated ground beef. Accurate and complete information identifying the product that was used to make ground beef and its source allows FSIS to trace it back to the producing establishment. Investigators determine the circumstances that led to contamination and take appropriate remedial and preventive action.

FSIS relies on records maintained by industry to trace product back to its source and trace it forward to others who may have used the ground beef made from the same components. In particular, 9 CFR 320.1 specifies the types of information that businesses must keep (e.g., bills of sale, bills of lading, and receiving or shipping documents). More information on details and suggested examples may help retail facilities implement practices that fully identify the source material used.

## Ground beef chub



When FSIS-regulated products are suspected or implicated during a foodborne illness investigation, FSIS uses a multi-disciplinary approach to the investigations. FSIS collaborates with local, state, territorial, and other federal public health partners to identify the source and minimize negative health impacts. Within FSIS, inputs from epidemiologists, microbiologists, in-plant regulatory experts, and compliance inspectors are used to determine the causal vehicle and take regulatory actions.

Ground beef has been frequently identified as a vehicle for illnesses caused by Shiga toxin producing *Escherichia coli* (STECs), primarily *E. coli* O157:H7, and also by *Salmonella*. In retail meat markets, ground beef is typically made from two sources: chubs are plastic tubes of beef previously ground in regulated establishments; trim consists of small pieces of beef remaining after larger cuts are processed into steaks or roasts within the retail store.